Sanitary sewer line replacement
Blanc Sablon's terminal
Airport Road, G0G 1W0
Project number : R.103205.001

Construction specifications

ISSUED FOR SUBMISSION
April 12, 2019

Les
ARCHITECTES
Odette Roy et Isabelle Jacques inc.

11525, 1ère avenue, Ville de Saint-Georges (Québec) G5Y 2C7
T.418.228.7543 E. architectes@royjacques.net

NORDA STELO

1 GENERAL

1.01 CONSULTANT

.1 Main expert advisor:
Odette Roy, architect
Les Architectes Odette Roy et Isabelle Jacques Inc.

.2 Under expert advisor in mechanics and electricity
Jean-Michel Tremblay, engineer
Norda Stelo Inc.

Marc-André Perron, engineer
Norda Stelo Inc.

.3 Under expert advisor in civil
Alexandre Paradis, engineer
Norda Stelo Inc.

END OF SECTION

SPECIFICATIONS AND DRAWINGS

SECTION **SUBJECT** **PAGE**

DIVISION 00 - REQUIREMENTS RELATING TO THE SUPPLIES AND THE CONTRACTS

DIVISION 1 - GENERAL REQUIREMENTS

DIVISION 2 - EXISTING CONDITIONS

DIVISION 6 - WOOD, PLASTICS AND COMPOSITES

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

DIVISION 9 – FINISHES

DIVISION 22 - PLUMBING

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING

DIVISION 26 – ELECTRICAL

DIVISION 31 - EARTHWORK

DIVISION 32 – EXTERIOR IMPROVEMENTS

DIVISION 33 – UTILITIES

DRAWINGS LIST

DIVISION A - ARCHITECTURE - ARCHITECTURE

Q131Q605A015 Architecture – Démolition / Réaménagement
Architecture – Demolition / Redevelopment

DIVISION C – CIVIL – CIVIL

Q131Q605C001 Civil – Plan view and typical detail

DIVISION E – ELECTRICITÉ - ELECTRICITY

Q131Q605E008 Electricity – Plan view and details
Q131Q605E009 Electricity – Distribution panel and details

DIVISION M – MÉCANIQUE - MECHANICAL

Q131Q605M009 Mechanical – Plumbing – Dismantling – Plan views
Q131Q605M010 Mechanical – Plumbing – Proposed – Plan views
Q131Q605M011 Mechanical – Plumbing – Dismantling / Proposed – Details

DIVISION S – STRUCTURE - STRUCTURAL

Q131Q605S006 Structure – Concrete – Dismantling / Proposed - Details

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 14 00 Works restrictions

.2 Section 01 56 00 Temporary barriers and enclosure

1.2 SCOPE OF WORK - ELECTRICITY

.1 Architecture: Works as described hereunder are not exhaustive and will take place by phase. Works are described more specifically in documents, plans and drawings.

- .1 Provide and install all necessary equipment to perform the following works by phase 1 – 2 – 3 (non-exhaustive list):
  - .1 Demolition: partitions, ceramic, flooring, vanity and w.-c. partition
  - .2 Reconstruction: partitions, ceramic, painting. Vanity and w.-c. partition to reinstall

.2 Mechanics: The works described below are not limiting. These works are defined more specifically in documents and drawings. It is understood that all devices or accessories necessary for a complete and functional installation must be provided and installed, even if they are not specifically described.

- .1 General
  - .1 The mechanical construction work of the sanitary blocks and the drinking water supply have to be carried out in three phases::
    - .1 Phase 1: Work on water supply;
    - .2 Phase 2: Sanitary block drainage works (men);
    - .3 Phase 3: Sanitary block drainage works (women).
  - .2 Water supply and drainage work don't have to be done at the same time.
- .2 Drinking water supply – Phase 1
  - .1 Retrieve the existing water inlet and relocate it to the small wardrobe.
  - .2 Make the connections and the seals as shown on the drawing.
- .3 Sanitary block (men) – Phase 2
  - .1 Remove the equipment.
  - .2 Remove concrete and ceramic floor, as shown on plan
  - .3 Excavate and remove existing pipes.
  - .4 Install new pipes as shown on plan
  - .5 Backfill and redo the concrete floor
  - .6 Reinstall sanitary equipment
- .4 Sanitary block (women) – Phase 3
  - .1 Same steps as sanitary block (men).
- .5 This work sequence at the sanitary block level allows to always having a mixed operational sanitary block (men/women) inside the terminal.

.3 Civil: The works described below are not limiting. These works are defined more specifically in documents and drawings. It is understood that all devices or accessories necessary for a complete and functional installation must be provided and installed, even if they are not specifically described.

.1 Water distribution

.1 Make the excavation trench for the new drinking water supply line.

.2 Supply and install the new drinking water supply line.

.3 Connect the new water line to the water supply well as shown on the plan

.4 Supply and install the new pump into the water supply well as shown on the plan

.5 Make the concrete slab around the water supply well as shown on the plan

.6 Provide and install the insulated cover of the water supply well as shown on the plan.

.7 Decommission the existing water supply line

.8 Backfill the new drinking water line as shown on the plan.

.9 Provide landscaping for areas that have been excavated fo passage of the new water supply line.

.2 Sanitary drainage

.1 Make the saw cuts on the pavement around the excavations for the new sanitary drainage pipe.

.2 Make the excavation trench for the new sanitary drainage pipe.

.3 Supply and install the new sanitary line

.4 Connect the new sanitary sewer to the existing septic tank.

.5 Decommission the existing outdoor sanitary sewer.

.6 Backfill the new sanitary line as shown on the plan

.7 Provide and set up the pavement foundation and new pavement

.4 Electrical: The works described below are not limiting. These works are defined more specifically in documents and drawings. It is understood that all devices or accessories necessary for a complete and functional installation must be provided and installed, even if they are not specifically described.

.1 For the 32 mm drinking water pipe and the pumping well

.1 Dismantle the existing power cable from the well pump and existing heating cable.

.2 Supply, install, connect and identify new electrical equipment (buried power cable, disconnectors, heating cable, thermostat and control accessories) as shown on plans and specifications.

.2 For 100 mm ductile iron pipe - sanitary

.1 Supply, install, connect and identify new electrical equipment (power cable, disconnector, heating cable, thermostat and control accessories) as shown on plans and specifications.

1.3 WORKS EXECUTION

.1 Executing the work according phases, so that the Departmental Representative could use the premises continuously during the works. Keeping temporary and safe accesses on the premises for the public while the work progress condition prevents from covering the usual accesses.

.2 Coordinating the work progress schedule according to the occupancy of the premises.

.3 Work sequences (by phase see plan A015)

.1 The building will remain occupied and functional by the Departmental Representative for all the duration of the work completion. All the activities of the terminal must be maintained without interruption.

.2 Building occupancy

.1 The premises are occupied from 7 A.M. to 8 P.M. except premise #11 which is occupied 24/7 without interruption.

.3 Outside entrances

.1 The work must be made in order to maintain a functional access on each of the façade, on the parking side

.4 Interior work (functional phasing see A015)

.1 Work will have to be performed at night from 8 P.M. to 5 A.M except outside works.

.2 All systems must be functional every morning:

.1 Electricity
.2 Heating
.3 Lighting
.4 Computers
.5 Telephony and other services

.3 The premises clean, dust and material free and that, every morning, the furniture that had been moved to perform the work must be put back in place. The protection plastic for the computer equipment will be removed.

.4 The contractor will have to demobilize every day because no material or tool or equipment will be tolerated in the premises except machinery room # 8 and electrical room # 9 and the areas where work is performed.

.5 Ceilings

1 The suspended ceilings that will be disassembled by section for passage of the mechanics will have to be temporarily fixed / supported to ensure the safety of users at all time. Plan for the required fixings; no element that are not adequately fixed will tolerated.

2 Plan for appropriate temporary installations when services will have to be interrupted.

.4 Construct Work in stages to provide for continuous public usage.

.5 Maintain fire access/control;

1.4 CONTRACTOR USE OF PREMISES

.1 Limit use of premises for Work, for storage, and for access, to allow:
- .1 Ministerial representative occupancy.
- .2 Public usage.
- .3 All interventions of the contractor must be coordinated the Departmental representative.

.2 Co-ordinate use of premises under direction of Ministerial representative.

.3 The contractor cannot circulate on the runway side without the permission of the Departmental representative.

.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 Ministerial representative.

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

1.5 MINISTERIAL REPRESENTATIVE OCCUPANCY

.1 No subject

1.6 PARTIAL OWNER OCCUPANCY

.1 No subject

1.7 PRE-ORDERED PRODUCTS AND PRE-BID WORK

.1 No subject

1.8 PRE-PURCHASED EQUIPMENT

.1 No subject

1.9 MINISTERIAL REPRÉSENTATIVE FURNISHED ITEMS

.1 No subject

1.10 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to occupants, public and normal use of premises. Arrange with Ministerial representative to facilitate execution of work.

1.11 EXISTING SERVICES

.1 Notify, Ministerial representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Ministerial representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian, vehicular traffic and tenant operations.

.3 Provide alternative routes for personnel, pedestrian and vehicular traffic.

.4 Establish location and extent of service lines in area of work before starting Work. Notify Ministerial representative of findings.

.5 Submit schedule to and obtain approval from Ministerial representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.6 Provide temporary services when directed by Ministerial representative to maintain critical building.

.7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.8 Where unknown services are encountered, immediately advise Ministerial representative and confirm findings in writing.

.9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.10 Record locations of maintained, re-routed and abandoned service lines.

.11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.12 DOCUMENTS REQUIRED

.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.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 11 01 General information of work

.2 Section 01 35 13.13 Special procedures for airport facilities

1.2 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including runways, ramps and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.3 USE OF SITE AND FACILITIES

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

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

.3 Where security is reduced by work provide temporary means to maintain security.

.4 . The contractor is responsible for providing the temporary sanitary facilities for his employees and other contractors. The use of the washroom is forbidden at all time.

.5 without object.

.6 Closures: protect work temporarily until permanent enclosures are completed.

1.4 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 Ministerial representative to facilitate execution of work.

1.5 EXISTING SERVICES

.1 Notify, Ministerial Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Ministerial Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for personnel, pedestrian and vehicular traffic.

.4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures .

1.6 SPECIAL REQUIREMENTS

.1 Occupied areas Monday to Sundays from 07:00 to 20:00 hours only.

.2 Carry out noise generating Work from 20:00 to 05:00 hours.

.3 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedule - Schedule - Bar (GANTT) Chart.

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

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

.6 Ingress and egress of Contractor vehicles at site is limited and will be decided with the Departmental representative. The contractor will have to inform the Departmental representative to park in “city area”

.7 Deliver materials outside of peak traffic hours 20:00 to 07:00 unless otherwise approved by Ministerial Representative.

.8 A copy of key will be transmitted to the contractor by the Ministerial Representative in order to reach the building during the night-works.

1.7 SECURITY

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

.2 Security clearances:
- .1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.
- .2 Obtain requisite clearance, as instructed, for each individual required to enter premises.
- .3 Contractor's personnel will require satisfactory RCMP initiated security screening in order to complete Work in premises and on site.
- .4 The contractor will have to take a SGS training given by the Department before performing the work in controlled area.

.3 Security escort:
- .1 Personnel employed on this project must be escorted when executing work in non-public areas during normal working hours. Personnel must be escorted in all areas after normal working hours.
- .2 Every escort request needs to be asked and coordinated directly by the contractor with the escort company. The Ministry representative does not manage the requests, however he must be informed of all the requests done by the contractor. The escort requests must be formulated to the escort company at least 14 days in advance. If the request are submitted in the deadline prescribed, the escort cost will be paid by the Ministry representative. On the other hand, all the inherent costs to late requests have to be all paid by the contractor.
- .3 Any escort request may be cancelled free of charge if notification of cancellation is given at least 4 hours before scheduled time of escort. Cost incurred by late request will be Contractor's responsibility.
- .4 Calculation of costs will be based on average hourly rate of security officer for minimum of [8] hours per day for late service request and of [4] hours for late cancellations.

1.8 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions. Smoking is not permitted.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 32 16.07 Construction progress schedule – bar (gantt) chart.

1.2 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of Ministerial Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting [four] days in advance of meeting date to Ministerial Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.7 Reproduce and distribute copies of minutes within 3 days after meetings and transmit to meeting participants and, affected parties not in attendance Ministerial Representative.

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

1.3 PRECONSTRUCTION MEETING

.1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Senior representatives of Ministerial Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 10 days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include:

- .1 Appointment of official representative of participants in the Work.
- .2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
- .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
- .5 Delivery schedule of specified equipment in accordance with Section 01 61 00 Common product requirements.
- .6 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures .
- .7 Proposed changes, change orders, procedures, approvals required, mark-up

percentages permitted, time extensions, overtime, administrative requirements.
.8 Owner provided products.
.9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
.10 Maintenance manuals in accordance with Section [01 78 00 - Closeout Submittals].
.11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
.12 Monthly progress claims, administrative procedures, photographs, hold backs.
.13 Appointment of inspection and testing agencies or firms.
.14 Insurances, transcript of policies.

1.4 PROGRESS MEETINGS

.1 During course of Work and 2 weeks prior to project completion, schedule progress meetings.

.2 Contractor, major Subcontractors involved in Work and Ministerial Representative and Owner are to be in attendance.

.3 Notify parties minimum 7days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.

.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 affect on construction schedule and on completion date.
.12 Other business.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 11 00 General information of work

.2 Section 01 14 00 Work restrinctions

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 day 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 major deliverable.

.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 Ministerial 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 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 Ministerial Representative within 14 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 Ministerial Representative within 5 working days of receipt of acceptance of Master Plan.

1.5 PROJECT MILESTONES

.1 Project milestones form interim targets for Project Schedule.
- .1 Excavation completed within 30 working days of Award of Contract date.
- .2 Substructure completed within 30 working days of Award of Contract date.
- .3 Superstructure completed within 30 working days of Award of Contract date.
- .4 Building closed-in and weatherproofed within 60 working days of Award of Contract date.
- .5 Interior finishing and fitting, mechanical, and electrical work completed within 90 working days of Award of Contract date.
- .6 Interim Certificate Substantial Completion within 150 working days after the start date of work.

1.6 MASTER PLAN

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

.2 Ministerial Representative will review and return revised schedules within 5 working days.

.3 Revise impractical schedule and resubmit within 5 working days.

.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 includes as minimum milestone and activity types as follows:
- .1 Award.
- .2 Shop Drawings, Samples.
- .3 Permits.
- .4 Mobilization.
- .5 Demolition.
- .6 Excavation.
- .7 Backfill.
- .8 Building footings.
- .9 Slab on grade.
- .10 Interior Architecture (Walls, Floors and Ceiling).
- .11 Plumbing.
- .12 Lighting.
- .13 Electrical.
- .14 Piping.
- .15 Heating.
- .16 Millwork.
- .17 Testing and Commissioning.
- .18 Supplied equipment long delivery items.

.19 Ministerial representative supplied equipment required dates.

1.8 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.

.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.

1.9 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

.2 Weather related delays with their remedial measures will be discussed and negotiated.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 45 00 Quality control.

.2 Section 01 61 00 Common product requirements.

.3 Section 01 78 00 Closeout submittals

1.2 REFERENCE STANDARDS

.1 Without object.

1.3 ADMINISTRATIVE

.1 Submit to Ministerial 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 Ministerial Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated 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 Ministerial 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 co-ordinated.

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

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

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

1.4 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 Canada.

.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 co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

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

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

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

.7 Accompany submissions with transmittal letter, 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 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .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 Ministerial Representative's review, distribute copies.

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

.11 Submit 1 electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Ministerial Representative where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit 1 electronic copy of test reports for requirements requested in specification Sections and as requested by Ministerial 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 3 years of date of contract award for project.

.13 Submit 1 electronic copy of certificates for requirements requested in specification Sections and as requested by Ministerial 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 1 electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Ministerial 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 1 electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Ministerial 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 1 electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Ministerial Representative.

.18 Delete information not applicable to project.

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

.20 If upon review by Ministerial Representative, no errors or omissions are discovered or if only minor corrections are made, [transparency] [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 Public Works and Government Services Canada (PSPC) is for sole purpose of ascertaining conformance with general concept.
- .1 This review shall not mean that PSPC 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.

1.5 SAMPLES

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

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

.3 Notify Ministerial 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 Ministerial Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Ministerial Representative prior to proceeding with Work.

.6 Make changes in samples which Ministerial 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.

1.6 MOCK-UPS

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

1.7 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic 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: 2 locations.
.1 Viewpoints and their location as determined by Ministerial Representative.

.4 Frequency of photographic documentation: as directed by Ministerial Representative.
.1 Upon completion of: excavation, foundation, framing and services before concealment, of Work, and as directed by Ministerial Representative.

1.8 CERTIFICATES AND TRANSCRIPTS

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

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

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 01 11 01 General information of work.

.2 Section 01 14 00 Work restrictions.

.3 Section 01 52 00 Construction facilities

.4 Section 01 56 00 Temporary barriers and enclosures

1.02 GENERAL PROTECTION

.1 Do not disrupt airport business except as permitted by Ministerial Representative.

.2 Provide temporary protection for safe handling of public, personnel, pedestrians and vehicular traffic: to Section 01 56 00 - Temporary Barriers and Enclosures.

.3 Provide barricades and lights where directed by Ministerial Representative.

1.03 MOVEMENT OF EQUIPMENT AND PERSONNEL

.1 In areas of airport not closed to aircraft traffic:
- .1 Obtain Ministerial Representative's approval on scheduling of Work.
- .2 Control movements of equipment and personnel as directed by Ministerial Representative.
- .3 Provide qualified field personnel at locations designated by Ministerial Representative to relay signals from airport traffic control tower to equipment and personnel wishing to cross live traffic areas.

1.04 UNSERVICEABLE AREAS

.1 Without object

1.05 TRENCHING

.1 Obtain Ministerial Representative's written permission to undertake trenching on pavements open to aircraft traffic which cannot be completed, backfilled and sealed within 1 working day.

1.06 AIRPORT FACILITIES

.1 Ministerial Representative will stake or indicate location of underground facilities such as cables, pipes, ducts and other services and utilities.

.2 Notify Ministerial Representative of work areas 48 hours minimum in advance of operations to allow sufficient time for underground facilities and service to be located.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 41 00 Regulatory requirements.

1.2 REFERENCE STANDARDS

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.2 Province of Quebec
- .1 An Act Respecting Occupational Health and Safety, R.S.Q., c.S-2.1 (current edition) - Updated 2005.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
- .1 Results of site specific safety hazard assessment.
- .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3 Without object.

.3 Submit 1 copy of Contractor's authorized representative's work site health and safety inspection reports to Ministerial Representative and or authority having jurisdiction,weekly.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit copies of incident and accident reports.

.6 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 29.06 Health and safety requirements, 01 35 43 Environmental procedures.

.7 Ministerial Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 4 days after receipt of plan. Revise plan as appropriate and resubmit plan to Ministerial Representative within 4 days after receipt of comments from Ministerial Representative.

.8 Ministerial Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Ministerial Representative.

1.4 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to beginning of Work.

.2 Contractor shall be responsible and assume the Principal Contractor role for each work zone

location and not the entire complex. Contractor shall provide a written acknowledgement of this responsibility with 3 weeks of contract award. Contractor to submit written acknowledgement to CNESST along with Ouverture de Chantier Notice.

.3 Work zone locations include:
.1 Terminal

.4 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project.

1.5 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.6 MEETINGS

.1 Schedule and administer Health and Safety meeting with Ministerial Representative prior to commencement of Work.

1.7 REGULATORY REQUIREMENTS

.1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

1.8 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:
.1 winds.
.2 fog.

1.9 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Ministerial representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.10 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Without object.

.3 Contractor shall be the Principal Contractor as described in the Quebec Act Respecting Health and Safety code for the Construction for only their scope and areas of work as defined and described this project specification.

.4 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.11 COMPLIANCE REQUIREMENTS

.1 Comply with R.S.Q., c. S-2.1, an Act respecting Health and Safety, and c. S-2.1, r.4 Safety Code for the Construction Industry.

.2 Comply with Occupational Health and Safety Regulations, 1996.

.3 Without object

.4 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.12 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Ministerial Representative verbally and in writing.

.2 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Health and Safety co-ordinator and follow procedures in accordance with Acts and Regulations of Province having jurisdiction and advise Ministerial Representative verbally and in writing.

1.13 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
- .1 Have site-related working experience specific to activities associated.
- .2 Have working knowledge of occupational safety and health regulations.
- .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
- .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- .5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.14 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Ministerial Representative.

1.15 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Ministerial Representative.

.2 Provide Ministerial Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Ministerial Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.16 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 35 29.06 Health and safety requirements

.2 Section 01 74 11 Cleaning.

.3 Section 01 74 21 Construction/demolition waste management and disposal

1.2 REFERENCE STANDARDS

.1 U.S. Environmental Protection Agency (EPA)/Office of Water
- .1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.
- .2 EPA General Construction Permit (GCP) [2012].

1.3 DEFINITIONS

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

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 and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.

.3 Without object:
- .1 Without object.

.4 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review [and approval] by Ministerial Representative.

.5 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

.6 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.7 Include in Environmental Protection Plan:
- .1 Name of persons responsible for ensuring adherence to Environmental Protection Plan.
- .2 Name and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
- .3 Name and qualifications of person responsible for training site personnel.
- .4 Descriptions of environmental protection personnel training program.

.5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations and EPA 832/R-92-005, Chapter 3.

.6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

.7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.

.1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.

.8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.

.1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.

.9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.13 Waste Water Management Plan identifying methods and procedures for management and] discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

.14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

.15 Pesticide treatment plan to be included and updated, as required.

1.5 FIRES

.1 Fires and burning of rubbish on site [permitted only when approved by Ministerial Representative is not permitted.

.2 Without object

.3 without object.

1.6 DRAINAGE

.1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations, EPA.

.2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.

.3 Provide temporary drainage and pumping required to keep excavations and site free from water.

.4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.7 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties as indicated.

.2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of [2] m minimum.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
.1 Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Without object.

1.8 WORK ADJACENT TO WATERWAYS

.1 Without object

1.9 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this Contract.

.2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
.1 Provide temporary enclosures where directed by Ministerial Representative.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.10 HISTORICAL/ ARCHAEOLOGICAL CONTROL

.1 Without object

1.11 NOTIFICATION

.1 Ministerial Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

.2 Contractor: after receipt of such notice, inform Ministerial Representative of proposed corrective action and take such action for approval by Ministerial Representative.
.1 Take action only after receipt of written approval by Ministerial Representative.

.3 Ministerial Representative will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

1.12 ADDITIONAL ENVIRONNEMENTAL RECOMMENDATIONS FROM TRANSPORT CANADA

.1 Protect, identify and store in a properly way every hazardous material containers at least 30 m from the drainage ditches;

.2 The management and the arrangement of the hazardous materials (creosote wood, batteries, soiled materials, thermostat containing mercury, lead paint, etc.) must respect all the effective standards and must be carried out on authorized sites to this effect;

.3 Ensure that equipments and machineries are in good working order and free from leakage.

.4 All machineries must be refueled on a impervious surface at least 30 meters from drainage ditches.

.5 Have on the site, near all the working areas, a complete emergency spill kit. Replace used equipment by new equipment. In case of a hazardous material spill, inform as soon as possible the responsible authorities and the Transport Canada responsible agent onsite.

.6 Have on the working site an emergency measures plan in the event of a hazardous material spill;

.7 Water that has been in contact with uncured or partially cured concrete (as the wash water of concrete mixers) must never be spilled in the drainage system or in the surrounding environment. These waters need to be managed out of the site and to an authorized area;

.8 Every excess or residue of concrete must be placed in sealed containers built for this purpose. The concrete can not be discharged to the ground or into the drainage ditches;

.9 Replace the site to its original condition by cleaning it and by disposing all of the residual materials.

2 PRODUCTS

2.1 NOT USED

.1 Not Used.

3 EXECUTION

3.1 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  .1 Leave Work area clean at end of each day.

.2 Bury rubbish and waste materials on site where directed after receipt of written approval from Ministerial Representative.

.3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

.4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.5 Waste Management: separate waste materials, when applicable, 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.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 35 29.06 Health and safety requirements

.2 Section 01 35 43 Environmental procedures

.3 Section 02 41 99 Demolition form minor works

1.2 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada 2010 (NBC 2010) 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.
- .3 SOR-2008, Regulation on storage systems of petroleum products and allied petroleum products.

1.3 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 Ministerial Representative..

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

.3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Ministerial Representative.

1.4 BUILDING SMOKING ENVIRONMENT

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

1.5 NATIONAL PARKS ACT

.1 Without object .

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 Submittal procedures

.2 Section 01 73 00 Execution

.3 Section 01 78 00 Closeout submittals.

1.2 REFERENCE STANDARDS

.1 Without object

1.3 INSPECTION

.1 Allow Ministerial 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 Ministerial 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 Ministerial Representative will 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, Ministerial Representative shall pay cost of examination and replacement.

1.4 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Ministerial Representative for purpose of inspecting and/or testing portions of Work. [Cost of such services will be borne by Ministerial Representative.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Ministerial Representative at no cost to Ministerial Representative. Pay costs for retesting and reinspection.

1.5 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.6 PROCEDURES

.1 Notify appropriate agency and Ministerial Representative in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.7 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Ministerial Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Ministerial Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Ministerial Representative.

1.8 REPORTS

.1 Submit 4copies of inspection and test reports to Ministerial Representative.

.2 Provide copies to subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

1.9 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

.2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Ministerial Representative and may be authorized as recoverable.

1.10 MOCK-UPS

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

.2 Construct in locations acceptable to Ministerial Representative as specified in specific Section.

.3 Prepare mock-ups for Ministerial Representative 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 If requested, Ministerial Representative will assist in preparing schedule fixing dates for preparation.

.6 Remove mock-up at conclusion of Work or when acceptable to Ministerial Representative.

.7 Mock-ups may remain as part of Work.

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

1.11 MILL TESTS

.1 Submit mill test certificates as [requested] [required of specification Sections].

1.12 EQUIPMENT AND SYSTEMS

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

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 14 00 Work restrictions

.2 Section 01 35 13.13 Special procedures for airport facilities.

.3 Section 01 52 00 Construction facilities.

1.2 REFERENCE STANDARDS

.1 U.S. Environmental Protection Agency (EPA) / Office of Water
- .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.5 DEWATERING

.1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.6 WATER SUPPLY

.1 Ministerial Representative will provide continuous supply of water for construction use.

.2 Arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.

.3 Ministerial Representative will pay for utility charges at prevailing rates.

1.7 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:
- .1 Facilitate progress of Work.
- .2 Protect Work and products against dampness and cold.
- .3 Prevent moisture condensation on surfaces.
- .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for safe working environment.

.4 Maintain temperatures of minimum 21 degrees C in areas where construction is in progress.

.5 Ventilating:
- .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
- .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
- .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
- .4 Ventilate storage spaces containing hazardous or volatile materials.
- .5 Ventilate temporary sanitary facilities.
- .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.6 Permanent heating system of building, [to] [not to] be used when available. Be responsible for damage to heating system if use is permitted.

.7 On completion of Work for which permanent heating system is used, replace filters.

.8 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Ministerial Representative.

.9 Pay costs for maintaining temporary heat, when using permanent heating system. Ministerial Representative will pay utility charges when temporary heat source is existing building equipment.

.10 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
- .1 Conform with applicable codes and standards.
- .2 Enforce safe practices.
- .3 Prevent abuse of services.
- .4 Prevent damage to finishes.
- .5 Vent direct-fired combustion units to outside.

.11 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.8 TEMPORARY POWER AND LIGHT

.1 Ministerial Representative will pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 230 volts 30 amps.

.2 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.

.3 Temporary power for electric cranes and other equipment requiring in excess of above is responsibility of [Departmental Representative] [DCC Representative] [Consultant].

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

.5 Maximum power supply is available and will be provided for construction use at no cost. Connect to existing power supply in accordance with Canadian Electrical Code [and provide meters and switching.

.6 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Ministerial 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.

1.9 TEMPORARY COMMUNICATION FACILITIES

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

1.10 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.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 11 01General information of work

.2 Section 01 14 00 Work restrictions

.3 Section 01 35 13.13 Special procedures for airport facilities

.4 Section 01 56 00 Temporary barriers and enclosures.

1.2 REFERENCE STANDARDS

.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.

.3 Public Works Government Services Canada (PSPC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: May 14, 2004.

.4 U.S. Environmental Protection Agency (EPA) / Office of Water
- .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

.4 Provide construction facilities in order to execute work expeditiously.

.5 Remove from site all such work after use.

1.5 SCAFFOLDING

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

.2 Provide and maintain scaffolding, ladders, swing staging, platforms necessary to the completion

of the work and to ensure maintenance of it.

1.6 HOISTING

.1 Provide, operate and maintain hoists, cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.

.2 Hoists (cranes) to be operated by qualified operator.

1.7 ELEVATORS

.1 Without object

.2 Without object.

1.8 SITE STORAGE/LOADING

.1 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.

1.9 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work.

.2 Provide and maintain adequate access to project site.

.3 Clean runways and taxi areas where used by Contractor's equipment.

1.10 SECURITY

.1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.11 OFFICES

.1 Provide office heated to 21 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

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

.3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

1.12 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.13 SANITARY FACILITIES

.1 Provide temporary sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

.3 When permanent water and drain connections are completed, provide temporary water closets and urinals complete with temporary enclosures, inside building. Permanent facilities may be used on approval of Ministerial Representative.

1.14 CONSTRUCTION SIGNAGE

.1 Provide and erect project sign, within 3 weeks of signing Contract, in a location designated by Ministerial.

.2 Construction sign 1.2 m x 2.4 m, of wood frame and plywood construction painted with exhibit lettering produced by a professional sign painter.

.3 Indicate on sign, name of Owner, and Contractor, of design style established by Ministerial Representative.

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

.5 Provide project identification site sign comprising framing, and one 1200 x 2400 mm signboard as detailed and as described below.
- .1 Foundations: concrete block.
- .2 Framework and battens: SPF, pressure treated minimum 89 x 89 mm.
- .3 Signboard: 19 mm Medium Density Overlaid Douglas Fir Plywood to CSA O121.
- .4 Paint: alkyd enamel to CAN/CGSB-1.59 over exterior alkyd primer to CAN/CGSB 1.189.
- .5 Fasteners: hot-dip galvanized steel nails and carriage bolts.
- .6 Vinyl sign face: printed project identification, self adhesive, vinyl film overlay, supplied by Ministerial Representative.

.6 Locate project identification sign as directed by Ministerial Representative and construct as follows:
- .1 Build concrete foundation, erect framework, and attach signboard to framing.
- .2 Paint surfaces of signboard and framing with one coat primer and two coats enamel. Colour white on signboard face, black on other surfaces.
- .3 Apply vinyl sign face overlay to painted signboard face in accordance with installation instruction supplied.

.7 Direct requests for approval to erect Ministerial Representative/Contractor signboard to Ministerial Representative. For consideration general appearance of Ministerial Representative/Contractor signboard must conform to project identification site sign. Wording in both official languages.

.8 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.

.9 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Ministerial Representative.

1.15 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and temporary relocated roads as necessary to maintain traffic.

.2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Ministerial Representative.

.3 Provide measures for protection and diversion of traffic, including provision of watch-persons and

flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs

.4 Protect travelling public from damage to person and property.

.5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

1.16 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 Stack stored new or salvaged material not in construction facilities.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 11 01 General information of work

.2 Section 01 14 00 Work restrictions

.3 Section 01 52 00 Construction facilities

1.2 REFERENCE STANDARDS

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

.2 Canadian Standards Association (CSA International)
- .1 CSA-O121-M1978(R2003), Douglas Fir Plywood.

.3 Public Works Government Services Canada (PSPC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as Of: May 14, 2004.

1.3 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

.3 Take account of the particularity sequence traffic area works (Tarmac)

1.4 HOARDING

.1 Erect temporary site enclosure using new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m on centre. Provide one lockable truck gate and for the pedestrians. Maintain fence in good repair.

.2 Build plywood public site enclosure (roof and sides), for pedestrians, with relevant signs and electrical lighting as required by law, and provide maintenance. To envisage these passages for all the entries of the building. Contractor is responsible to make check, sign and seal, with his expenses, the design of these passages by an engineer skill to exert in Canada and to make the transmission to Ministerial Representative.

.3 Paint public side of site enclosure in selected colours with one coat primer to CAN/CGSB 1.189 and one coat exterior paint to CGSB 1.59. Maintain public side of enclosure in clean condition.

.4 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.5 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors.

.2 Provide as required by governing authorities and as indicated.

1.6 WEATHER ENCLOSURES

.1 Provide weather tight closures and other openings in floors.

.2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work.

.3 Design enclosures to withstand wind pressure.

1.7 DUST TIGHT SCREENS

.1 Provide dust tight screens or [insulated] partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.

.2 Maintain and relocate protection until such work is complete.

1.8 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

.2 Controlled area side tracks (Tarmac)

1.9 PUBLIC TRAFFIC FLOW

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

1.10 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.12 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Ministerial Representative locations and installation schedule 3 days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

1.13 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 Submittal procedures.

1.2 REFERENCE STANDARDS

.1 Within text of each specifications section, reference may be made to reference standards.

.3 Conform to these reference standards, in whole or in part as specifically requested in specifications.

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

.5 Cost for such testing will be born by Ministerial Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.3 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 Ministerial 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.

1.4 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 Ministerial 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 Ministerial Representative at commencement of Work and should it

subsequently appear that Work may be delayed for such reason, Ministerial Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 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 cementitious 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 materials, 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 Ministerial Representative.

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

1.6 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 Ministerial Representative. Unload, handle and store such products.

1.7 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 Ministerial Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Ministerial Representative will establish course of action.

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

1.8 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 Ministerial 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. Ministerial 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 Ministerial Representative, whose decision is final.

1.9 CO-ORDINATION

.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.

1.10 CONCEALMENT

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

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

1.11 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.

1.12 LOCATION OF FIXTURES

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

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

1.13 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.

1.14 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.

1.15 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 Ministerial Representative.

1.16 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, [and/or building occupants] [and pedestrian and vehicular traffic].

.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.

and for the pedestriansEND OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 73 00 Execution

1.2 REFERENCE STANDARDS

.1 Documents of the project owner showing the limits of the property and the existing surveying control points.

1.3 QUALIFICATIONS OF SURVEYOR

.1 Without object.

1.4 SURVEY REFERENCE POINTS

.1 Existing base horizontal and vertical control points are designated on drawings.

.2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.3 Make no changes or relocations without prior written notice to Ministerial Representative.

.4 Report to Ministerial Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

.5 Require surveyor to replace control points in accordance with original survey control.

1.5 SURVEY REQUIREMENTS

.1 Establish 2 permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.

.2 Establish lines and levels, locate and lay out, by instrumentation.

.3 Stake for grading, fill and topsoil placement and landscaping features.

.4 Stake slopes.

.5 Establish pipe invert elevations.

.6 Stake batter boards for foundations.

.7 Establish foundation, column locations and floor elevations.

.8 Establish lines and levels for mechanical and electrical work.

1.6 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Ministerial Representative of findings.

.2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by Ministerial Representative.

1.7 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 Ministerial Representative of impending installation and obtain approval for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Ministerial Representative.

1.8 RECORDS

.1 Maintain a complete, accurate log of control and survey work as it progresses.

.2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.

.3 Record locations of maintained, re-routed and abandoned service lines.

1.9 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit name and address of Surveyor to Ministerial Representative.

.2 On request of Ministerial Representative, submit documentation to verify accuracy of field engineering work.

.3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform with Contract Documents.

1.10 SUBSURFACE CONDITIONS

.1 Promptly notify Consultant in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 Submittal procedures

.2 Section 07 84 00 Fire stopping

1.2 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.

1.3 MATERIALS

.1 Required for original installation.

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

1.4 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.

1.5 EXECUTION

.1 Execute cutting, fitting, and patching including 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 Remove samples of installed Work for testing .

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

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

.8 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

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

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

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

.12 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material in accordance with Section 07 84 00 - Firestopping, full thickness of the construction element.

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

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

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for [reuse] [and] [recycling] in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 14 00 Work restrictions

.2 Section 01 74 21 Construction/demolition waste management and disposal

.3 Section 01 77 00 Closeout procedures

1.2 REFERENCE STANDARDS

.1 Without object.

1.3 PROJECT CLEANLINESS

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

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Ministerial Representative. Do not burn waste materials on site, unless approved by Ministerial Representative.

.3 Clear snow and ice from access to building, bank/pile snow in designated areas only or remove from site.

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

.5 Provide on-site containers for collection of waste materials and debris.

.6 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.7 Dispose of waste materials and debris at designated dumping areas on Crown property, off site.

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

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

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

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

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

.13 General cleaning to do every day considering the occupation of the premises.

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 [other than] [including] that caused by Owner or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Ministerial Representative. Do not burn waste materials on site, unless approved by Ministerial 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 doors.

.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 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.14 Remove dirt and other disfiguration from exterior surfaces.

.15 Sweep and wash clean paved areas.

.16 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

.17 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.18 Remove snow and ice from access to building.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

END OF SECTION

1 GENERAL

1.1 WASTE MANAGEMENT GOALS

.1 Prior to start of Work conduct meeting with Ministerial Representative to review and discuss PSPC's waste management goal and Contractor's proposed Waste Reduction Workplan for Construction, Renovation and /or Demolition (CRD) waste to be project generated.

.2 PSPC's waste management goal: to divert a minimum 75 percent of total Project Waste from landfill sites. Prior to project completion provide Ministerial Representative documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced. The overall waste diversion goal for this project is 25 percent.

.3 Minimize amount of non-hazardous solid waste generated by project and accomplish maximum source reduction, reuse and recycling of solid waste produced by CRD activities.

.4 Protect environment and prevent environmental pollution damage.

1.2 RELATED REQUIREMENTS

.1 Section 01 11 01 General information of work

.2 Section 01 74 11 Cleaning.

1.3 REFERENCE STANDARDS

.1 Canadian Construction Association (CCA)
- .1 CCA 81-2001: A Best Practices Guide to Solid Waste Reduction.

.2 Public Works and Government Services Canada (PSPC)
- .1 2002 National Construction, Renovation and Demolition Non-Hazardous Solid Waste Management Protocol.
- .2 CRD Waste Management Market Research Report (available from PSPC's Environmental Services).
- .3 Sustainable Development Strategy 2007-2009: Target 2.1 Environmentally Sustainable Use of Natural Resources.
  - .1 Real Property projects over $1 million and in communities where industrial recycling is supported, implementation of CRD waste management practices will be completed, with waste materials being reused or recycled.
  - .2 Contractually ensure resources used in construction or maintenance are consumed and recovered in a sustainable manner.

1.4 DEFINITIONS

.1 Approved/Authorized recycling facility: waste recycler approved by applicable provincial authority or other users of material for recycling approved by the Ministerial Representative.

.2 Class III: non-hazardous waste - construction renovation and demolition waste.

.3 Construction, Renovation and/or Demolition (CRD) Waste: Class III solid, non-hazardous waste materials generated during construction, demolition, and/or renovation activities

.4 Cost/Revenue Analysis Workplan (CRAW): based on information from Waste Reduction

Workplan, and intended as financial tracking tool for determining economic status of waste management practices (Schedule E).

.5 Inert Fill: inert waste - exclusively asphalt and concrete.

.6 Waste Source Separation Program (WSSP): implementation and co-ordination of ongoing activities to ensure designated waste materials will be sorted into pre-defined categories and sent for recycling and reuse, maximizing diversion and potential to reduce disposal costs.

.7 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

.8 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.9 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.10 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
- .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
- .2 Returning reusable items including pallets or unused products to vendors.

.11 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.12 Separate Condition: refers to waste sorted into individual types.

.13 Source Separation: act of keeping different types of waste materials separate beginning from the point they became waste.

.14 Waste Audit (WA): detailed inventory of estimated quantities of waste materials that will be generated during construction, demolition, deconstruction and/or renovation. Involves quantifying by volume/weight amounts of materials and wastes that will be reused, recycled or landfilled. Refer to Schedule A.

.15 Waste Diversion Report: detailed report of final results, quantifying cumulative weights and percentages of waste materials reused, recycled and landfilled over course of project. Measures success against Waste Reduction Workplan (WRW) goals and identifies lessons learned.

.16 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as co-ordinating required submittal and reporting requirements.

.17 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials generated by project. Specifies diversion goals, implementation and reporting procedures, anticipated results and responsibilities. Waste Reduction Workplan (Schedule B) information acquired from Waste Audit.

1.5 DOCUMENTS

.1 Post and maintain in visible and accessible area at job site, one copy of following documents:
- .1 Waste Audit (Schedule A).
- .2 Waste Reduction Workplan (Schedule B).
- .3 Waste Source Separation Program.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Prepare and submit following prior to [project start-up]:
- .1 1 electronic copy of completed Waste Audit (WA): Schedule A.
- .2 1 electronic copy of completed Waste Reduction Workplan (WRW): Schedule B.
- .3 1 electronic copy of Waste Source Separation Program (WSSP).

.3 Prepare and submit on basis, throughout project or at intervals agreed to by Ministerial Representative the following:
- .1 Receipts, scale tickets, waybills, and/or waste disposal receipts that show quantities and types of materials reused, recycled, or disposed of.
- .2 Updated Waste Materials Tracking form (Schedule D).
- .3 Written monthly summary report detailing cumulative amounts of waste materials reused, recycled and landfilled, and brief status of ongoing waste management activities.

.4 Submit prior to final payment the following:
- .1 Waste Diversion Report, indicating final quantities [in tones] by material types salvaged for reuse, recycling or disposal in landfill and recycling centres, re-use depots, landfills and other waste processors that received waste materials (See Schedule C).
- .2 Provide receipts, scale tickets, waybills, waste disposal receipts that confirm quantities and types of materials reused, recycled or disposed of and destination.

1.7 WASTE AUDIT (WA)

.1 Ministerial Representative will prepare WA prior to project start-up. WA will be provided with bid documentation (see Schedule A).

.2 WA provides detailed inventory, estimated quantities and types of waste materials that will be generated as well as their potential to be reused and/or recycled and project's waste diversion goals and objectives.

.3 After award of contract, contractor to review WA and confirm that anticipated quantities of waste generated are accurate and goals achievable.

.4 If after review, contractor determines that indicated quantities or opportunities in WA are not accurate or achievable, contractor to provide written details of discrepancies and revised quantities for areas of concern. Contractor to meet with Ministerial Representative to review and justify revisions.

.5 Post on-site WA where contractor and sub-contractors are able to review content.

1.8 WASTE REDUCTION WORKPLAN (WRW)

.1 Prepare and submit WRW (Schedule B) at least 10 days prior to project start-up.

.2 WRW identifies strategies to optimize diversion through reduction, reuse, and recycling of materials and comply with applicable regulations, based on information acquired from WA.

.3 WRW should include but not limited to:
- .1 Applicable regulations.
- .2 Specific goals for waste reduction, identify existing barriers and develop strategies to overcome them.
- .3 Destination of materials identified.
- .4 Deconstruction/disassembly techniques and schedules.

.5 Methods to collect, separate, and reduce generated wastes.
.6 Location of waste bins on-site.
.7 Security of on-site stock piles and waste bins.
.8 Protection of personnel, sub-contractors.
.9 Clear labelling of storage areas.
.10 Training plan for contractor and sub-contractors.
.11 Methods to track and report results reliably (Schedule D).
.12 Details on materials handling and removal procedures.
.13 Recycler and reclaimer requirements.
.14 Quantities of materials to be salvaged for reuse or recycled and materials sent to landfill.
.15 Requirements for monitoring on-site wastes management activities.

.4 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

.5 Post WRW or summary where workers at site are able to review content.

.6 Monitor and report on waste reduction by documenting total volume (in tonnes) and cost of actual waste removed from project (Schedule D).

1.9 COST/REVENUE ANALYSIS WORKPLAN (CRAW)

.1 Prepare CRAW (see Schedule E) and include the following:
.1 Cost of current waste management practices.
.2 Implementation cost of waste diversion program.
.3 Savings and benefits resulting from waste diversion program.

1.10 WASTE SOURCE SEPARATION PROGRAM (WSSP)

.1 As part of Waste Reduction Workplan, prepare WSSP prior to project start-up.

.2 WSSP will detail methodology and planned on-site activities for separation of reusable and recyclable materials from waste intended for landfill.

.3 Provide list and drawings of locations that will be made available for sorting, collection, handling and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide sufficient on-site facilities and containers for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.5 Locate containers to facilitate deposit of materials without hindering daily operations.

.6 Provide training for sub-contractors and workers in handling and separation of materials for reuse and/or recycling.

.7 Locate separated materials in areas which minimizes material damage.

.8 Clearly and securely label containers to identify types/conditions of materials accepted and assist sub-contractors and workers in separating materials accordingly.

.9 Monitor on-site waste management activities by conducting periodic site inspections to verify: state of signage, contamination levels, bin locations and condition, personnel participation, use of waste tracking forms and collection of waybills, receipts and invoices.

.10 On-site sale of salvaged materials is not permitted unless authorized in writing by Ministerial Representative and provided that site safety regulations and security requirements are adhered to.

1.11 USE OF SITE AND FACILITIES

.1 Execute Work with minimal interference and disturbance to normal use of premises.

.2 Maintain security measures established by facility provide temporary security measures approved by Ministerial Representative.

1.12 WASTE PROCESSING SITES

.1 Contractor is responsible to research and locate waste diversion resources and service providers. Salvaged materials are to be transported off site to approved and/or authorized recycling facilities or to users of material for recycling.

1.13 QUALITY ASSURANCE

.1 After award of Contract, a mandatory site examination will be held for this Project for Contractor responsible for construction, renovation demolition/deconstruction waste management.
- .1 Date, time and location will be arranged by Ministerial Representative.

.2 Waste Management Meeting: Waste Management Co-ordinator is to provide an update on status of waste diversion and management activities at each meeting. Written monthly Waste Diversion Report summary to be provided by Waste Management Coordinator (refer Waste Materials Tracking form in Schedule D).

1.14 STORAGE, HANDLING AND PROTECTION

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

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

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

.4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

.5 Protect structural components not removed and salvaged materials from movement or damage.

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

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

.8 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials.

.9 Separate and store materials produced during project in designated areas.

.10 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.
- .1 On-site source separation is recommended.
- .2 Remove co-mingled materials to off site processing facility for separation.
- .3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.
- .4 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.

1.15 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner into waterways, storm, or sanitary sewers.

.3 Keep records of construction waste including:
- .1 Number and size of bins.
- .2 Waste type of each bin.
- .3 Total tonnage generated.
- .4 Tonnage reused or recycled.
- .5 Reused or recycled waste destination.

.4 Remove materials on-site as Work progresses.

.5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in the waste audit.

1.16 SCHEDULING

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

2 PRODUCTS

2.1 NOT USED

.1 Not Used.

3 EXECUTION

3.1 APPLICATION

.1 Do Work in compliance with WRW and WSSP.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 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 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.
- .2 Source separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

.1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Ministerial Representative, and consistent with applicable fire regulations.
- .1 Mark containers or stockpile areas.
- .2 Provide instruction on disposal practices.

.2 On-site sale of recyclable materials is not permitted except on indications opposite of the Ministerial Representative.

3.4 WASTE DIVERSION REPORT

.1 At completion of Project, prepare written Waste Diversion Report indicating quantities of materials reused, recycled or disposed of as well as the following:
- .1 Identify final diversion results and measure success against goals from Waste Reduction Workplan.
- .2 Compare final quantities/percentages diverted with initial projections in Waste Audit and Waste Reduction Workplan and explain variances.
  - .1 Supporting documentation.
  - .2 Waybills and tracking forms.
  - .3 Description of issues, resolutions and lessons learned.

3.5 WASTE AUDIT (WA) (Annexe A)

.1 Schedule A - Waste Audit (WA)

(1) Material Category	(2) Material Quantity Unit	(3) Estimated Waste %	(4) Total Quantity of Waste (unit)	(5) Generation Point	(6) % Recycled	(7) % Reused
Wood and Plastics Material Description						
Off-cuts						
Warped Pallet						
Forms Plastic Packaging						
Cardboard Packaging						
Glass						
Wood						
Metal						
Other						

3.6 WASTE REDUCTION WORKPLAN (WRW) (Annexe B)

.1 Schedule B

(1) Material Category	(2) Person(s) Responsible	(3) Total Quantity of Waste (unit)	(4) Reused Amount (units) Project	Actual Reused Amount (unit) Project	(5) Actual Recycled Amount (unit) Project	(6) Material(s) Destination
Wood and Plastics Material Description						
Chutes						
Warped Pallet						
Forms Plastic Packaging						

Card-board Packaging
Wood
Metal
Other

3.7 FINAL REPORT ON WASTE REDIRECTOIN (ANNEX D)

Others					0	#DIV/0!
					0	#DIV/0!
Wood					0	#DIV/0!
					0	#DIV/0!
Floor covering!					0	#DIV/0!
Electricity						
Wiring					0	#DIV/0!
					0	#DIV/0!
Others					0	#DIV/0!
					0	#DIV/0!
Specialities and various elements					0	#DIV/0!
Cardboard					0	#DIV/0!
Other packages					0	#DIV/0!
Mixed recycling					0	#DIV/0!
General waste					0	#DIV/0!
Others					0	#DIV/0!
O	**0**	**0**		**0**	**0**	**#DIV/0!**

3.8 COST/REVENUE ANALYSIS WORKPLAN (CRAW) (Annexe E)

.1 Schedule E - Cost/Revenue Analysis Workplan (CRAW)

(1) Material Description	(2) Total Quantity (unit)	(3) Volume (cum)	(4) Weight (cum)	(5) Disposal Cost/Credit $(+/-)	(6) Category Sub-Total $(+/-)	(7) Cost (+/-) Revenue (+)
Wood						
Wood Stud						
Plywood						
Panel Regular						
Slab Regular						
Drainage piping						
Drinking water piping						

3.9 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Schedule G - Government Chief Responsibility for the Environment:

Province	Address	General Inquires	Fax
Québec	Ministère de l'environnement et de la faune Siège social 150, boul, René-Lévesque Est Québec QC G1R 4Y1	418-643-3127 800-561-1616	418-646-5974
	Conseil de la conservation et de l'environnement 800, place d'Youville 19e étage Québec QC G1R 3P4	418-643-3818	

3.10 SCHEDULES

.1 Following Schedules are attached to this Specification:
- .1 Waste Audit - Schedule A.
- .2 Waste Reduction Workplan Form - Schedule B .
- .3 Waste Diversion Report Form - Schedule C (non applicable).
- .4 Waste Materials Tracking Form - Schedule D.
- .5 Cost/Revenue Analysis Workplan - Schedule E. (non applicable)

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 78 00 Closeout submittals

1.2 REFERENCE STANDARDS

.1 Canadian Environmental Protection Act (CEPA)
- .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:
- .1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
  - .1 Notify Ministerial Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
  - .2 Request Ministerial Representative inspection.
- .2 Ministerial Representative Inspection:
  - .1 Ministerial Representative and Contractor to inspect Work and identify defects and deficiencies.
  - .2 Contractor to correct Work as directed.
- .3 Completion Tasks: submit written certificates in 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 boiler Inspection Branch, Fire Commissioner, Utility companies: submitted.
  - .5 Operation of systems: demonstrated to Owner's personnel.
  - .6 Commissioning of mechanical systems: completed in accordance with 01 91 13 - General Commissioning (Cx) Requirements final Commissioning Report submitted to Ministerial Representative.
  - .7 Underground, Aboveground storage tank inspection documentation, registration, forms, decommissioning and removal in accordance with CEPA SOR/2008-197.
  - .8 Work: complete and ready for final inspection.
- .4 Final Inspection:
  - .1 When completion tasks are done, request final inspection of Work by Ministerial Representative, and Contractor.
  - .2 When Work incomplete according to Ministerial Representative, complete outstanding items and request re-inspection.
- .5 Declaration of Substantial Performance: when Ministerial Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
- .6 Commencement of Lien and Warranty Periods: date of Owner'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.
- .7 Final Payment:
  - .1 When Ministerial Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.2 When Work deemed incomplete by Ministerial Representative, complete outstanding items and request re-inspection.

.8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.4 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 45 00 Quality control

.2 Section 01 77 00 Closeout procedures

1.2 REFERENCE STANDARDS

.1 Canadian Environmental Protection Act (CEPA)
- .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:
- .1 Convene meeting 1 week prior to contract completion with contractor's representative and Ministerial 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 Ministerial 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.

1.4 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 Ministerial Representative, 1 final copies of operating and maintenance manuals in French and 1 electronic copy.

.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.

1.5 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 dxf format on CD.

1.6 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 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 79 00 - Demonstration and Training.

1.7 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, [in addition to requirements in General Conditions, at site for Ministerial 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.

.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 Ministerial Representative.

1.8 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of blue line opaque drawings, provided by Ministerial Representative.

.2 Use felt tip marking pens, maintaining separate colours 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 depths of elements of foundation in relation to finish first floor datum.
.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
.4 Field changes of dimension and detail.
.5 Changes made by change orders.
.6 Details not on original Contract Drawings.
.7 Referenced Standards 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.

1.9 FINAL SURVEY

.1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.10 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 colour 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] [Design-Builder's] co-ordination drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

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

.14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control.

.15 Underground, and Aboveground storage tank inspection documentation, registration, forms, decommissioning and removal in accordance with CEPA SOR/2008-197.

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

1.11 MATERIALS AND FINISHES

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour 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 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

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

1.12 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 Ministerial 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 site; place and store.
.4 Receive and catalogue items.
.1 Submit inventory listing to Ministerial 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 Ministerial Representative.
.2 Include approved listings in Maintenance Manual.

1.13 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 Ministerial Representative.

1.14 WARRANTIES AND BONDS

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

.2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Ministerial Representative approval.

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

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

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

.6 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.

.7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.8 Conduct joint 4 month and 9 month warranty inspection, measured from time of acceptance, by Ministerial Representative.

.9 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 roofs, HVAC balancing, pumps, motors, transformers, and commissioned systems.

.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 4 and 9 month 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.

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

.11 Written verification to follow oral instructions.

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

1.15 WARRANTY TAGS

.1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Ministerial Representative.

.2 Attach tags with copper wire and spray with waterproof silicone coating.

.3 Leave date of acceptance until project is accepted for occupancy.

.4 Indicate following information on tag:
- .1 Type of product/material.
- .2 Model number.
- .3 Serial number.
- .4 Contract number.
- .5 Warranty period.
- .6 Inspector's signature.
- .7 Construction Contractor.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 14 00 Word restrictions

.2 Section 01 35 29.06 Health and safety requirements

.3 Section 01 56 00 temporary barriers and enclosures

.4 Section 01 74 21 Construction/demolition waste management and disposal

1.2 REFERENCE STANDARDS

.1 CSA International
- .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

.2 National Research Council Canada (NRC)
- .1 National Building Code of Canada 2010 (NBC).
- .2 National Fire Code of Canada 2010 (NFC).

.3 U.S. Environmental Protection Agency (EPA)/Office of Water
- .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures and 01 74 21 - Construction/Demolition Waste Management Disposal.

.2 Submit demolition drawings:
- .1 Submit for review and approval by Ministerial Representative shoring and underpinning drawings stamped and signed by professional engineer registered or licensed in Canada, showing proposed method.

.3 Sustainable Design Submittals:
- .1 not used.
- .2 Construction Waste Management:
  - .1 Submit project [Waste Management Plan] [Waste Reduction Workplan] highlighting recycling and salvage requirements.
  - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50% of construction wastes were recycled or salvaged.
- .3 Erosion and Sedimentation Control: submit erosion and sedimentation control plan in accordance with EPA 832/R92-005 authorities having jurisdiction.

1.4 SITE CONDITIONS

.1 Review "Designated Substance Report" and take precautions to protect environment.

.2 If material resembling spray or trowel-applied asbestos or other designated substance [listed as hazardous] be encountered, stop work, take preventative measures, and notify Ministerial Representative immediately.
- .1 Proceed only after receipt of written instructions have been received from Ministerial Representative.

.3 Notify Ministerial Representative before disrupting [building] access or services.

2 PRODUCTS

2.1 NOT USED

.1 Not used.

3 EXECUTION

3.1 EXAMINATION

.1 Inspect building with Ministerial Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

.4 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.

.1 Immediately notify Ministerial Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.

.2 Immediately notify the Ministerial Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

3.2 PREPARATION

.1 Temporary Erosion and Sedimentation Control:

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work..

.2 Protection of In-Place Conditions:

.1 Prevent movement, settlement, or damage to adjacent [structures,] [utilities,] [and landscaping features] [and parts of building] to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

.5 Do Work in accordance with Section 01 35 29.06 - Health and Safety Requirements .

.3 Demolition/Removal:

.1 Remove items as indicated.

.2 Removal of Pavements, Curbs and Gutters:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method

approved by Ministerial Representative.
.2 Protect adjacent joints and load transfer devices.
.3 Protect underlying and adjacent granular materials.

.3 Remove parts of existing building to permit new construction.

.4 Trim edges of partially demolished building elements to tolerances as defined by Ministerial Representative to suit future use.

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 Refer to demolition drawings and specifications for items to be salvaged for reuse.

.4 Waste Management: separate waste materials for 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.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 09 22 16 Non structural metal framing

.2 Section of divisions 22, 23 and 26 for the plumbing, HVAC and electricity devices.

1.2 REFERENCE STANDARDS

.1 CSA International
- .1 CSA B111-1974(R2003], Wire Nails, Spikes and Staples.
- .2 CSA O121-08, Douglas Fir Plywood.
- .3 CSA O141-05(R2009), Softwood Lumber.
- .4 CSA O151-09, Canadian Softwood Plywood.
- .5 CAN/CSA-O325.0-07, Construction Sheathing.
- .6 CAN/CSA-Z809-08, Sustainable Forest Management.

.2 National Research Council Canada (NRC)
- .1 National Building Code of Canada 2010 (NBC).

.3 Forest Stewardship Council (FSC)
- .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.4 Green Seal Environmental Standards (GS)
- .1 GS-11-11, Paints and Coatings.

.5 National Lumber Grades Authority (NLGA)
- .1 Standard Grading Rules for Canadian Lumber 2010.

.6 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
- .1 SCAQMD Rule 1113-A2011, Architectural Coatings.

.7 Sustainable Forestry Initiative (SFI)
- .1 SFI-2010-2014 Standard.

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 [rough carpentry work] and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 QUALITY ASSURANCE

.1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood identification: by grade mark in accordance with applicable CSA standards.

.3 Plywood, OSB and wood based composite panel construction sheathing identification: by

grademark in accordance with applicable CSA standards.

.4 Sustainable Standards Certification:
.1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.

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, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect wood from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return of pallets, crates, padding, banding, and packaging materials as specified in[Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

2 PRODUCTS

2.1 MATERIALS

.1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% (R-SEC) or less in accordance with following standards:
.1 CAN/CSA-O141.
.2 NLGA Standard Grading Rules for Canadian Lumber.
.3 CAN/CSA-Z809 or FSC or SFI certified.

.2 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
.1 S2S is not acceptable.
.2 Board sizes: "Standard" or better grade.
.3 Dimension sizes: "Standard" light framing or better grade.
.4 Post and timbers sizes: "Standard" or better grade.

.3 Panel Materials:
.1 Douglas fir plywood (DFP): to CSA O121, standard construction.
.1 Urea-formaldehyde free.
.2 Canadian softwood plywood (CSP): to CSA O151, standard construction.
.1 Urea-formaldehyde free.
.3 Plywood, OSB and wood based composite panels: to CAN/CSA-O325.
.1 Urea-formaldehyde free.
.4 Fibrous cement composite panels made up of Portland cement compound reinforced with synthetic fibers and additives, density of 1500 kb/m3, having a thickness indicated on the plans, conform to ULC S-114 noncombustibility standard and ASTM D1037 Impacts standard. Dimensions of 1220 mm x 3050 mm smooth finish. Light cement panels made up of beadwalls are not acceptable for these works

.4 Wood Preservative:
.1 General points

.1 The preservative products must be danger free for the structures that will be in contact with humans or horticultural products.
.2 . Products applied in factory: chemical type, in compliance with CSA 080 standards, under pressure, dried after treatment.

.2 Water repellent wood
.1 .Preservative product applied on surface: coloured water repellent preservative product.
.2 VOC content no more than 350 g /l, in compliance with Rule number 113 of SCAQMD.
.3 Preservative products containing pentachlorophenol (PCP), creosote or inorganic arsenicals such as chromate copper arsenate (CCA) are not acceptable.
.4 Wood preservative methods against rot and mildew (water repellent)
.1 Apply on surface to cover the perforations, cuts and nicks of pressure treated products: Water repellent solution with 2% zinc, muted green, to apply in 2 coats (coloured water repellent preservative product).
.2 Vacuum and pressure wood impregnation product, in compliance with CSA 080 standard: wood impregnation with a preservative product until obtaining a net retention of at least 3.84 kg/m3 of wood; muted green colour.
.3 If a water base preservative product (water-soluble) have been used, after treatment, let the materials dry until getting a humidity degree of no more than 14%.
.5 Treat the following elements:
.1 Eaves boards, nailing bases for roof fascias, selvages, nailing strips, ledger strips for roof deck;
.2 Nailing bases of openings in walls that will have entrance or window frame ;
.3 Flashings, strips or any other wood pieces included in the structures of outer envelopes .
.4 Plywood boards for building roofs and the surround of the glass-porches structure. .

2.2 ACCESSORIES

.1 Fasteners: to CAN/CSA-G164, for exterior work, pressure- preservative treated lumber.

.2 Nails, spikes and staples: to CSA B111.

.3 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.

.4 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fiber plugs, [explosive actuated fastening devices], recommended for purpose by manufacturer.

.5 Vaporized material to fill in empty spaces between the outer frames and the elements of the outer walls: polyurethane foam with one component, minimal foaming, adjustable gun applied in order to control the length of the isolating cordon.

.1 Acceptable product::
.1 Demilec R SEAL 260 .
.2 Hilti CF-I XTW
.3 Adfast AD Foam Plus

.6 All purpose glue in compliance with CSA 0112.9 standards
.1 VOC content no more than 200g/L in accordance with Gs-36 standard and rule number 1168 of SCAQMD.

.7 Nailing disks: sheet metal with a diameter of at least 25 mm and 0.4 mm thick ,made to prevent their cupping. Distorted disks are not acceptable.

.8 Fasteners finish
.1 Galvanized steel: in compliance with ASTM A123/A123M and ASTM A653 standards for outer

structures and pressure treated wood structures
.2 Stainless steel: shade 302

3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for rough carpentry installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Ministerial Representative.
.2 Inform Ministerial 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 Ministerial Representative.

3.2 PREPARATION

.1 Treat surfaces of material with wood preservative, before installation.

.2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and 1 minute soak on plywood.

.3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation of the elements or treated wood.

3.3 MATERIALS USES

.1 Exterior walls siding panels (nailing base)
.1 Douglas fir plywood or Canadian softwood, siding category, 19 mm thick rough standard category (unless otherwise indicated)

.2 Underlayment
.1 . Douglas fir plywood or Canadian softwood, siding category, 19 mm thick rough framing headers (unless otherwise indicated)

3.4 INSTALLATION

.1 Install the element square and plumb, according to recommended height dimensions, rivals and alignments

.2 Realize continuous elements from the longest possible parts.

.3 Comply with requirements of National Building Code of Canada (NBC), supplemented by the following paragraphs.

.4 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.

.5 Align and plumb faces of furring and blocking to tolerance of 1:600.

.6 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.7 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure

using galvanized fasteners.

.8 Install wood backing, dressed, tapered and recessed slightly below top surface of roof insulation for roof hopper.

.9 Install sleepers as indicated.

.10 Use caution when working with particle board. Use dust collectors and high quality respirator masks.

.11 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.12 Countersink bolts where necessary to provide clearance for other work.

3.5 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 - Construction/Demolition Waste Management and Disposal.
- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

.1 Protect the installed materials and elements against all damages during construction.

.2 Repair damages caused by the installation of carpentry element to materials and adjoining materials.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 06 08 99 Rough carpentry for minor works

1.2 REFERENCE STANDARDS

.1 ASTM International
- .1 ASTM C 553-13, Standard Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
- .2 ASTM C 665-12, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- .3 ASTM C 1320-10, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.

.2 CSA Group
- .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .2 CSA B149 PACKAGE-10, Consists of B149.1, Natural Gas and Propane Installation Code and B149.2, Propane Storage and Handling Code.

.3 Underwriters Laboratories of Canada (ULC)
- .1 CAN/ULC-S702-2012, Standard for Mineral Fibre Insulation for Buildings.

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 [blanket insulation] and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Certificates:
- .1 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Test Reports:
- .1 Submit certified test reports showing compliance with specified performance characteristics and physical properties.

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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect specified materials from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

2 PRODUCTS

2.1 INSULATION

.1 Batt and blanket mineral fibre: to ASTM C 665 (resistance to steel corrosion), CAN/ULC-S702, friction installation type 1 .
- .1 Thickness: as indicated.
- .2 Thermal resistance: value RSI 0,60/25 mm

2.2 ACCESSORIES

.1 Insulation clips:
- .1 Impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.

.2 Nails: galvanized steel, length to suit insulation plus 25 mm, to CSA B111.

.3 Staples: 12 mm minimum leg.

.4 Tape: as recommended by manufacturer.

3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for blanket insulation application in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of Ministerial Representative.
- .2 Inform Ministerial 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 Ministerial Representative.

.2 For the replacement allocation of batt insulation according to section 01 21 00 – Allocations, the contractor must carry out an inspection of the premises with the departmental representative and count the quantities to be replace. No work can be done before obtaining the departmental representative’s written approval.

3.2 INSULATION INSTALLATION

.1 Install insulation to maintain continuity of thermal protection to building elements and spaces and to ASTM C 1320.

.2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.

.3 Do not compress insulation to fit into spaces.

.4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and

minimum 50 mm from [idewalls of CAN/ULC-S604 Type A chimneys and CSA B149.1 and CSA B149.2 Type B and L vents.

.5 Do not enclose insulation until it has been inspected and approved by Ministerial Representative.

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 - Construction/Demolition Waste Management and Disposal.
  .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 07 92 00 Joint sealants

.2 Section 09 21 16 Gypsum board and finish concrete panels finish

.3 Section 09 91 23.01 Interior re-painting

.4 See the mechanical and electrical reference drawings for the firewall and smoke barrier set in place in the mechanical and electrical installations (for example: and damper assemblies, cable trays)

1.2 REFERENCE STANDARDS

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

.2 National Research Council Canada (NRC)
  .1 National Building Code of Canada 2010 (NBC).

.3 Underwriter's Laboratories of Canada (ULC)
  .1 ULC-S115-1995, Fire Tests of Fire stop Systems.

1.3 DEFINITIONS

.1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.

.2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.

.3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

.4 Tightly Fitted; (ref: NBC Part 3.1.9.1(1) and 9.10.9.6(1)): penetrating items that are cast in place in buildings of noncombustible construction or have "0" annular space in buildings of combustible construction.
  .1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.4 DESIGN CRITERIAS

.1 It is up to the present section to choose the different types of firewall assemblies to use for all the conditions in the project, in accordance with the recommendations.

.2 The firewall assemblies chosen must be approved by the Underwriter’s Laboratories of Canada (ULC) and bear an assembly number certifying the test and approval.

.3 The choice of the different firewall assemblies must take into account alle the conditions related

to its location including among others and without being restricted to: adjoining materials and works, structure deflection and movement, environment and fire resistance indicated.

.4 When the firewall assembly is installed in a non-hidden location, the latter must be made of paintable materials and must be painted.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
- .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit [two] copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 29.06 Health and safety requirements and 01 35 43 Environmental procedures.

.3 Shop Drawings:
- .1 Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation.
- .2 Construction details should accurately reflect actual job conditions.

.4 Samples:
- .1 Submit duplicate 300 x 300 mm samples showing actual fire stop material proposed for project.

.5 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
- .1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.
  - .1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.
- .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.
- .4 Manufacturer's Field Reports: submit to manufacturer's written reports within [3] days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

1.6 QUALITY ASSURANCE

.1 Qualifications:
- .1 Installer: company, person specializing in fire stopping installations approved by manufacturer.

.2 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.
- .1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.
- .2 Upon during progress of Work at 60% complete.
- .3 Upon completion of Work, after cleaning is carried out.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
.3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.

.2 Storage and Protection:
.1 Store materials 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.

.3 Waste Management and Disposal:
.1 Separate waste materials for [recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.8 WORK SAMPLES

.1 Make the work required samples at the locations indicated by the departmental representative.

.2 Give 72 hours to the departmental representative to examine the work samples before beginning the works.

.3 Once reviewed by the Architect, the work samples will be the minimum standard to respect concerning the works being part of the present section. Unless otherwise indicated, they may be part of the finish work. Otherwise, and for the rejected works, they may be dismantled, the rejected materials will taken out of the site and a new work sample will have to be made.

.4 Make the following works samples:

.1 One (1) work sample for each type of proposed firewall assembly.

1.9 WARRANTY

.1 For works in the present section, the 12 month warranty period prescribed in the general conditions is extended to 5 years.

.2 Provide a written document jointly signed, issued by the manufacturer and the installer in the name of Canada certifying that the works in the present section will meet all the established performance requirements in normal use conditions for a five (5) year period.

.3 The warranty will cover among others that the works made will free from defects, including the adhesion or cohesion losses, crazings, flarings, fusions, shrinkages, sagging or smudging of the adjoining surfaces and the lack of making an efficient flames, fumes and gas barriers

.4 The warranties must include the fast correction of any defect upon reception of a written notice from the departmental representative to this effect. The repairing works must include workmanship, materials, equipments, and in the case of manufactured elements, the supplying and installation of new replacement parts, all of it free of charge and to the departmental representative liking. The warranties must also include the repairing or the replacement of the other components of the building (and its finishes) and any other works of the departmental representative, damaged or

moved during the repairing of the defects to the work.

2 PRODUCTS

2.1 MANUFACTURER

.1 Acceptable manufacturers:

.1 A/D Fire Protection Systems
.2 3M Fire Protection Products
.3 Hilti
.4 Tremco
.5 Or replacement product approved by addenda in accordance with the instructions to the bidders.

2.2 MATERIALS

.1 All the firewall and smoke barrier products of the assemblies of the same type set in place must come from one and the same manufacturer.

.2 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.
.1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN-ULC-S115 and not to exceed opening sizes for which they are intended and conforming to specified special requirements described in PART 3.
.2 Fire stop system rating: according to the indications and conform to the recommendations of the 2010 National Building Code..

.3 Service penetration assemblies: systems tested to CAN-ULC-S115.

.4 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.

.5 Fire-resistance rating of installed fire stopping assembly in accordance with NBC 2010.

.6 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

.7 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

.8 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.9 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.10 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.11 Sealants for vertical joints: non-sagging.

.12 Firewall mastic to wrap the electrical outlets in the fire resistant divisions. Acceptable product: Hilti CP 617 or acceptable product according to the manufacturers' standards in point 2.01

.13 Self-bracing intumescent pillows for clogging the bar or duct guides through the walls or floors: pillow made of a coating of intumescent materials embedded in fire-resistant insulation, the whole thing being covered with an airproof polyethylene envelope.

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 EXAMINATION

.1 Before proceeding to the installation of the fire-retardant assemblies**,** make sure that the state of the surfaces/supports first set up at the end of other sections or contracts and the flatness variations are acceptable and allow for the realization of the works in accordance to the manufacturer’s written instructions.

.1 Inform the departmental representative immediately of any unacceptable conditions detected.

.2 Have the installation surfaces approved by the technical representative of the supplier of flexible pavement.

.2 Provide, otherwise, a report showing the deficiencies or the approval of the control desk inspector before starting the installations.

.3 Start installation works only after having corrected the unacceptable conditions and received the written approval of the control desk inspector of the partition’s supplier. Installing them without this approval, this contractor alone will be responsible for repairing the entire work including the works of other sections and of the latter

3.3 PREPARATION

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
.1 Ensure that substrates and surfaces are clean, dry and frost free.

.2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation [without interruption to vapour barrier.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.4 INSTALLATION

.1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.

.2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are

maintained.

.3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.4 Tool or trowel exposed surfaces to neat finish.

.5 Remove excess compound promptly as work progresses and upon completion.

3.5 SEQUENCES OF OPERATION

.1 Proceed with installation only when submittals have been reviewed by Ministerial Representative.

.2 Install floor fire stopping before interior partition erections.

.3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.

.4 Mechanical pipe insulation: [certified] fire stop system component.
.1 Ensure pipe insulation installation precedes fire stopping.

3.6 LOCATION OF THE FIRE-RETARDANT ASSEMBLIES

.1 Determine the location of the fire-retardant assemblies according to the instructions for all the fields among others and without being limited to: for the location and dimensions of the openings, ducts, steel and concrete framing elements, types of partitions and exteriors walls.

.2 The openings include among others and without being limited to: the electrical, mechanical and telecommunication ducts, the architectural elements and any other element that go through.

.3 Walls and partitions include among others and without being limited to: plasterboard partitions, concrete elements' masonry walls, prefabricated concrete panels and any other type of exterior or interior walls and partitions.

.4 Make fire-retardant and smoke barrier in the following locations:

.1 Walls and partitions making a fire-retardant division and whose fire resistance is shown:
.1 Walls and partitions openings.
.2 Joints between two types of walls and partitions.
.3 Walls and partitions intersection.
.4 Top and bottom part of the walls and partitions.
.5 Recessed and reinforcing joints made in walls and partitions.
.6 Access points and sheaths put in or set in place in fire-retardant partitions for future use, including among others and without being limited to the trapdoors for the mechanical and electrical equipments.
.7 Edge of the mechanical and electrical assemblies that go through walls and partitions.
.8 Edge and surface of electrical outlets inside fire-resistance partitions.

.

.2 Slabs, ceilings and roofs making a fire-retardant division and whose fire resistance is shown:
.1 Floor, ceiling and roof slabs.

.2 Joints between floor, ceiling, roof and wall slabs, prefabricated partitions and concrete panels.

.3 Joint in the floor, ceiling and roof slabs.

.3 Prefabricated concrete panels making a fire-retardant division and whose fire resistance is shown:

:

.1 Joints between two prefabricated concrete panels making a fire-retardant division and whose fire resistance is shown:

. .2 Opening of prefabricated concrete panels making a fire-retardant division

.3 Intersection of prefabricated concrete panels.

.4 Top and bottom part of the prefabricated concrete panels.

.5 Joints between prefabricated concrete panels and floor, ceiling, roof and wall slabs.

.6 Recessed and reinforcing joints made in walls and partitions

.7 Access points and sheaths put in or set in place in fire-retardant partitions for future use, including among others and without being limited to the trapdoors for the mechanical and electrical equipments.

.8 Edge of the mechanical and electrical assemblies that go through walls and partitions.

3.7 FIELD QUALITY CONTROL

.1 Inspections: notify Ministerial Representative when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

.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 - 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 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.8 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 07 84 00 Fire stopping

.2 Division 9 for Sheating finish

1.2 REFERENCE STANDARDS

.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.

.4 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.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).

.6 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 and 01 35 43 - Environmental Procedures.

.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.

.5 Laboratory tests reports
1 Submit the laboratory tests reports, in accordance with section 01 45 00 – Quality control
2 Test the sealing materials, accessories and substrates in accordance with the following elements before beginning work on this section.
1 Obtain the samples of substrate specified in other sections.
2. Adhesion: in accordance with C 510 or C1248 ASTM D2203, check that the sealing materials will not stain the substrates to be joined.
3. Compatibility: in accordance with ASTM C1087, determine that the materials that join and the adjoining materials do not change the performance of the sealing materials and their colour.
4. Stains: in accordance with C 510 or C1248 ASTM D2203, check that the sealing materials will not stain the substrates to be joined

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 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 indoors, in accordance with manufacturers' recommendations in clean, dry, well-ventilated area with room temperature or less than 15°C.
.2 Store and protect joint sealants from [nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan.

.5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Planning accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 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.

1.7 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 Ministerial Representative will arrange for ventilation system to be operated on maximum outdoor air and exhaust during installation of caulking and sealants. Ventilate area of work as directed by Ministerial Representative by use of approved portable supply and exhaust fans.

1.8 WARRANTY

.1 For works in the present section, the 12 month warranty period prescribed in the general conditions is extended to 5 years

.2 Provide a written document jointly signed, issued by the manufacturer and the installer in the name of Canada certifying that the works in the present section will meet all the established performance requirements, without water or air infiltration through the sealed joints for a five (5) year period.

.3 The warranty will cover among others that the works made will free from defects, including the adhesion or cohesion losses, splitting, flairings, fusions, disintegrations, shrinkages, saggings or smudgings of the adjoining surfaces

.4 The warranties must include the fast correction of any defect upon reception of a written notice from the departmental representative to this effect. The repairing works must include workmanship, materials, equipments, and in the case of manufactured elements, the supplying and installation of new replacement parts, all of it free of charge and to the departmental representative liking. The warranties must also include the repairing or the replacement of the other components of the building (and its finishes) and any other works of the departmental representative, damaged or moved during the repairing of the defects to the work.

2 PRODUCTS

2.1 WATERPROOFING PRODUCTS – GENERALITIES

.1 .Caulking products emitting strong odours, containing toxic chemicals or not certified as being moistures resistant must not be used in air treatment apparatuses.

.2 If we have to use toxic products, limit use in locations where emanations can be expelled outside or in locations where they will be contained behind an airtightness system or still let several months pass before occupying the area to allow expelling the emanations on the longest period possible.

.3 Waterproofing products for each location must be one and only type and be form the same manufacturer.

.4 In the case of waterproofing products homologated with a primer, only the primer in question must be used with the said waterproofing product.

.5 Unless otherwise stated, the colour of each waterproofing product for each location will at the departmental representative from the manufacturer's standard coulours.

2.2 WATERPROOFING PRODUCTS - DESCRIPTION

.1 Urethane base sealing material

.1 Type 1:

.1 Multi-components waterproofing material.

.2 Type M, Grade NS, conform to ASTM C 920 standard.

.1 Average strength modulus:

.1 Acceptable products (see note 1 at the end of 2.02)

.1 Sika Class 25 Sikaflex 2c NS, T, NT, M, G, A and O use.

.2 Tremco Class 25 or 50 Dymeric 240 or 240FC, T, NT, M, A and O use.

.2 Type 2:

.1 One component waterproofing material.

.2 Type S, Grade NS, conform to ASTM C 920 standard.

.1 2A – Low strength modulus

.1 Acceptable product (see note 1 at the end of 2.02)

.1 Tremco Class 50 Dymonic FC, NT, M, A and O use.

. 2 2B - Average strength modulus:

.1 Acceptable products (see note 1 at the end of 2.02)

.1 Tremco Class 25, Vulkem 116, T, NT, M, A, I and O use. .

.3 Type 3:

.1 Self-leveling multi-components waterproofing material

.2 Type M, Grade P, conform to ASTM C 920 standard.

.1 Average strength modulus:

.1 Acceptable product (see note 1 at the end of 2.02)

.1 Tremco Class 25 THC 900 (THC 901 for inclined plan up to 10%),, T, M and O use

.2 Sika Class 25, Sikaflex 2c SL, T, NT, M, G, A, O, I use.

.4 Type 4:

.1 Self-leveling one component waterproofing material.

.2 Type S, Grade P, conform to ASTM C 920 standard.

.1 Average strength modulus:

.1 Acceptable product (see note 1 at the end of 2.02)

.1 Sika Class 25 Sikaflex self-leveling T and M use.

.2 .Tremco Class 50 Vulkem 45 SSL T, M, A, O and I

use.

.2 Silicon base neutral maturing sealant:
- .1 Type 5:
  - .1 Multi-components waterproofing material
  - .2 Type M, Grade S, conform to ASTM C 920 standard.
    - .1 Low strength modulus:
      - .1 Acceptable product (see note 1 at the end of 2.02)
        - .1 Tremco Class 25 Spectrem 4-TS NT, M, G, A and O use.
- .2 Type 6:
  - .1 Multi-components waterproofing material
  - .2 Type M, Grade P, conform to ASTM C 920 standard.
    - .1 Very low strength modulus :
      - .1 Acceptable product (see note 1 at the end of 2.02)
        - .1 Sika Grade P Class 100/50 Sikasil-728 RCS T, M, G, A and O use.
- .3 Type 7:
  - .1 One component waterproofing material.
  - .2 Type S, Grade NS, conform to ASTM C 920 standard.
    - .1 Type-7A - Very low strength modulus:
      - .1 Acceptable product (see note 1 at the end of 2.02)
        - .1 Tremco Class 100/50 Spectrem 1, NT, M, G, A and O use.
        - .2 Dow Corning Class 100/50 790 Silicone building sealant, T, NT, M, G, A and O use.
    - .2 Type-7B - Low strength modulus:
      - .1 Acceptable product (see note 1 at the end of 2.02)
        - .1 Sika Class 100/50 Sikasil-728 NS, NT, T, M, G, A and O use.
        - .2 Tremco Class 50 Spectrem 3, NT, M, G, A and O use.
        - .3 Dow Corning Class 50 Contractor concrete sealant (CCS), T, NT, M, G, A and O use.
        .
    - .3 Type 7C: Average strength modulus.
      - .1 Acceptable product (see note 1 at the end of 2.02)
        - .1 Dow Corning Class 25 Contractors weatherproofing sealant (CWS), NT, M, A and O use
        - .2 Tremco Class 25 Tremsil 600, NT, G, A and O use.
    - .4 Type 7D : . - Low strength modulus, for parking lots, Class 100/50
      - .1 Acceptable product (see note 1 at the end of 2.02)
        - .1 Tremco Spectrem 800, application with sprayer.
        - .2 Self-leveling Tremco Spectrem 900.
        - .3 Dow corning NS Parking structure sealant

.3 Acetic acid maturing silicone base sealant:

.1 Type 8:

.1 One component waterproofing material.

.2 Type S, Grade NS, conform to ASTM C 920 standard

.1 8A - Mold and mildew resistant:

.1 Acceptable product (see note 1 at the end of 2.02)

.1 Dow Corning 786 Silicone sealant, Class 25, NT, G, and A use.

.2 Tremco Tensil 200, NT, G, A et O use.

.2 8B - Glazing:

.1 UV resistant and non-yellowing acceptable product (see note 1 at the end of 2.02).

: .1 Dow Corning 999-A Silicone building and glazing, NT, G, A and O use.

.2 Acceptable product (see note 1 at the end of 2.02)

.1 Dow Corning 795 Silicone Building Sealant, NT, G, A and O use.

.2 Tremco Spectrem2, Class 50, NT, M. G. A and O use.

.3 Tremco Proglaze, NT, G, A et O use.

.4 Other sealants

.1 Type 9:

.1 Acrylic latex one component waterproofing material

.2 Conform to ASTM 834 standard; one component, solvent maturing, does not stain, bleeding-free, non-sag.

.1 Acceptable product: Tremco Tremflex 834 (see note 1 at the end of 2.02)

2 Type 10:

.1 Rubber bas one component waterproofing material

.1 Acceptable product: Tremco Acoustic sealant (see note 1 at the end of 2.02)

.3 Type 11:

.1 Butyle or polyisobutylene one component waterproofing material conform to ASTM C1311 standard.

.1 Acceptable product: Tremco Butyle sealant (see note 1 at the end of 2.02)

** Note 1: for all the acceptable products it is possible to suggest a replacement product by addenda in accordance with the instructions to the bidders in the products from Dow Corning, Tremco, Sika.

2.3 ACCESSORIES

.1 Non-corrosive cleaner, leaving no stain in accordance with the sealant manufacturer's recommendations and compatible with the materials to join.

.2 Primer:

.1 Leaving no stain, leaving no stain in accordance with the sealant manufacturer's recommendations and compatible with the substrates on which it will be applied.

.3 Compressible and non-compressible preformed backup strips:

.1 Backup strips must fit the appropriate waterproofing products and be of the same type recommended by the manufacturer.

.2 Polyethylene foam elements

.1 Cavernous/extruded foam filling rods.

.2 Elements oversized by 30 to 50%.

.3 Conform to ASTM C1330 type B standard.

.3 Neoprene or rubber-butyle elements

.1 Round and solid rods, with 70 Shore A hardness.

.4 Strong density foam elements.

.1 Extruded cellular polythene foam elements,

.2 with 20 Shore A hardness

.3 Tensile strength from 140 to 200 kPa.

.4 Ant- positive connection tape.

.1 Polyethylene tape that does not adhere to the waterproofing material and recommended by the sealant's manufacturer.

.5 Masking tape:

.1 Leaving no stain and non-absorbent, recommended by the sealant's manufacturer and compatible with substrates on which it will be applied.

2.4 CLEANING PRODUCTS FOR JOINTS:

.1 Non-corrosive and non-dirty, compatible with the materials with which the joints are made and the waterproofing products, and recommended by their manufacturer.

3 EXECUTION

3.1 QUALITY OF EXECUTION

.1 Conformity: conform with the manufacturer's written requirements, recommendations and specifications, including the technical bulletins and installation instructions specified in the products' catalogues and the wrapping cardboards, as well as to the indications on the data sheets.

.2 In addition to the manufacturers' requirements, ensure that the sealing works respect the requirements in the « Applicator Training Manual » of the Sealant, Waterproofing & Restoration Institute (SWR Institute

3.2 INSPECTION

.1 Check the surfaces and joints openings meant to receive these works. Before proceeding to

the installation of the waterproofing products:

.1 Make sure that the state of the surfaces/supports first set up at the end of other sections or contracts and the flatness variations are acceptable and allow for the realization of the works in accordance to the manufacturer's written instructions.

.2 Make sure that the concrete surfaces have completed their setting cycle.

.3 Inform the departmental representative immediately of any unacceptable conditions detected

.2 Have the installation surfaces approved by the technical representative of the supplier. Send this approval immediately to the departmental representative.

.3 Start installation works only after having corrected the unacceptable conditions and received the written approval of the control desk inspector of the partition's supplier. Beginning the works without this approval means the acceptation of the base works and the responsibility if need be.

3.3 PREPARATION

.1 Protect works installed by third parties from soiling or any other form of contamination. Before applying the primer and the waterproofing product, mask the adjoining surfaces to avoid soiling.

.2 Preparing the surfaces:

.1 Prepare the surface in accordance with AST C 1193 and the manufacturer's instructions.

.2 Check the dimensions of the joints to make and the state of the surfaces in order to obtain an adequate width-depth ratio for the setting up of the backup strips and waterproofing products.

.3 Remove from the joints' surfaces any undesirable matter, including dust, rust, oil, grease and other foreign matters that are likely to impede the quality of execution of the works.

.4 Make sure that joints' surfaces are well dried and that they are not frozen.

3.4 SETTING UP CONDITIONS

.1 Environment:

.1 Do not proceed to the setting up of waterproofing products in the following conditions:

.1 When room temperature and the substrate temperature are outside the limits fixed by the manufacturer of the products.

.2 When the degree of relative humidity and the moisture content of the substrate are outside the limits fixed by the manufacturer of the products.

.3 Or any other more strict recommendations of the manufacturer or mentioned standards and organisms.

.2 Width of the joints:

.1 Do not proceed with the setting up of the waterproofing products when the width of the joints is inferior to the one fixed by the product's manufacturer for the indicated applications or to less than 6 mm

.2 Obtain the approval of the departmental representative to make joint that are less than 6 mm or more than 13 mm.

.3 Substrate:

.1 Do not proceed to the setting up of waterproofing products until the substrate have been cleared of any contaminants that are likely to prevent the adherence of the products.

.4: Safety :

.1 Make sure that building's ventilation system works at the maximum admission of air and de-aeration during the setting up of the waterproofing and caulking products. Aerate the working areas following the instruction of the manufacturer's Consultant or the technical advisor with portable blower and roof fans

.2 Satisfy the requirements of the Workplace Hazardous Materials Information System (WHMIS) concerning the use, handling, storing and disposal of hazardous materials as well as the labeling and providing safety data sheets acknowledge by Labour Canada

3.5 SETTING UP THE PRIMER

1 Apply the primer on the lateral surfaces of the joints immediately before setting up the waterproof product, in accordance with the instructions of the waterproof product's manufacturer.

3.6 INSTALLATION OF THE BACKUP STRIP

.1 Install Anti-positive connection tape at the required locations, in accordance with the manufacturer's instructions.

.2 Compressing it about 30%,install the backup joint according to the depth and profile of desired and requested by the technical representative of the waterproofing products' manufacturer.

.

3.7 SETTING UP THE WATERPROOFING PRODUCT

.1 Proportion:

.1 Proportion the components rigorously respecting the instructions of the waterproofing products' manufacturer

.2 Application of the waterproofing product:

.1 Set up the waterproofing product in accordance with the manufacturer's written instructions.

.2 In order to achieve clean joints, install masking tape on the edges of the surface to joint.

.3 Apply the waterproofing product making a continuous bead.

.4 Apply the waterproofing product with a constant flow electric gun equipped with a nozzle of the appropriate dimension.

.5 The feeding pressure must be strong enough to allow the filling of voids and the perfect filling of the joints.

.6 Achieve the joint so as to form a continuous waterproofing bead free from edges, plies, saggings, airspaces and covered dirt.

.7 Before a skin is formed on the joints, shape the exposed surfaces in order to give them a slightly concave profile.

.8 Remove the surplus of waterproofing products as the works progress as well as at the end.

.9 Where it is unavoidable to join silicone sealants to urethane sealants:

.1 First install the urethane sealant..

.2 Join the silicone sealants to urethane sealants according to the manufacturer's recommendations.

.10 Give a concave profile to the exposed sealants or according to the manufacturer's recommendations

.3 Drying :

.1 Ensure the drying and hardening of the waterproofing products according to the instructions of these products' manufacturer.

.2 Do not cover the joints made waterproofing products before they are well dry.

.4 Make sure that the waterproofing products are free from forming skin, bad adhesion and that they do not have defective works that are likely to harm the quality of the work.

3.8 LISTS AND TABLES

.1 Waterproofing products – exterior locations:

.1 Application

.1 Expansion and control joints provided for in the exterior withe of the site concrete walls.

.2 Expansion and control joints provided for in the exterior withe of the prefabricated decorative panels walls.

.3 Expansion and control joints provided for in the exterior withe of the masonry walls (Stone, clay brick, concrete block)

.4 Joints between the metal panels.

.5 Joints between the materials mentioned above.

.6 Joints between the exterior walls' materials mentioned above and the doors, windows, louvers and other openings' frames.

.7 Joints provided for in horizontal surfaces (eaves, weatherboards)

.8 Other moving joints provided for in vertical surfaces and other horizontal surfaces not prone to vehicle or pedestrian traffic.

.2 Type of products to use depending on the working conditions and according and the manufacturer's recommendations:

.1 Type-1, type-2B, type-5, type-7C.

.2 Waterproofing products – interior locations

.1 Application:

.1 Expansion and control joints provided for in the interior withe of the site concrete walls

.2 Interior edge of the openings made in exterior walls according to the detail of the drawings

.3 Joints provided for in the prefabricated beams or planks underside.

.4 Joints between the interior walls' materials mentioned above and the doors, windows, louvers, elevator's doors and other openings according to indications and details.

.5 Other moving joints provided for in vertical surfaces and other horizontal surfaces not prone to vehicle or pedestrian traffic such as:

.1 At the intersection of masonry walls (blocks/blocks, blocks/concrete).

.2 At the top of non-bearing masonry wall, at the underside of site concrete elements.

.3 In drywall partitions constructions.

.2 Type of products to use depending on the working conditions and according and the manufacturer's recommendations:

.1 Type-1, Type-2B, Type-5, Type-7A,C ou Type-9.

.3 Waterproofing products for traffic surfaces

.1 Application:

.1 Expansion and control joints provided for in interior floors.

.2 Expansion and control joints provided for in site concrete elements.

.3 Expansion and control joints provided for in prefabricated concrete structural elements.

.4 Joints between the prefabricated concrete paving blocks.

.5 Expansion and control joints provided for in tiling works other than works in section 09 30 13 – Ceramic tilings

.6 Joints between materials mentioned above.

.7 Other moving joints provided for in exterior or interior horizontal or inclined surfaces prone to vehicle or pedestrian traffic.

.2 Type of products to use depending on the working conditions and according and the manufacturer's recommendations:

.1 Type-3, Type-4, Type-6 et Type-7D.

.4 Interior waterproofing products in indirect contact with food. Refer to the requirements of CFIA:

.1 Application:

.1 Joints on kitchen counters and preparation surfaces.

.2 Joints between the food service equipments and the adjoining construction.

.3 Other joints where contact with food is possible.

.2 Type of products to use depending on the working conditions and according and the manufacturer's recommendations:

.1 Type-8A, Type-9

.5 Interior waterproofing products – Sanitary facility:

.1 Applications:

.1 Joint on restroom and bathroom counters.

.2 Joints between the plumbing equipments and the adjoining materials.

.3 Joints between the lockers and the adjoining materials.

.4 Joints between the food service equipments and the adjoining construction.

.5 Other interior joints in humid or wet locations where the control of mold and mildew is necessary.

.2 Type of products to use depending on the working conditions and according and the manufacturer's recommendations:

.1 Type-8A

.6 Waterproofing products in immersion

.1 Applications: joints in liquid approved by manufacturer of the immerged sealant.

.1 Type of products to use depending on the working conditions and according and the manufacturer's recommendations:

.1 Tremco Vulkem 116, Type-2B

.2 Sika Sikaflex 2c SL, Type-3

.3 Tremco Vulkem 45 SSL,Type-4

.7 Waterproofing products – fuel petroleum product

.1 Applications:

.1 Joints in concrete surfaces prone to fuel petroleum product spill.

.2 Type of products to use depending on the working conditions and according and the manufacturer's recommendations:

.1 Type-4.

.8 Other hidden waterproofing products.

.1 Applications: Joints between the metal flashings and the trims.

.1 Type of products to use depending on the working conditions and according and the manufacturer's recommendations: Type-7B.

.2 Applications: treated bed joints under the metal tresholds.

.1 Type of products to use depending on the working conditions and according and the manufacturer's recommendations: Type-7C or Type-10.

.3 Applications: Joints between the vapour barrier sheets.

.1 Type of products to use depending on the working conditions and according and the manufacturer's recommendations:

.1 Type -10.

.4 Applications: Interior acoustic joints

.1 Type of products to use depending on the working conditions and according and the manufacturer's recommendations:

.1 Type-10.

.5 Applications: Glazing joints

.1 Type of products to use depending on the working conditions and according and the manufacturer's recommendations:

.1 Type-8B

3.9 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - 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 11 - Cleaning.

.3 Waste Management: separate waste materials for 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

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 06 08 99 Rough carpentry for minor works

.2 Section 07 21 16 Blanket and bat insulations

.3 Section 07 84 00 Fire stopping

.4 Section 07 92 00 Joints sealants

.5 Section 09 22 16 Non-structural metal framing

.6 Section 09 30 13 Ceramic tiling

.7 Divisions 22 and 23 for the positioning of access doors to fire-fighting and mechanical equipment and embedded equipments in these divisions.

.8 Division 26 for the positioning of access doors to electrical, communication and electronic security equipment and embedded equipments in these divisions.

1.2 REFERENCE STANDARDS

.1 Aluminum Association (AA)
- .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.

.2 ASTM International
- .1 ASTM C 475-02(2007), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .2 ASTM C 514-04(2009e1), Standard Specification for Nails for the Application of Gypsum Board.
- .3 ASTM C 557-03(2009)e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
- .4 ASTM C 840-08, Standard Specification for Application and Finishing of Gypsum Board.
- .5 ASTM C 954-07, 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 0.112 in. (2.84 mm) in Thickness.
- .6 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.
- .7 ASTM C 1047-09, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
- .8 ASTM C 1280-99, Standard Specification for Application of Gypsum Sheathing.
- .9 ASTM C 1177/C 1177M-08, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- .10 ASTM C 1178/C 1178M-08, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.
- .11 ASTM C1396/C1396M-09a, Standard Specification for Gypsum Wallboard.

.3 Association of the Wall and Ceilings Industries International (AWCI)
- .1 AWCI Levels of Gypsum Board Finish-97.

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
.2 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.

.6 Green Seal Environmental Standards (GS)
.1 GS-11-2008, 2nd Edition, Paints and Coatings.

.7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
.1 SCAQMD Rule 1113-A2007, Architectural Coatings.
.2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

.8 Underwriters' Laboratories of Canada (ULC)
.1 CAN/ULC-S102-07, Standard Method of Test of Surface Burning Characteristics of Building Materials and Assemblies.

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 board assemblies and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
.1 Submit for review and acceptance of each unit.
.2 Samples will be returned for inclusion into work.
.3 Submit one samples of corner and casing beads and shadow mould.

1.4 TRANSPORTATION, 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, labeled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store gypsum board assemblies materials level off ground, indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect gypsum board assemblies from nicks, scratches, and blemishes.
.3 Protect from weather, elements and damage from construction operations.
.4 Handle gypsum boards to prevent damage to edges, ends or surfaces.
.5 Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
.6 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse of pallets, as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal].

1.5 AMBIENT CONDITIONS

.1 Maintain temperature 10 degrees C minimum, 21 degrees C maximum for 48 hours prior to and

during application of gypsum boards and joint treatment, and for 48 hours minimum after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

.3 Ventilation: ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.6 WARRANTY

.1 For works in the present section, the 12 month warranty period prescribed in the general conditions is extended to 5 years.

.2 Provide a written and signed document issued in the name of Canada, certifying the installed material from any presence of mildew, any delamination or any other deformation or deterioration for a period of 5 years. Refer to the general condition for the beginning of the warranties.

.3 The warranties must include the fast correction of any defect upon reception of a written notice to Canada to this effect. The repairing works must include workmanship, materials, equipments and the required services to repair the de defectives parts of the building and, in the case of manufactured elements, the supplying and installation of new replacement parts, all of it free of charge and to the departmental representative liking. The warranties must also include the repairing or the replacement of the other components of the building (and its finishes) and any other works of the departmental representative, damaged or moved during the repairing of the defects to the work.

2 PRODUCTS

2.1 PANELS AND BOARDS

.1 Standard gypsum boards: to ASTM C1396/C1396M standard having thicknesses indicated on the drawings, and Type X, 1200 mm wide x maximum practical length, square edges on the ends and beveled edges on the sides.

.2 Water-resistant gypsum board: to ASTM C1396/C1396M, having the thicknesses indicated on the plans, Type X, 1200 mm wide x longest practical length with square edges on the ends and beveled edges on the sides.

.3 Gypsum boards resistant to shocks, conform to ASTM C36/C36M and C1396 standards, cellulose reinforced, having a thickness indicated on the plans, Type X, 1200 mm wide x maximum practical length possible, square edges on the ends and beveled edges on the sides.

.4 Glass mat gypsum substrate sheathing: to ASTM C 1177/C 1177M, having thicknesses indicated on the drawings,1200 mm wide x maximum practical length.

.5 Fibrous cement composite panels made up of Portland cement compound reinforced with synthetic fibers and additives, density of 1500 kb/m3, having a thickness indicated on the plans, conform to ULC S-114 noncombustibility standard and ASTM D1037 Impacts standard. Dimensions of 1220 mm x 3050 mm smooth finish. Light cement panels made up of beadwalls are not acceptable for these works.

2.2 MOLDINGS AND ACCESSORIES

.1 Metal furring runners, hangers, tie wires, inserts, anchors: according to the manufacturer’s

characteristics.

.2 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.

.3 Resilient clips: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.

.4 Nails: to ASTM C 514.

.5 Steel drill screws: to ASTM C 1002.

.6 Stud adhesive: to CAN/CGSB-71.25.

.7 Laminating compound: as recommended by manufacturer, asbestos-free.

.8 Casing beads, corner beads, control joints and edge trim: to ASTM C 1047, metal, galvanized by 0.5 mm base thickness, perforated flanges, one piece length per location.

.9 Aluminum extrusion molding: 6063 conform to ASTM B-221 standard for recessed joint.

.10 Adjustable and detachable guard “J” molding for PVC window edge with integrated thermal break.

.11 Cornice cap: 12.7 mm deep x partition width, of 1.6 mm base thickness galvanized sheet steel, prime painted and extruded aluminum, minimum 2.5 mm thick, clear anodized to Aluminum Association designation AA . Include splice plates for joints.

.12 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
- .1 VOC limit 250 g/L maximum to SCAQMD Rule 1168.
- .2 Acoustic sealant: in accordance with Section 07 92 00 - Joint Sealants.

.13 Polyethylene: to CAN/CGSB-51.34, Type 2.

.14 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, with self sticking permanent adhesive on one face, with right length and width.

.15 Joint compound for gypsum boards: conform to ASTM C 475 standard, asbestos-free type recommended by the panel manufacturer for the required application.

.16 Joint tape for gypsum boards: conform to ASTM C 475 standard, preformed plastic and coated to receive the joint compound and recommended by the panel manufacturer for the required application.

.17 Non-combustible acoustic insulation: fiberglass bat insulation to be inserted, conform to CAN/ULC S702 and CAN 4-S114 standard, type 1 of the indicated thickness. Bats must be of the right dimensions for the spacing of the studs.

.18 Polyethylene film : conform to CAN/CGSB-51-34 standard, 0.15 mm (6 mils) thick for walls with adapted sealing tape and recommended by the manufacturer.

.19 Wood furring for attachment backing in accordance with section 06 08 99 - Carpentry - minor works

2.3 ACCESS PANELS

.1 Supply the non-prescribed access panels in the electromagnetic sections (divisions 21 to 28).

- .1 Steel, type to be installed in gypsum partition, embedded, with no resistance to fire, of a thickness recommended by the manufacturer, prefinished in factory with a primer

coating

.2 Flush model with no resistance to fire for installation in gypsum.

.1 Acceptable product: Acudor Model DW-5040 or ED-2002, or equivalent product approved by the ministerial representative.

.3 Flush model with resistance to fire of 90 minutes to 120 minutes for installation in gypsum.

.4 Tight model in aluminum, of the right dimensions for tightness joints.

.5 Dimensions: according to the indications (305 x 305 mm, 457 x 457 mm or 610 x 610 mm).

.6 Lock working with a master key for spaces used by the public and working with a screwdriver for service spaces.

3 EXECUTION

3.1 EXAMINATION

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

.1 Visually inspect substrate in presence of Ministerial Representative.

.2 Inform Ministerial 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 Ministerial Representative.

3.2 ERECTION

.1 Do application and finishing of gypsum board to ASTM C 840 except where specified otherwise.

.2 Do application of gypsum sheathing to ASTM C 1280.

.3 Erect hangers and runner channels for suspended gypsum board ceilings to ASTM C 840 except where specified otherwise.

.4 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.5 Install work level to tolerance of 1:1200

.6 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles, as well as all the other equipments embedded in the ceiling.

.7 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.

.8 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.

.9 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.

.10 Install wall furring for gypsum board wall finishes to ASTM C 840, except where specified otherwise.

.11 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.

.12 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

.13 Erect drywall resilient furring transversely across studs or joists between the layers of gypsum board, spaced maximum 600 mm on centre and not more than 150 mm from ceiling/wall juncture. Secure to each support with drywall screw long enough to ensure a minimum drive of 10 mm in the steel studs.

.14 To fill in the difference between the height of the partition and the height of the sack panels, install a continuous adjustment gypsum strip at the base of the partition cut in a gypsum panel making this partition mounted on resilient furring to ensure its rigidity.

.15 Install the cement panels in accordance with ANSI A108.11 standard and to the manufacturer's instructions.

.16 Set in place the bat insulation in the partitions identified on the plans according to the required thicknesses and in accordance with the manufacturer's instructions.

3.3 APPLICATION

.1 Apply gypsum board after bucks, anchors, blocking, sound attenuation, electrical and mechanical work have been approved.

.2 Apply single or double layer gypsum board to metal furring or framing using screw fasteners for first layer and for second layer. Maximum spacing of screws 300 mm on centre.
- .1 Single-Layer Application:
  - .1 Apply gypsum board on ceilings prior to application of walls to ASTM C 840.
  - .2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.
- .2 Double-Layer Application:
  - .1 Install gypsum board for base layer and exposed gypsum board for face layer.
  - .2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250mm.
  - .3 Apply base layers at right angles to supports unless otherwise indicated.
  - .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.

.3 Apply single or double layer gypsum board to concrete or concrete block surfaces, where indicated, using laminating adhesive.
- .1 Comply with gypsum board manufacturer's recommendations.
- .2 Brace or fasten gypsum board until fastening adhesive has set.
- .3 Mechanically fasten gypsum board at top and bottom of each sheet.

.4 In the case of walls and partitions going up to the structural slabs, make joints de désolidarisation at the top of these partitions with a double ledger strip and according to the indications on the drawings. In general, do not fix the gypsum boards to the wall plates but only to the studs leaving enough space to allow a bending of the slabs of at least 16 mm.

.5 Install cement panels used as skin to the walls and ceilings, according to the indications. Fix the panels with anticorrosion screws recommended by the panels' manufacturer and ANSI A108.11 spacing them by 200 mm for the walls and 150 mm for the ceilings. Make sure that the steel skeletons receiving those panels are at least 0.8 mm thick (gauge 20). At the top of the exterior walls with joints de désolidarisation , leave a space of at least 16 mm between the cement panel and the slab. Allow for steel perimeter mouldings according to the indications on the drawings and 07 62 00Flashins and metal sheet accessories.

.6 Exterior Soffits and Ceilings: install exterior gypsum board perpendicular to supports; stagger end joints over supports. Install with 6 mm gap where boards abut other work.

.7 Apply water-resistant gypsum board where wall tiles coating to be applied and adjacent to slop sinks, janitors closets and other indicated locations. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.

.8 Apply 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, in partitions where perimeter sealed with acoustic sealant.

.9 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.

.10 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.

.11 Install gypsum board with face side out.

.12 Do not install damaged or damp boards.

.13 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

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 shadow mould at gypsum board/ceiling juncture as indicated. Minimize joints; use corner pieces and splicers.

.6 Construct control joints of preformed units set in gypsum board facing and supported independently on both sides of joint.

.7 Provide continuous polyethylene dust barrier behind and across control joints.

.8 Locate control joints where indicated at changes in substrate construction at approximate 10 m spacing on long corridor runs at approximate 15 m spacing on ceilings.

.9 Install control joints straight and true.

.10 Construct expansion joints as detailed, at building expansion and construction joints. Provide continuous dust barrier.

.11 Install expansion joint straight and true.

.12 Install cornice cap where gypsum board partitions do not extend to ceiling.

.13 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at 300 mm on centre.

.14 Splice corners and intersections together and secure to each member with 3 screws.

.15 Install access doors to electrical and mechanical fixtures specified in respective sections.
- .1 Rigidly secure frames to furring or framing systems.

.16 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.

.17 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with AWCI Levels of Gypsum Board Finish:
- .1 Levels of finish and location:
  - .1 Degree 0: no jointing product, accessory or finish element required.
    - .1 Location: for temporary works.
  - .2 Degree 1: Install with interior joints and angles covered with a masking tape embedded in the joint compound. The jointed surfaces must be free from excess joint compound but tool marks and dents are acceptable.
    - .1 Location: acoustic partition in the ceiling spaces.
  - .3 Degree 2 : Embed the tape put on the interior joints and angles in a joint compound and apply a distinct layer of joint compound on the joints, angles and head of fastening devices and other used accessories. The jointed surfaces must be free from excess joint compound but tool marks and dents are acceptable
    - .1 Location: panels covered with ceramic/porcelain tiling.
  - .4 .Degree : Embed the tape put on the interior joints and angles in a joint compound and apply two distinct layers of joint compound on the joints, angles and head of fastening devices and other used accessories. The jointed surfaces must be free from excess joint compound but tool marks and dents are acceptable
    - .1 Location : Exposed panels to be coated with a medium or heavy thickness of textured material or to cover with a thick wallpaper.
  - .5 Degree 4 : Embed the tape put on the interior joints and angles in a joint compound and apply three distinct layer of joint compound on the joints, angles and head of fastening devices and other used accessories. The jointed surfaces must be free from tool marks and dents.
    - .1 Location lightly textured partitions, interior faces of the walls, ceilings and everywhere else.
  - .6 Degree 5: Embed the tape put on the interior joints and angles in a joint compound and apply three distinct layers of joint compound on the joints, angles and head of fastening devices and other used accessories. Then apply a thin layer of skimming coat on all the surface of the skin set in place. The jointed surfaces must be smooth and free from tool marks and dents
    - .1 Location: plain partitions with not very or not visible joints and fastening devices, once the decoration completed.

.18 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.

.19 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.

.20 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.21 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

3.5 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.

.2 Waste Management: separate waste materials for 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.

3.6 PROTECTION

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

.2 Repair damage to adjacent materials caused by gypsum board assemblies installation.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 06 08 99 Rough carpentry for minor works

.2 Section 07 21 16 Blanket and bat insulations

.3 Section 07 92 00 Joint sealants

1.2 REFERENCE STANDARDS

.1 ASTM International
- .1 ASTM C 645-11a, Standard Specification for Nonstructural Steel Framing Members.
- .2 ASTM C 754-11, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

.2 Environmental Choice Program (ECP)
- .1 CCD-047-98(R2005), Architectural Surface Coatings.
- .2 CCD-048-95(R2006), Surface Coatings - Recycled Water-Borne.

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).

.4 The Master Painters Institute (MPI)
- .1 Architectural Painting Specification Manual - [current edition].
  - .1 MPI #26, Primer, Galvanized Metal, Cementitious.

.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 [metal framing] and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
- .1 Submit duplicate 300 mm long samples of non-structural metal framing.

1.4 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

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 metal framing from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse 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.

1.6 WARRANTY

.1 For works in the present section, the 12 month warranty period prescribed in the general conditions is extended to 5 years

.2 Provide a written document jointly signed by the manufacturer and the installer, issued in the name of Canada certifying the installed material from any deformation or deterioration and will meet all the performance requirements established in normal use conditions, for a period of5 years. Refer to general conditions for the beginning of the warranty.

.3 The warranties must include the fast correction of any defect upon reception of a written notice from the departmental representative to this effect. The repairing works must include workmanship, materials, equipments required services to repair the defective parts of the work and in the case of manufactured elements, the supplying and installation of new replacement parts, all of it free of charge and to the departmental representative liking. The warranties must also include the repairing or the replacement of the other components of the building (and its finishes) and any other work of the departmental representative, damaged or moved during the repairing of the defects to the work.

2 PRODUCTS

2.1 MATERIALS

.1 Non-loadbearing channel stud framing: studs of indicated dimensions, conform to ASTM C 645 standard, flat rolled hot dipped galvanized steel metal plate with required thickness designed for screwing gypsum panels, strip laths and with knockouts set at 460 mm center to center for the passing of active pipes.

Stud:	*Max. height Partition, one*	*Max. height Partition, two*	*Max. height Build-out*
41	2.510m	2.700m	2.175m
64	3.270m	3.580m	2.970m
64	3.657m	4.267m	3.505m
92	4.267m	4.750m	3.886m
92	4.495m	5.384m	4.572m
152	6.090m	6.090m	5.715m
152	6.959m	7.594m	7.086m

Note: the maximum spacing of the profiles will be 400 mm c/c and the deflection L/360.

.2 Upper and lower laths: conform to ASTM C 645 standard, of width appropriate to the dimension of the studs and with 32 mm high legs except in the case of partitions going up to the structural slabs where the legs must be 50 mm high so as to make désolidarisation joints.

.3 Metal stiffeners of required dimensions: 1.4 mm thick, galvanized cold rolled steel profiles

.4 Z bar: flat rolled hot dipped galvanized metal sheet with required thickness with the required thickness according to stud indicated on the plans.

.5 Acoustic sealing compound: conform to ASTM C919,last revision and report to section07 92 10 – Sealing products for joints.

.6 Insulating strip: rubber foam strip, 3 mm thick and 12 mm wide, resistant to humidity, self -adhesive on one face ant cut to the required length.

.7 Sealing strip: closed cells polyethylene foam, 4.7 mm thick, of width indicated or required (to fill in void between low lath and substrate).

.8 Non-combustible acoustic insulation: fiberglass bat insulation to insert, conform to CAN/ULC S702 and CAN4-S114 standards, type 1, of the thickness indicated. Bats must be of the dimensions appropriate to the spacing of the studs.

.9 Anchor backings: 1.21 mm thick galvanized steel metal plate (gauge 18) of the required width.

3 EXECUTION

3.1 INSPECTION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for non-structural metal framing application in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of Ministerial Representative.
- .2 Inform Ministerial 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 Ministerial Representative.

3.2 ERECTION

.1 Align partition tracks at floor and ceiling and secure at [600] mm on centre maximum.

.2 Install damp proof course under stud shoe tracks of partitions on slabs on grade.

.3 Place studs vertically at 400 mm on centre and not more than 50 mm from abutting walls, and at each side of openings and corners.
- .1 Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.

.4 Brace the steel stud, if needed, so as to ensure the stiffness of the skeleton.

.5 Erect metal studding to tolerance of 1:1000.

.6 Attach studs to bottom ceiling track using screws except in the case of désolidarisation joints where we must not fix the jambs to the top laths leaving a space between the top of the jamb and the core of the top lath (top plate) making a double lath assembly: install 2 top laths with 50 mm

overlapping legs and fixing the studs to the bottom lath only. Respect the spacing between the two laths according to the indications.

.7 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

.8 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.

.9 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified.
- .1 Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.

.10 Install 0.914 mm and more (gauge 20 and less) heavy gauge single jamb studs at openings.

.11 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs.
- .1 Secure track to studs at each end, in accordance with manufacturer's instructions.
- .2 Install intermediate studs above and below openings in same manner and spacing as wall studs.

.12 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.

.13 Provide 40mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.

.14 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.15 Extend partitions to ceiling height except where noted otherwise on drawings.

.16 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.
- .1 Use 50 mm leg ceiling tracks. Use double track slip joint as indicated.

.17 Install continuous insulating strips to isolate studs from non insulated surfaces.

.18 Install two continuous beads of acoustical sealant or insulating strip under studs and tracks around perimeter of sound control partitions.

.19

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 - Construction/Demolition Waste Management and Disposal.
- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

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

.2 Repair damage to adjacent materials caused by non-structural metal framing application.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 07 92 00 Joint sealants

.2 Section 09 21 16 Gypsum board finish

.3 Section 09 91 23.01 Interior re-painting

.4 Division 22 – Plumbing

1.2 REFERENCE STANDARDS

.1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
- .1 ANSI A108.1-99, Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).
- .2 CTI A118.3-92, Specification for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive (included in ANSI A108.1).
- .3 CTI A118.4-92, Specification for Latex Cement Mortar (included in ANSI A108.1).
- .4 CTI A118.5-92, Specification for Chemical Resistant Furan Resin Mortars and Grouts for Tile Installation (included in ANSI A108.1).
- .5 CTI A118.6-92, Specification for Ceramic Tile Grouts (included in ANSI A108.1).

.2 American Society for Testing and Materials International (ASTM)
- .1 ASTM C 144-04, Specification for Aggregate for Masonry Mortar.
- .2 ASTM C 207-06, Specification for Hydrated Lime for Masonry Purposes.
- .3 ASTM C 847-06, Specification for Metal Lath.
- .4 ASTM C 979-05, Specification for Pigments for Integrally Coloured Concrete.

.3 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .2 CGSB 71-GP-22M-78(AMEND.), Adhesive, Organic, for Installation of Ceramic Wall Tile.
- .3 CAN/CGSB-75.1-M88, Tile, Ceramic.
- .4 CAN/CGSB-25.20-95, Surface Sealer for Floors.

.4 Canadian Standards Association (CSA International)
- .1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.
- .2 CAN/CSA-A3000-03(R2006), Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.5 South Coast Air Quality Management District (SCAQMD), California State
- .1 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

.6 Terrazzo Tile and Marble Association of Canada (TTMAC)
- .1 Tile Specification Guide 09 30 00 2006/2007, Tile Installation Manual.
- .2 Tile Maintenance Guide 2000.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.
.1 Include manufacturer's information on:
.1 Ceramic tile, marked to show each type, size, and shape required.
.2 Chemical resistant mortar and grout (Epoxy and Furan).
.3 Cementitious backer unit.
.4 Dry-set cement mortar and grout.
.5 Divider strip.
.6 Elastomeric membrane and bond coat.
.7 Reinforcing tape.
.8 Levelling compound.
.9 Latex cement mortar and grout.
.10 Commercial cement grout.
.11 Organic adhesive.
.12 Slip resistant tile.
.13 Waterproofing isolation membrane.
.14 Fasteners.

.3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
.1 Base tile: submit duplicate, 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.
.2 Floor tile: submit duplicate, 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.
.3 Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, colour, and size.
.4 Adhere tile samples to 11 mm thick plywood and grout joints to represent project installation.

1.4 QUALITY ASSURANCE

.1 Quality Assurance Submittals:
.1 Manufacturer's Instructions: manufacturer's installation instructions.
.2 Manufacturer's Field Reports: manufacturer's field reports specified.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:
.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 21 - Construction/Demolition Waste Management and Disposal.

1.6 AMBIENT CONDITIONS

.1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 degrees C for 48 hours before, during, and 48 hours after, installation.

.2 Do not install tiles at temperatures less than 12 degrees C or above 38 degrees C.

.3 Do not apply epoxy mortar and grouts at temperatures below 15 degrees C or above 25 degrees C.

1.7 MAINTENANCE

.1 Extra Materials:

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
.2 Provide minimum 5% of each type and colour of tile required for project for maintenance use. Store where directed.
.3 Maintenance material same production run as installed material.

1.8 WARRANTY

.1 For works in the present section, the 12 month warranty period prescribed in the general conditions is extended to 5 years

.2 Provide a written and jointly signed document issued by the manufacturer and the installer in the name of Canada, certifying the tiling woks from delamination, flaring, colour fading, crevices, loss of watertightness, for a period of 5 years. Refer to the general conditions for the beginning of the warranties

.3 The warranties must include the fast correction of any defect upon reception of a written notice to Canada to this effect. The repairing works must include workmanship, materials, equipments and the required services to repair the de defectives parts of the building and, in the case of manufactured elements, the supplying and installation of new replacement parts, all of it free of charge and to the departmental representative liking. The warranties must also include the repairing or the replacement of the other components of the building (and its finishes) and any other works of the departmental representative, damaged or moved during the repairing of the defects to the work.

2 PRODUCTS

2.1 MATERIALS – GENERAL POINTS

.1 All the mortars, adhesives, additive products, membranes and grouts must come from the same manufacturer.

.2 All the tiles of a given type must come from a one and only manufacturer and must be modular.

.3 The tiling bonding coat and the grout must be supplied by the same manufacturer.

2.2 FLOOR TILING

.1 Ceramic tiles: conform to CAN/CGSB-75.1 standard

.1 Acceptable products:
.1 ***** Tuile Olympia Eco-Stone, colour Grigio # 7600564, size 300 mm x 600 mm, 9.5 mm thick. *** TO PRIORITIZE AS EXISTING**
.2 Soligo Gravel Serie tile, colour Mud # CA70682, size 300 mm x 600 mm, 9.5 mm thick.
.3 Ciot Tecnica Serie tile, colour Cenere, size 300 mm x 600 mm, 9.5 mm thick.
.4 or replacement product approved by addenda in accordance with the instructions to the bidders.

2.3 BASEBOARDS

.1 Baseboards: blocks of the type, shape, colour and texture corresponding to the adjoining floor tiling.

2.4 EDGE ELEMENT

.1 The characteristics of the edge elements must correspond to those of the tiling

.2 The edge element to install on constantly humid horizontal surfaces must be non-slip surface.

.3 The size and dimension of the edge elements must correspond to the tile elements, joints included, unless otherwise indicated.

.4 Internal and external angles: the following edge elements must be planned at the indicated location.

.1 Rounded edge elements for external angles edges.
.2 Groove elements for internal angles.

2.5 TILING BONDING COAT

.1 Portland cement mortar-glue (dry mortar or for dry setting): two components (powder and liquid polymer), conform to ANSI A118.4

1 Acceptable products:
.1 Proma Probond grey with for walls and Probond Plus..
.2 Mapei Kerabond grey white and Keralastic
.3 TEC TA 337 with additive TA 862
.4 or replacement product approved by addenda in accordance with the instructions to the bidders

.2 Water: drinkable and free from minerals or chemicals that could spoil the mortar and grout mixes. (Where there is no water supply system, use bottled water).

2.6 GROUT

.1 Pigments:

.1 Mineral pigments, lime resistant, non-fading, conform to ASTM C979 standard.
.2 Pigments must be added to the grout by the manufacturer.
.3 Grouts coloured on site are not accepted.
.4 Pigments can be added to the commercial type cement grouts, to the grout for dry setting and to latex modified cement grout.

.2 Chemicals resistant grout: conform to ANSI A118.3 standard, non-slip, high resistance and 100% solids.

.1 Acceptable products:
.1 Proma Prosuperpoxy 2
.2 Mapei Kerapoxy
.3 TEC TA440
.4 or replacement product approved by addenda in accordance with the instructions to the bidders

2.7 ACCESSORIES

.1 Transition and tape edgings:

.1 Stainless steel extruded special elements to cover the top of the tiling baseboard and transition between the floor finishes.

.2 Reducer strip : stainless steel extruded special elements showing a maximal slope of 1:2.

.3 Prefabricated control joints: stainless steel extruded special elements with a coloured elastomer strip.

.1 Acceptable product: Schluter Systems DILEX-EKSA

.4 Floor drain

.1 Refer to documents in division 22 - Plumbing

.5 Tightness product:

.1 To seal joints and drill into the wall ceramic works: mono-component silicone rubber sealant with incorporated fungicide conform to CAN/CGSB-19.22-M standard, colours chosen by the departmental representative among the manufacturer's standard range.

.1 Acceptable product: Dow Corning #786

.2 To seal control joints in floor ceramic works: sealant conform to CAN/CGSB-19.24-M standard, last revision, type 1 category B, self-leveling, colours chosen by the departmental representative among the manufacturer's standard range

.1 Acceptable product : Tremco THC 900 or 901

.3 Backup strips, primers and other accessories: according to the recommendations in section 07 92 00 – Joints' tightness

.6 Sealer (primer) and floor sealer: conform to the recommendations of the tiling and grout manufacturer,

.7 Cleaning products

.1 Specially designed products for cleaning masonry and concrete surfaces, but that do not spoil the bonding of the various layers of sealer for the setting of tiling, including the patching-smoothing layers as well as the layers and elastomer base waterproofing membranes.

.2 Products with acid or caustic matters are not accepted.

2.8 PATCHING-SMOOTHIGS SEALER

.1 Portland cement base polymer resins pre-dosed mix, specially designed to recharge and smooth the concrete support-slabs. Products with gypsum are not accepted.

.2 The sealer must be able to be applied in three coats of no more than 50 mm thick, to feather edged and smooth with a trowel.

.3 The sealer coating must be ready to receive the following coating 48 hours after application.

.4 Patching-smoothing sealer mixed with a polymer applicable with a trowel:

.1 Acceptable products:

.1 Proma Propatch Plus

.2 Mapei Planipatch plus

.3 TEC TA330

.4 or replacement product approved by addenda in accordance with the instructions to the bidders.

.5 Primers and adhesives: as required and recommended by the manufacturer of the patching-smoothing sealer.

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 INSPECTION

.1 Examine the state of the surfaces, supports and works intended to receive the ceramic tiles.

.2 Checking the conditions: before proceeding to the setting of the ceramics, make sure that the state of the surfaces/supports first set up at the end of other sections or contracts and the flatness variations are acceptable and allow for the realization of the works in accordance to the manufacturer’s written instructions.

.1 Inform the departmental representative immediately of any unacceptable conditions detected.

.2 Have the installation surfaces approved by the technical representative of the supplier. Send this approval immediately to the departmental representative.

.3 Start installation works only after having corrected the unacceptable conditions and received the written approval of the control desk inspector of the ceramics’ supplier. Beginning the works without this approval means the acceptation of the base works and the responsibility of their correction if need be.

3.3 PREILMINARY WORKS

.1 Preparing the support

.1 Inspect the supports to determine the works that must be made to have them clean to receive the ceramic tiling.

.2 Fill in the 3 mm wide crevices and smooth the protrusions of more than 1 mm with an appropriate and compatible patching-smoothing sealer.

.3 Respect the manufacturer recommendations with regard to thickness of sealer to apply.

.4 Apply a compatible primer on the large surfaces to repair.

.5 Concrete supports must be dry, hardened and clean.

.6 Concrete supports must be free from paint, dirt, grease, oil, curing compound and désolidarisation, sealer and any other contaminant susceptible of spoiling the gluing of the bonding sealer.

.7 Apply on the porous or powdery concrete supports a primer compatible with the bonding sealer so as to make the surface suited to receive a covering set by direct bonding on the support.

.2 Preparing the surfaces: prepare the surfaces in accordance with the Terrazzo, Tile and Marble Association of Canada (TTMAC) and in the allowed tolerances.

.3 Preparing the supports ceramic tiling: according to the manufacture’s written instructions.

3.4 QUALITY OF EXECUTION

.1 Unless otherwise indicated, execute the tiling according to the manual titled “Tile setting manual 2006/2007” published by the Terrazzo, Tile and Marble Association of Canada (TTMAC)

.2 Set the tiles or support sealers on sound and clean surfaces.

.3 .Adjust the tiles at the angles, around the accessories, equipments, floor drains and other embedded objects. Make even joints. Cut the edged so that they are clean and smooth.

.4 Maximum flatness deviation admissible is 1:800.

.5 Make even joints of the width recommended by the manufacturer so that the tiles be plumb, square, aligned and all in the same plan. Make sure that we do not distinguish the different tile boards in the finished work. Align the patterns.

.6 Set the tiling so that the peripheral tiles measure less than half of their full size. Plan a staggered n installation of the tiling, overlapping 1/3:2/3.

.7 After setting, pat the tiles and replace those that sound hollow in order to obtain a perfect adherence.

.8 Make the inside corners with sharp edges and the outside corners with smooth edges.

.9 Use smooth edges tiles to finish the a wall panel except at the crossing line of the panel with an overhanging surface or in a different plan.

.10 Set the baguette joints where the floor tiling and different floor coverings meet.

.11 Wait at least 24 hours after setting the tiles before applying the jointing grout.

.12 Once the work has hardened and that the grout is well set, clean the tiled surfaces.

.13 Execute control joints at the indication locations, of a width equal to the one of the joints between the tiles. Fill in the control joints with waterproofing product conform to section 07 92 00 – Waterproofing products for joints. Keep the expansion joints of the building free mortar and grout.

.14 Use the double spread method in order to reduce the voids.

.15 Unless otherwise indicated, set the door openings, interrupt the floor tiling under lateral axis of the door when the tiling finish or colour is different in the adjoining rooms. Install the transition molding centered in the median plane of the door or the frame.

.16 Unless otherwise indicated, set the floor tiling flush with the adjoining finishes. Make tiling slope at the door openings, when required, to join the finishes with the existing floors. The slope must not exceed 1:12 (8.33%). The vertical drops are not acceptable.

.17 At the saw marks and the construction or expansion joints, set the tile in accordance with the TTMAC 301 MJ-E detail and according to the manufacturer’s written instructions.

3.5 FLOOR TILING

.1 Set the tiling accordance with the TTMAC 311F-2002A detail and according to the manufacturer’s written instructions.

3.6 BASEBOARDS

.1 Set the tiling accordance with the TTMAC instructions.

3.7 PRIMER AND FLOOR SEALERS

.1 Apply in accordance with the manufacturer's instructions.

3.8 ACCESSORIES

.1 Install the prefabricated tape edgings, transition and control joints according to the manufacturer's written instructions and the minimum following instructions:

- .1 For protection, outside angles decoration, install a Schiene type molding.
- .2 At the changes of different finishes and of same thickness, install a Schiene type molding.
- .3 At raising finishes changes, install a Quadec type molding.
- .4 At the baseboards stoppers, install a Quadec type molding.
- .5 At the top of the baseboards, install a Schiene type molding.

3.9 QUALITY CONTROL ON SITE

.1 Controls made on site by the manufacturer.

- .1 The manufacturer must make recommendations regarding the use of the product(s), and make periodic visits to verify if the setting up has been made according to his recommendations

3.10 CLEANING

.1 . Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning

- .1 . Leave Work area clean at end of each day.
  - .1 Remove any trace of primer and sealer, caulking and waterproofing.
  - .2 Clear the finished surfaces of the mastic and any other material used to set glazings.
  - .3 Remove all the tags, once the works completed.
  - .4 Clean the glazing with a non-abrasive product, according to the manufacturer's instructions.
- .2 Final cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.2 Waste Management: separate waste materials for 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 facilities.

3.11 PROTECTION

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

.2 Once the installation completed, mark each glazing with an X with a removable compound or plastic tape.

- .1 Do not mark mirrored glass or heat absorbing glass panels.

.3 Repair the damages caused by the installation of the glazings to adjoining materials.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 09 53 00.01 Acoustical suspension

.2 Sections for divisions: 23 and 26 for embedded sprinklers, mechanical, lighting and communication equipments.

1.2 REFERENCE STANDARDS

.1 American Society for Testing and Materials International (ASTM)
- .1 ASTM C 423-02a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- .2 ASTM E 1264-98, Standard Classification for Acoustical Ceiling Products.
- .3 ASTM E 1477-98a(2003), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction and Amendment No. 1 [1988].
- .2 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.

.3 Canadian Standards Association (CSA International)
- .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.4 Department of Justice Canada (Jus)
- .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
- .2 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).

.6 Underwriter's Laboratories of Canada (ULC)
- .1 CAN/ULC-S102-[2003], Surface Burning Characteristics of Building Materials and Assemblies.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data: submit WHMIS MSDS.

.3 Co-ordinate submittal requirements and provide submittals required.

.4 Submit duplicate samples of each type acoustical units.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements:
- .1 Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by Canadian Certification Organization accredited by Standards Council of Canada.

.2 Mock-up:

.1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
.2 Construct mock-up 15m^{2}minimum of each type acoustical panel ceiling including one inside corner and one outside corner.
.3 Construct mock-up where directed.
.4 Allow 72 hours for inspection of mock-up by Ministerial Representative before proceeding with ceiling work.
.5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.

.3 Health and Safety:
.1 Do construction occupational health and safety in accordance with Section [01 35 29.06 - Health and Safety Requirements].

1.5 DELIVERY, STORAGE AND HANDLING

.1 Protect on site stored or installed absorptive material from moisture damage.

.2 Store extra materials required for maintenance, where directed by Ministerial Representative.

.3 Waste Management and Disposal:
.1 Separate waste materials for recycling] in accordance with Section 01 74 21 - Construction /Demolition Waste Management and Disposa].
.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material [in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).
.4 Separate for recycling and place in designated containers Steel, Metal, Plastic waste in accordance with Waste Management Plan.
.5 Place materials defined as hazardous or toxic in designated containers in accordance with Section 01 35 43 - Environmental Procedures.
.6 Handle and dispose of hazardous materials in accordance with CEPA, Regional and Municipal, regulations.
.7 Ensure emptied containers are sealed and stored safely in accordance with Section 01 35 43 - Environmental Procedures.
.8 Fold up metal and plastic banding, flatten and place in designated area for recycling.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Permit wet work to dry before beginning to install.

.2 Maintain uniform minimum temperature of 15 degrees C and humidity of 20-40% before and during installation.

.3 Store materials in work area 48 hours prior to installation.

1.7 EXTRA MATERIALS

.1 Provide extra materials of acoustic units in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide acoustical units amounting to 5% of gross ceiling area for each pattern and type required for project.

.3 Ensure extra materials are from same production run as installed materials.

.4 Clearly identify each type of acoustic unit, including colour and texture.

.5 Deliver to Ministerial Representative, upon completion of the work of this section.

1.8 WARRANTY

.1 For works in the present section, the 12 month warranty period prescribed in the general conditions is extended to 5 and 10 years.

.2 Provide a written and jointly signed document issued by the manufacturer and the installer in the name of Canada, certifying that the supplied ceiling acoustic elements will remain free from any material, finish, manufacturing defect for a period of ten (10 years); refer to the general conditions.

.3 The installer of the ceiling acoustic elements supplied in this section must provide a written and signed document, issued in the name of Canada certifying that the works in the present section are warranted from any installation defect for a period of 5 years; refer to the general conditions.

.4 The warranties must include the fast correction of any defect upon reception of a written notice from the departmental representative to this effect. The repairing works must include workmanship, materials, equipments and services required to repair the defective parts of the work and in the case of manufactured elements, the supplying and installation of new replacement parts, all of it free of charge and to the departmental representative liking. The warranties must also include the repairing or the replacement of the other components of the building (and its finishes) and any other works of the departmental representative, damaged or moved during the repairing of the defects to the work.

2 PRODUCTS

2.1 MATERIALS

.1 Acoustic units for suspended ceiling system: to ASTM E 1264.
- .1 Type IV, form 2, E pattern.
- .2 Resistant to Class A fire.
- .3 Durabrite Hydroformed mineral fibers with acoustically transparent membrane.
- .4 Textures: fine.
- .5 Flame spread rating of 25 or less in accordance with CAN/ULC-S102.
- .6 Smoke developed 50 or less in accordance with CAN/ULC-S102.
- .7 Noise Reduction Coefficient (NRC) designation: 0..80
- .8 Ceiling Attenuation Class (CAC) rating 35, in accordance with ASTM E 1264
- .9 Light Reflectance (LR) range of [_____] to [ASTM E 1477] [_____].
- .10 Colour. White
- .11 Size 610 mm x 1220 mm x 25 mm thick.
- .12 Shape: square suspended.

.2 Acceptable products
- .1 Armstrong Ultima tegular 1943
- .2 Rockfon Sona tegular 16101
- .3 CGC Mars tegular 88185
- .4 or replacement product approved by addenda in accordance with instructions to bidders

3 EXECUTION

3.1 EXAMINATION

.1 Do not install acoustical panels and tiles until work above ceiling has been inspected by

Ministerial Representative.

3.2 INSTALLATION

.1 Install acoustical panels and tiles in ceiling suspension system.

.2 Install fibrous acoustical media [and spacers] over entire area above [suspended metal panels].

.3 In fire rated ceiling systems, secure lay-in panels with hold-down clips and protect over light fixtures, diffusers, air return grilles and other appurtenances according to Certification Organizations design requirements.

3.3 INTERFACE WITH OTHER WORK

.1 Co-ordinate with Section 09 53 00.01 - Acoustical Suspension.

.2 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

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.

.2 Waste Management: separate waste materials for 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.

3.4 PROTECTION

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

.2 Repair damage to adjacent materials caused by non-structural metal framing application.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 09 51 13 Acoustical Panel ceilings.

.3 Sections for divisions: 23 and 26 for the trims of embedded mechanical, electrical and electronic equipments.

1.2 REFERENCE STANDARDS

.1 ASTM International
- .1 ASTM C 635/C 635M-07, Standard Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
- .2 ASTM C 636/C 636M-08, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).

1.3 CALCULATION CRITERIA

.1 Maximum flexion: deflection of 1/360 of the span, determined by the bending tests prescribed in ASTM C 635 standard.

.2 Submit the calculation notes showing that the design of the suspended ceilings meets the requirements article 4.1.8,Charges and effects due to earthquakes**,** National Building Code of Canada (NBC 2010) or those of ASTM E 580/E 580M, Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Moderate Seismic Restraint. These calculations must bear the seal and signature of an engineer acknowledged in Canada. This seal certifies that the designs of the works prescribed in the present section answer the requirements of the contract documents.

.3 In addition, these sealed calculations certify that the capacity of the anchorings to the supports indicated supports in the installation plans and are used to answer the requirements of the NBC and of the applicable standards.

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 [acoustical suspension] and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
- .1 Submitted drawings must bear the seal and signature of an engineer acknowledged or licensed in Canada.
- .2 Submit reflected ceiling plans for special grid patterns as indicated.
- .3 The shop drawing must clearly show the layout, spacing details and fastening method of the anchoring and suspension elements to meet the requirements imposed by a seismic categorization B for ceiling grid braces, location of hidden splines, changes in level

details, access door dimensions, and locations and acoustical unit support at ceiling fixture, lateral bracing and accessories.

.4 Samples:
- .1 Submit for review and acceptance of each unit.
- .2 Samples will be returned for inclusion into work.
- .3 Submit one representative model of each type ceiling suspension system.
- .4 Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.

1.5 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for acoustical suspension for incorporation into manual.

1.6 QUALITY ASSURANCE

.1 Fire-resistance rated suspension system: certified by a Canadian Certification Organization accredited by Standards Council of Canada.

.2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance criteria and physical characteristics, namely the requirements for seismic charges.

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, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store acoustical ceiling braces so as to protect them 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 in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.8 WARRANTY

.1 For works in the present section, the 12 month warranty period prescribed in the general conditions is extended to 10 years.

.2 Provide a written and jointly signed document issued by the manufacturer and the installer in the name of Canada, certifying that the installed braces will remain free from any material, manufacturing, finish and installation defect for a period of 10 years. Refer to the general conditions.

.3 The warranties must include the fast correction of any defect upon reception of a written notice

from the departmental representative to this effect. The repairing works must include workmanship, materials, equipments and services required to repair the defective parts of the work and in the case of manufactured elements, the supplying and installation of new replacement parts, all of it free of charge and to the departmental representative liking. The warranties must also include the repairing or the replacement of the other components of the building (and its finishes) and any other works of the departmental representative, damaged or moved during the repairing of the defects to the work

2 PRODUCTS

2.1 MATERIALS

.1 Heavy duty system to ASTM C 635/ASTM C635M.

.2 Basic materials for suspension system: commercial quality hot rolled steel.

.3 Suspension system: non fire rated, made up as follows:
- .1 Parallel exposed T section grid.
- .2 Acceptable products:
  - .1 Armstron Prelude XL suspension, 24 mm
  - .2 Rockfon #1250 suspension, 24 mm
  - .3 CGC DX/DL suspension, 24 mm
  - .4. or replacement product approved by addenda in accordance with the instructions to the bidders.

.4 Hanger wire: galvanized soft annealed steel wire:
- .1 3.6 mm diameter for access tile ceilings.
- .2 2.6 mm diameter for other ceilings.

.5 Carrying channels: 38 x 19 mm channel, painted steel.

.6 White extruded aluminum molding, supplied by the manufacturer of suspension braces for vertical installation between two different ceiling levels. Moulding height ± 50 mm.

.7 Accessories: splices, clips, metal ties (wire or other), retainers, anchoring for perimeter rod, sections and shims and wall-ceiling moulding for flush or recessed erection, to achieve a complete suspension grid, as recommended by system manufacturer.

.8 Staples release :
- .1 Acceptable products :
  - .1 Modèl CHDC, Armstrong
  - .2 Modèl 935, Chicago Metallic of Rockfon
  - .3 Modèl PZ (variable locking hold-down clip) of CGC

3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for acoustical ceiling tile and track installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of Ministerial Representative.
- .2 Inform Ministerial 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 Ministerial Representative.

3.2 INSTALLATION

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

.2 Installation: to ASTM C 636/C 636M except where specified otherwise.

.3 Install suspension system to manufacturer's instructions and Certification Organizations tested design requirements.

.4 Seismic restraint: install the grid elements in accordance to ASTM E 580-87 standard, manufacturer’s instructions and the sop drawing certified by a qualified engineer.

.5 Do not erect ceiling suspension system until work above ceiling has been inspected and approved by Ministerial Representative.

.6 Secure hangers to overhead structure using attachment methods as indicated on the sop drawings and installation plans certified by a qualified engineer concerning the resistance to earthquakes and the suspension of the equipments and other heavy objects.

.7 Install hangers spaced at maximum 1200mm centres and within 150 mm from ends of main tees.

.8 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter with border units not less than 50% of standard unit width system according to reflected ceiling plan.

.9 Ensure suspension system is co-ordinated with location of related components.

.10 Install wall moulding to provide correct ceiling height.

.11 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles and speakers

.12 Support at light fixtures, diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.13 Interlock cross member to main runner to provide rigid assembly.

.14 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.

.15 Finished ceiling system to be square with adjoining walls and level within 1:1000.

.16 Expansion joints:
- .1 All along the building’s expansion joint, install parallel to and at ± 100 mm from each other, two main T bearing sections. A joint cover for expansion joint will be installed between the two T sections in accordance with the instructions in section 07 95 13 Joint covers for expansion joints.

.17 Staples release to be installed only in room # 18 –Luggage room

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
  .1 Touch up scratches, abrasions, voids and other defects in painted surfaces.

.3 Waste Management: separate waste materials for 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.

3.4 PROTECTION

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

.2 Repair damage to adjacent materials caused by acoustical suspension installation.

END OF SECTION

1 GENERAL POINTS

1.1 RELATED REQUIREMENTS

.1 Section 09 21 16 Gypsum board assemblies

1.2 REFERENCE STANDARDS

.1 The Master Painters Institute (MPI)
  .1 Maintenance Repainting Manual 2004, Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List.

.2 Environmental Protection Agency (EPA)
  .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).

.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
  .1 SCAQMD Rule 1113-04, Architectural Coatings.

1.3 QUALITY ASSURANCE

.1 Conform to latest MPI requirements for interior repainting work including cleaning, preparation and priming.

.2 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners and solvents) shall be in accordance with the latest edition of the MPI Approved Product List and shall be from a single manufacturer for each system used.

.3 Paint materials such as linseed oil, shellac, reducers and turpentine shall be the highest quality product of an approved manufacturer listed in MPI Maintenance Repainting Manual and shall be compatible with other coating materials as required.

.4 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Ministerial Representative.

.5 Standard of Acceptance: when viewed using final lighting source surfaces shall indicate the following:
  .1 Walls: no defects visible from a distance of 1000 mm at 90degrees to surface.
  .2 Ceilings: no defects visible from floor at 45 degreesto surface.
  .3 Final coat to exhibit uniformity of colour and sheen across full surface area.

.6 Mock-ups: construct mock-ups in accordance with Section 01 45 00 - Quality Control.
  .1 Provide a mock-up in accordance with requirements of Section 01 45 00 - Quality Control to Ministerial Representative.
  .2 Prepare and repaint mock-up designated interior room, surface or item to requirements specified herein, with specified paint or coating showing selected colours, gloss/sheen, textures and workmanship to MPI Maintenance Repainting Manual standards for review and approval.
  .3 When approved, repainted room, surface and/or item shall become acceptable standard of finish quality and workmanship for similar on-site interior repainting work.

1.4 PERFORMANCE REQUIREMENTS

.1 Environmental Performance Requirements: ecological performance required in accordance with the Green Seal Agency MPI GPS-1 "Green Seal" standard.

.2 Provide paint products meeting MPI "Environmentally Friendly" E3 ratings based on VOC (EPA Method 24) content levels. When products are not E3 homologated by the MPI, use product having received the E2 rating.

.3 Where indoor air quality (odour) is a problem, use only MPI listed materials having a minimum E3 rating.

1.5 SCHEDULING

.1 Submit work schedule for various stages of painting to Ministerial Representative for review. Submit schedule a minimum of 48 hours in advance of proposed operations.

.2 Paint occupied facilities in accordance with approved schedule. Schedule operations to approval of Ministerial Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

.3 Obtain written authorization from Ministerial Representative for changes in work schedule.

.4 Schedule repainting operations to prevent disruption by other trades if applicable and by occupants in and about building.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide product data and manufacturer's installation/application instructions for each paint and coating product to be used in accordance with the requirements of Section 01 33 00 - Submittal Procedures.

.2 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
- .1 Submit full range colour sample chips for review and selection. Indicate where colour availability is restricted.
- .2 Submit WHMIS MSDS - Material Safety Data Sheets for paint and coating materials.

.3 Closeout Submittals:
- .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
  - .1 Submit records of products used. List products in relation to finish system and include following:
    - .1 Product name, type and use (i.e. materials and location).
    - .2 Manufacturer's product number.
    - .3 Colour code numbers.
    - .4 MPI Environmentally Friendly classification system rating.
    - .5 Manufacturer's Material Safety Data Sheets (MSDS).

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements, supplemented as follows:.
- .1 Deliver and store materials in original containers, sealed, with labels intact.
- .2 Labels to indicate:
  - .1 Manufacturer's name and address.
  - .2 Type of paint or coating.

.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.
.4 Store and handle in accordance with manufacturer's recommendations.
.5 Store materials and equipment in secure, dry, well-ventilated area with temperature range between 7 degrees C to 30]degrees C. Store materials and supplies away from heat generating devices and sensitive products above minimum temperature as recommended by manufacturer.
.6 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Ministerial Representative. After completion of operations, return areas to clean condition to approval of Ministerial Representative.
.7 Remove paint materials from storage in quantities required for same day use.
.8 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
.9 Fire Safety Requirements:
.1 Provide one 9 kg Type ABC dry chemical 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 daily.
.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada.

.2 Waste Management and Disposal:
.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
.2 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
.3 Materials that cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
.4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
.5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
.1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.
.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
.4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
.5 Empty paint cans are to be dry prior to disposal or recycling (where available).
.6 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.
.6 Where paint recycling is available, collect waste materials by type and provide for delivery to recycling or collection facility.
.7 Set aside and protect surplus and uncontaminated finish materials: Deliver to or arrange collection by organizations for verifiable re-use or re-manufacturing.

1.8 SITE CONDITIONS

.1 Heating, Ventilation and Lighting:
- .1 Do not perform repainting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above [10] degrees C for 24 hours before, during and after paint application and until paint has cured sufficiently.
- .2 Ventilate enclosed spaces in accordance with Section 01 35 29 Health and dafety requirements. Where required, provide continuous ventilation for seven days after completion of application of paint.
- .3 Co-ordinate use of existing ventilation system with General Contractor and Ministerial Representative and ensure its operation during and after application of paint as required.
- .4 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements. Use of gas-fired appliances is not permitted.
- .5 Do not perform painting work unless minimum lighting level of 323 Lux is provided on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:
- .1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer, do not perform repainting work when:
  - .1 Ambient air and substrate temperatures are below 10 degrees C.
  - .2 Substrate temperature is over 32 degrees C unless paint is specifically formulated for application at high temperatures.
  - .3 Relative humidity within area to be repainted is above 85%.
- .2 Conduct moisture tests using properly calibrated electronic Moisture Meter, except use simple "cover patch test" on concrete floors to be repainted.
- .3 Do not perform repainting work when maximum moisture content of substrate exceeds:
  - .1 12% for concrete and masonry (clay and concrete brick/block).
  - .2 15% for wood.
  - .3 12% for plaster and gypsum board.
- .4 Test painted concrete, masonry and plaster surfaces for alkalinity as required.

.3 Surface and Environmental Conditions:
- .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when ventilation conditions are such that airborne particles will not affect quality of finished surface.
- .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.
- .3 Apply paint when previous coat of paint is dry or adequately cured, unless otherwise pre-approved by specific coating manufacturer.
- .4 Apply paint in occupied facilities unoccupied rooms or areas. Schedule operations to approval of the Ministerial Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

1.10 MAINTENANCE

.1 Extra Materials:

.2 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.3 Submit one - four litre can of each type and colour of finish coating. Identify type and colour in relation to established colour schedule and finish system.

2 PRODUCTS

2.1 MATERIALS

.1 Paint materials listed in latest edition of MPI Approved Product List (APL) are acceptable for use on this project.

.2 Where required by authorities having jurisdiction, paints and coatings to provide a fire resistant rating.

.3 Paint materials for repaint systems to be products of single manufacturer.

.4 Only qualified products with MPI "Environmentally Friendly" E3 and E2 rating are acceptable for use on this project.

.5 Use only MPI listed L rated materials.

.6 Paints, coatings, thinners, solvents, cleaners and other fluids used in repainting, to be as follows:
- .1 Be manufactured without compounds which contribute to ozone depletion in upper atmosphere.
- .2 Be manufactured without compounds which contribute to smog in lower atmosphere.
- .3 Be manufactured where matter generating 'Biochemical Oxygen Demand' (BOD) in undiluted production plant effluent discharged to natural watercourse or a sewage treatment facility lacking secondary treatment does not exceed 15 mg/L.
- .4 Be manufactured where total suspended solids (TSS) content in undiluted production plant effluent discharged to natural watercourse or sewage treatment facility lacking secondary treatment does not exceed 15 mg/L.

.7 Paints and coatings must not be formulated or manufactured with formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.

.8 Water based covering products, new or recycled, must have a flash point of 61:00C or more.

.9 Painting products and sealers must be manufactured and transported so that every steps of the process, including the disposal of wastes generated during the works, conform to the relevant requirements of governmental laws, order and rules, including in the case of installations located in Canada, to the Fisheries Act and the Canadian Environmental Protection Act (CEPA).

2.2 COLOURS

.1 Ministerial Representative will provide Colour Schedule after Contract award.

.2 Colour schedule will be based upon selection of eight base colours and twelve accent colours. No more than twenty colours will be selected for entire project and no more than three colours will be selected in each area.

.3 Selection of colours will be from manufacturers full range of colours.

.4 Where specific products are available in restricted range of colours, selection will be based on limited range.

.5 First coat in three coat (Premium) repaint system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting

materials.

.2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.

.3 Where thinner is used, addition not to exceed paint manufacturer's recommendations. Do not use kerosene or such organic solvents to thin water-based paints.

.4 Thin paint for spraying in accordance with paint manufacturer' instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Ministerial Representative.

.5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

.1 Paint gloss defined as sheen rating of applied paint, in accordance with following MPI gloss / sheen standard values:

Gloss Level Category	Units @ 60 Degrees	Units @ 85 Degrees
G1 - matte finish	0 to 5	maximum 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	minimum 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	

.2 Gloss level ratings of repainted surfaces shall be as specified herein and as noted on Finish Schedule.

2.5 INTERIOR RESTORING PAINTING SYSTEMS

.1 General points:

.1 For the acceptable products mentioned in the painting systems, the acceptable products equivalent to each product from:

.1 Benjamin Moore,
.2 Dulux (Bétonel),
.3 Sherwin-Williams,
.4 PPG are accepted as replacement products.
.5 or replacement product approved by addenda in accordance with the instructions to the bidders

.2 System 01 – System for gypsum board walls (except in bathrooms and equipment rooms).

.1 Preparation of the surfaces: conform to 85-GP-33M standard.

.2 Latex sealer primer, 0 VOC, MPI approved and conform to CAN/CSGB-1.119-95 standards.

.1 Reference product: ECOSOURCE 850-130.

.3 Finish: 2 coats of 100% acrylic latex paint, eggshell finish, 0VOC, 15 to 25% sheen (85 degrees); MPI and Green Seal GS-11 approved.

.1 Reference product: ECOSOURCE Serie 853

.3 System 02 - System for gypsum board walls in bathrooms and equipment rooms.

.1 Preparation of the surfaces: conform to 85-GP-33M standard.

.2 Latex sealer primer, conform to CAN/CSGB-1.119-95 and MPI-6 standards, 0 VOC 83 g/l.

.1 Reference product: SICO EXPERT 870-177

.3 Finish: 2 coats of 100% acrylic latex paint, melamine finish, MPI-43 approved, VOC <150g/l, 20-30% sheen (60 degrees).

.1 Reference product: SICO EXPERT Serie 875.

.4 System 03 - System for gypsum board ceiling

.1 Preparation of the surfaces: conform to 85-GP-33M standard.

.2 Latex sealer primer, low VOC, MPI approved and conform to CAN/CSGB-1.119-95 standards.

.1 Reference product: SICO EXPERT 870-177

.3 Finish: 2 coats of interior latex paint finish mat for ceiling. Low VOC.(85degrees): 0 to 5%, MPI approved.

.1 Reference product: SICO EXPERT Serie 871.

.5 System 04 - System for concrete wall panels

.1 Preparation of the surfaces: conform to ONGC 1.138 standard and to the manufacturer's instructions.

.2 Clean thoroughly according to the manufacturer's instructions.

.3 Apply 3 coats of acrylic latex mat such as Sico Expert Serie 971.

.6 System 05 - System for galvanized or zinc coated surfaces (interior steel doors and frames and other metals left with a hot dip galvanized finih.

.1 Preparation of the surfaces in accordance with ONGC 85-GP-16M standard and according to the manufacturer's instructions.

.2 Treat the surface with a cleaner and de-rusting for metal.

.1 Reference product : SICO 635-104.

.3 Rince with clear water.

.4 Finish: 2 coats of 1 component paint without VOC.

.1 Reference product: Sierra S37.

.7 System 06 – 2 components floor water base epoxy coating system for equipment rooms, 0 VOC industrial quality primer.

.1 Mechanical preparation of all the surfaces to paint, necessary to remove existing paint surfaces and/or to apply the covering system.

.2 Two finishing coats of the thickness of a dry film per coat: 125 microns (5 mils), thickness of wet film to obtain dry film: 250 microns (10 mils).

.1 Reference product: SICO SIERRA S-40 / RUST-OLÉUM

.3 Colour: at the choice of the ministerial representative.

.8 System 07 – System for interior material, primed

.1 Preparation of the surfaces: touch up the bare spots in accordance with CAN/CGSB-1.40-97 standard.

.2 Primer/finish: 2 coats of anticorrosion water bas paint for metal, conform to MPI-153 standard.

.1 Reference product: SICO Serie 632

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 EXAMINATION

.1 Interior repainting work: inspected by MPI Accredited Paint Inspection Agency (inspector) acceptable to specifying authority and local Painting Contractor's Association. Painting contractor to notify Paint Inspection Agency a minimum of three week prior to commencement of work and provide a copy of project repainting specification and Finish Schedule (as well as plans and elevation drawings).

.2 Interior surfaces requiring repainting: inspected by both painting contractor and Paint Inspection Agency who will notify Ministerial Representative in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.

.3 Where an assessed degree of surface degradation of DSD-1 to DSD-3 before preparation of surfaces for repainting is revealed to be DSD-4 after preparation, repair or replacement of such unforeseen defects discovered are to be corrected, as mutually agreed, before repainting is started.

.4 Where "special" repainting or recoating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer to provide as part of work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Ministerial Representative.

3.3 PREPARATION

.1 Perform preparation and operations for interior painting in accordance with MPI Maintenance Repainting Manual requirements except where otherwise specified.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

.3 Clean and prepare interior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:

.1 Remove dust, dirt, and surface debris by [vacuuming,] wiping with dry, clean cloths [or compressed air].

.2 Wash surfaces with a biodegradable detergent [and bleach where applicable] and clean warm water using stiff bristle brush to remove dirt, oil and surface contaminants.

.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

.4 Allow surfaces to drain completely and to dry thoroughly. Allow sufficient drying time and test surfaces using an electronic moisture metre before commencing work.

.5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.

.6 Many water-based paints cannot be removed with water once dried. Minimize use of kerosene or such organic solvents to clean up water-based paints.

.4 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminates from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.

.5 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.

.6 Do not apply paint until prepared surfaces have been accepted by Ministerial Representative.

.7 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from distance up to 1000 mm.

3.4 EXISTING CONDITIONS

.1 Prior to commencing work, examine site conditions and existing interior substrates to be repainted. Report in writing to Ministerial Representative and General Contractor damages, defects, or unsatisfactory or unfavourable conditions or surfaces that will adversely affect this 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" and report findings to Ministerial Representative and General Contractor. Maximum moisture content not to exceed specified limits.

.3 Do not commence until such adverse conditions and defects have been corrected and surfaces and conditions are acceptable to Painting Subcontractor and Inspection Agency.

.4 Degree of surface deterioration (DSD) to be assessed using MPI Identifiers and Assessment criteria indicated in MPI Maintenance Repainting Manual. MPI DSD ratings and descriptions are as follows:

Condition	Description
DSD-0	Sound Surface (includes visual (aesthetic) defects that do not affect film's protective properties).

DSD-1 Slightly Deteriorated Surface (indicating fading; gloss reduction, slight surface contamination, minor pin holes scratches).

DSD-2 Moderately Deteriorated Surface (small areas of peeling, flaking, slight cracking, and staining).

DSD-3 Severely Deteriorated Surface (heavy peeling, flaking, cracking, checking, scratches, scuffs, abrasion, small holes and gouges).

DSD-4 Substrate Damage (repair or replacement of surface required).

3.5 PROTECTION

.1 Protect existing surfaces and adjacent fixtures and furnishings from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Ministerial Representative.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.4 Protect general public and building occupants in and about building.

.5 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and surface mounted equipment, fittings and fastenings prior to undertaking re-painting operations. Store items and re-install after painting is completed.

.6 Move and cover furniture and portable equipment as necessary to carry out repainting operations. Replace as painting operations progress.

.7 As repainting operations progress, place "WET PAINT" signs in occupied areas to approval of Ministerial Representative.

3.6 APPLICATION

.1 Apply paint by method that is best suited for substrate being repainted using brush, roller, air sprayer and/or airless sprayer. Conform to manufacturer's application instructions unless specified otherwise. Methods of application as pre-approved by Ministerial Representative before commencing work.

.2 Brush and Roller Application:

- .1 Apply paint in uniform layer using brush and/or roller of types suitable for application.
- .2 Work paint into cracks, crevices and corners.
- .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
- .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple unless approved by Ministerial Representative.
- .5 Remove runs, sags and brush marks from finished work and repaint.

.3 Spray Application:

.1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
.2 Keep paint ingredients properly mixed in containers during paint application by continuous mechanical agitation or intermittent agitation frequently as necessary.
.3 Apply paint in uniform layer, with overlapping at edges of spray pattern.
.4 Back roll spray applications and brush out runs and sags immediately.
.5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.

.4 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Ministerial Representative.

.5 Apply paint coats in continuous manner and allow surfaces to dry and properly cure between coats for minimum time period as recommended by manufacturer. Minimum dry film thickness of coats not less than that recommended by manufacturer. Repaint thin spots or bare areas before next coat of paint is applied.

.6 Sand and dust between coats to remove visible defects.

.7 Repaint surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.

.8 Repaint top, bottom, and vertical edges of doors and frames to be repainted.

.9 Repaint inside of cupboards and cabinets as specified for outside surfaces.

.10 Repaint closets and alcoves to match existing, unless otherwise scheduled or noted.

3.7 MECHANICAL / ELECTRICAL EQUIPMENT

.1 Unless otherwise noted, repainting to include exposed to view / previously painted mechanical and electrical equipment and components (panels, conduits, piping, hangers, and ductwork.).

.2 Touch up scratches and marks and repaint such mechanical and electrical equipment and components with colour, and sheen finish to match existing unless otherwise noted or scheduled.

.3 Do not paint over name plates or instruction labels.

.4 Leave unfinished exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish.

.5 Keep sprinkler heads free of paint.

.6 Do not paint interior transformers and substation equipment.

.7 Standard of Acceptance: when viewed using natural prevailing sunlight at peak period of day (mid-day) on surface viewed, surfaces to indicate following:
.1 Walls: no defects visible from distance of 1000 mm at 90 degrees to surface.
.2 Soffits: no defects visible from grade at 45 degrees to surface.
.3 Final coat to exhibit uniformity of colour and sheen across full surface area.

.8 Apply a primer and one coat of black paint finish G1 on the interior surfaces of the ventilation ducts that can be seen through the louvers.

3.8 SITE QUALITY CONTROL

.1 Inspection:

.1 Advise Ministerial Representative and Paint Inspection Agency when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.2 Co-operate with Paint Inspection Agency and provide access to areas of work.

.3 The inspection on site of the interior painting works will be performed by an independent inspection organism named and hired by the ministerial representative.

3.9 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning, supplemented as follows:.

.1 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

.2 Keep work area free from unnecessary accumulation of tools, equipment, surplus materials and debris.

.3 Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.

.4 Clean equipment and dispose of wash water used for water borne materials, solvents used for oil based materials as well as other cleaning and protective materials (e.g. rags, drop cloths, and masking papers), paints, thinners, paint removers/strippers in accordance with safety requirements of authorities having jurisdiction and as noted herein.

.5 Clean painting equipment in leak-proof containers that will permit particulate matter to settle out and be collected. Sediment remaining from cleaning operations to be recycled or disposed of in manner acceptable to authorities having jurisdiction.

.6 Recycle paint and coatings in excess of repainting requirements as specified.

3.10 RESTORATION

.1 Clean and re-install hardware items removed before undertaken painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on affected exposed surfaces. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust to approval of Ministerial Representative . Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Ministerial Representative.

END OF SECTION

1. GENERAL

1.1 WORK IN AN EXISTING BUILDING

1.1.1 General:

1.1.1.1 The Contractor shall take note that it will be his responsibility to remove all existing mechanical equipment not reused following this work. The costs for this work will be included in his estimate.

1.2 OTHER SPECIALITIES

1.2.1 The Contractor shall carefully consult the drawings of the other specialities before submitting his quote in order to note the modifications to the existing building and to coordinate his work.

1.3 UNUSED PIPING

1.3.1 When existing pipes are no longer used after modification, these and all supports shall be removed in their entirety.

1.4 OBSTACLES

1.4.1 All displacements and / or obstructions will be carried out by the present Contractor as instructed by the Departmental Representative.

1.5 DEMOLITION WORK

1.5.1 The following demolition work shall be carried out by the Contractor concerned by this work.

1.5.1.1 Waterproof the existing unused connections and outlets on piping and master ducts.

1.5.1.2 Use plugs made of the same material and size as the piping and master ducts.

1.5.1.3 All other work required.

1.5.2 All materials, appliances and equipment resulting from the demolition shall remain the property of the Departmental Representative and the Contractor shall dispose of them at a place determined by this one depending of the case.

2. PRODUCTS

2.1.1 Not applicable.

3. EXECUTION

3.1.1 Not applicable.

END OF SECTION

1. GENERAL

1.1 DOCUMENTS/SAMPLES TO BE SUBMITTED

1.1.1 The shop drawings must show or indicate the following:

1.1.1.1 assembly details;

1.1.1.2 the necessary space to allow the use and maintenance of apparatus.

1.1.2 Submit the following documents with the shop drawings and data sheets:

1.1.2.1 detailed drawings of podia, supports/hangers, and anchor bolts;

1.1.2.2 data relating to the acoustic power of systems and apparatus, if applicable;

1.1.2.3 performance curves indicating operating points;

1.1.2.4 a document issued by the manufacturer attesting that the products in question are current models;

1.1.2.5 a certificate of compliance to the pertinent codes.

1.1.3 In addition to the transmittal letter, specify the number of the section and article in question.

1.1.4 Documents/elements to be handed in at work completion

1.1.4.1 The use and maintenance manual must be approved, before final inspection, by the Departmental Representative, who will keep the final copies.

1.1.4.2 The use sheets must include the following:

1.1.4.2.1 diagrams of control/regulation circuits for each system, including the climate control/regulation circuit;

1.1.4.2.2 a description of each system and its control/regulation devices;

1.1.4.2.3 a description of the operation of each system under various loads, with a schedule of set point changes and an outline of seasonal changes;

1.1.4.2.4 instructions concerning the use of each system and each component;

1.1.4.2.5 a description of measures to be taken in case of failure of apparatus/equipment;

1.1.4.2.6 a table of valving apparatus and a flow diagram;

1.1.4.2.7 the colour code.

1.1.4.3 The maintenance sheets must include the following:

1.1.4.3.1 instructions concerning the maintenance, repair, use, and troubleshooting of each component;

1.1.4.3.2 an implementation schedule specifying the frequency and duration of task execution, as well as the necessary tools for executing the tasks.

1.1.4.4 The performance sheets must include the following:

1.1.4.4.1 performance data provided by the manufacturer of the apparatus/ equipment, specifying the working point for each one, to be taken down once the activation is finished;

1.1.4.4.2 the results of performance tests of the apparatus/equipment;

1.1.4.4.3 all other particular performance data specified elsewhere in the contractual documents;

1.1.4.5 Approval

1.1.4.5.1 For the purposes of approval, submit to the Departmental Representative two (2) copies of the preliminary version of the use and maintenance manual. Unless otherwise instructed by the Departmental Representative, the sheets must not be submitted individually.

1.1.4.5.2 Make the required changes to the use and maintenance manual and resubmit it to the Departmental Representative.

1.1.4.6 Additional Information

1.1.4.6.1 Prepare sheets with additional information and append them to the use and maintenance manual if, during the aforementioned training sessions, such sheets are deemed necessary.

1.1.4.7 Documents to keep on site

1.1.4.7.1 The Departmental Representative will provide one (1) reproducible set of mechanical drawings for progressively indicating all changes made over the course of the project.

1.1.4.7.2 Transfer the information recorded on the copy to the drawings in such a way that they show the mechanical systems and apparatus as they are actually installed.

1.1.4.7.3 Use a different-coloured pen with indelible ink for each system.

1.1.4.7.4 Keep these drawings on site and make them available to the concerned persons for reference and verification purposes.

1.1.4.8 As-built drawings

1.1.4.8.1 Before proceeding with TAB (Testing, Adjusting, and Balancing of HVAC systems) operations, complete the as-built drawings.

1.1.4.8.2 Identify each drawing in the lower-right corner, in letters at least 12mm tall, as follows: "AS-BUILT DRAWING: THIS DRAWING HAS BEEN REVIEWED AND SHOWS THE MECHANICAL SYSTEMS/APPARATUS AS THEY ARE ACTUALLY INSTALLED". (Signature of the Contractor) (Date).

1.1.4.8.3 Submit the drawings to the Departmental Representative for approval, and make the necessary corrections according to his instructions.

1.1.4.8.4 Carry out the testing, adjusting, and balancing of HVAC systems with the as-built drawings in hand.

1.1.4.8.5 Submit the reproducible copies of the completed as-built drawings along with the use and maintenance manual.

1.1.4.9 Submit sets of as-built drawings, which will be attached to the definitive TAB report.

1.2 QUALITY CONTROL

1.2.1 Quality control: in accordance with Section 01 45 00 - Quality Control.

1.3 MAINTENANCE

1.3.1 Provide the following spare parts:

1.3.1.1 one (1) set of packing for each pump;

1.3.1.2 one (1) gasket packing for each size of pump;

1.3.1.3 one (1) head gasket for each heat exchanger;

1.3.1.4 one (1) glass tube for each level indicator;

1.3.1.5 one (1) cartridge or one (1) set of filters for each filter or battery of filters, in addition to those that will be installed before the definitive acceptance of the facility.

1.3.2 Provide a kit with all special tools necessary for the maintenance of the apparatus/equipment, in accordance with the recommendations of the manufacturers.

1.3.3 Provide one (1) commercial-quality grease gun, grease, and adaptors for all categories of grease and grease fittings used.

1.4 TRANSPORTATION, STORAGE, AND MAINTENANCE

1.4.1 Waste management and disposal

1.4.1.1 Construction/demolition waste management and disposal: sort and recycle waste with a view to reusing and recycling it in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.5 ADDITIONAL GENERAL INSTRUCTIONS

1.5.1 Refer to Section 22 00 04.

2. PRODUCTS

2.1.1 Not applicable.

3. EXECUTION

3.1 REPAIR /REFURBISHING

3.1.1 Dress and retouch surfaces whose painted finish has been damaged, and ensure that the new finish corresponds to the original finish.

3.1.2 Refurbish all surfaces whose finish has been too greatly damaged to merely require a coat of primer and retouching.

3.2 CLEANING

3.2.1 Clean the inside and outside of all elements, apparatus, and systems, including screens and filters, and vacuum inside air conduits and air treatment apparatus.

3.3 ON-SITE QUALITY CONTROL

3.3.1 On-site testing: carry out the following tests in accordance with Section 01 45 00 - Quality Control and submit the reports according to the requirements stated in the DOCUMENTS/SAMPLES TO BE SUBMITTED section from PART 1.

3.3.2 On-site inspections carried out by the manufacturer

3.3.2.1 Obtain a written report from the manufacturer confirming the compliance of the work to the specified criteria regarding the maintenance, implementation, and application of products as well as the protection and cleaning of the structure, and submit this report in accordance with the DOCUMENTS/SAMPLES TO BE SUBMITTED section from PART 1.

3.3.2.2 The manufacturer must formulate recommendations regarding the use of the product(s) and make periodic visits to verify whether the implementation has been carried out according to his recommendations.

3.3.2.3 Anticipate site visits in accordance with the QUALITY ASSURANCE section from PART 1.

3.4 DEMONSTRATION

3.4.1 The Departmental Representative will use certain apparatus, equipment, and systems for testing purposes before they have been accepted. Provide the necessary labour, equipment, and instruments for carrying out testing.

3.4.2 Provide the tools, equipment, and services of qualified instructors to ensure that use and maintenance personnel are trained, during normal work hours, with respect to the operation, control/regulation, adjustment, diagnosis of problems / troubleshooting, and maintenance of apparatus, equipment, and systems, before these items are accepted.

3.4.3 When specified elsewhere in Division 22 or Division 23, manufacturers must demonstrate the operation of apparatus, equipment, and systems, and guarantee the associated training of the personnel.

3.4.4 Training material must include the use and maintenance manual, as-built drawings, and audio-visual aids.

3.4.5 The requirements relating to the number of hours of training necessary are indicated in each pertinent section.

3.5 PROTECTION

3.5.1 Using appropriate elements, prevent dust, dirt, and other foreign matter from entering through the openings of apparatus, equipment, and systems.

END OF SECTION

1. GENERAL INFORMATION

1.1 REFERENCES

All must be in accordance with the "National Plumbing Code of Canada 2015" and the requirements of municipal authorities.

2. PRODUCTS

2.1 MATERIALS

2.1.1 TABLE 22 BRONZE FAUCETS

TABLE 22C

BRONZE FAUCETS (ref.: 22 11 16)

TYPE	DESCRIPTION	BRAND	THREADED	WELDED	FLANGED
Ball valve 2 inches or less	- 150 psi steam and 600 W.O.G. - Standard ASTM B - 584 - Teflon seat	Nibco Watts Milwaukee Apollo MAS	T -585-66 LF	S-585-66-LF	With 66 SS
Ball valve purge	- 4 137 kPa - Plug and chain	Nibco Kitz Toyo NH	T -585-80 LF HC 68AC 5046 1969Cap	S-585-70 LF HC	

END OF SECTION

APPENDIX A

SHOP DRAWING TO SUBMIT

NORDA STELO

SHOP DRAWING TO SUBMIT

CONTRACTOR :		PROJECT TITLE :	Terminal Blanc-Sablon/ R.103205.001
SPECIALITIES :	PLUMBING		
PROJECT MANAGER :		PROJECT # :	117226.001

DESCRIPTION	QUOTATION NUMBER SECTION	DRAWING RECEIVE ON		REFUSAL OR RÉVISE & RESUBMIT		REVIEWED AND ANNOTATED		REVIEWED		COLOR BY ARCH.
		BY	DATED	BY	DATED	BY	DATED	BY	DATED	
« P » Siphon										
Stop valve										
Plug valve										
Supply piping										
Waste piping										
Insulation										
Bracket piping										

Note : All shop drawings have to reach in one and only dispatch.

Prepared by :	
Date :	

1. GENERAL

1.1 GENERALITIES

1.1.1 This section covers topics common to all sections on mechanics.

1.1.2 The sections on the architectural specifications are an integral part of this section.

1.1.3 General Instructions:

1.1.3.1 Above all, these instructions define the distinctive features that must be followed, and do not mention the usual design elements that one usually expects to find in plans and specifications.

1.1.3.2 In the case of disagreement between standards, codes and the present instructions, the strictest and most rigorous requirements must be met.

1.1.4 Inspection of the Specifications:

1.1.4.1 The bidder must carefully study the structural, architectural and design plans and specifications in order to ensure that the work under this contract may be satisfactorily executed, as indicated on the plans. Before starting work, examine the work done by other specialty contractors and report to the ministerial representative any defect or any obstacle to executing the work described in these specifications or affecting the required guarantee.

1.1.4.2 No additional indemnity will be granted to the contractor for the consequences of his failure to carry out this inspection.

1.1.5 Startup:

1.1.5.1 Install and start up the systems covered by these specifications in such a way that they perform the functions for which they were designed.

1.1.6 It is the responsibility of the contractors to verify from competent authorities that their choices of materials and systems respond to the requirements of the codes and regulations in effect.

1.2 PRIVATE SERVICES

1.2.1 Known Facilities:

1.2.1.1 Consult the ministerial representative before starting work, and comply with his written instructions.

1.2.1.2 Once the facilities have been located, any damage caused during excavation work and any resulting repair and replacement fees are the responsibility of these presents.

1.3 COORDINATION

1.3.1 Avoid conflicts by coordinating work with work from other sections.

1.3.2 Position the distribution networks, equipment and materials in such a way as to limit obstacles during the course of the work and keep as much work space as possible.

1.3.3 In the case of an obstacle at work, the ministerial representative must approve any changes of equipment, regardless of what is planned in the implementation schedule. It will be the contractor's responsibility to have such changes approved and to report them to the ministerial representative before making them.

1.4 REGULATIONS AND STANDARDS

1.4.1 Conform with all laws, codes and regulations in effect governing the construction trade concerned, according to the National Building Code 2015; National Plumbing Code 2015;

Canadian Standards Association (CSA); Canadian General Standards Board (CGSB); Underwriters Laboratories of Canada (ULC).

1.4.2 Obtain and pay for all required permits, licences or inspection certificates.

1.4.3 Present certificates from competent authorities attesting that the structures comply with the requirements.

1.5 PLANS AND SPECIFICATIONS

1.5.1 All contractual documents complement each other, and any instructions from one document are just as executory as if they appeared in all documents.

1.5.2 If contradictions arise between the various contractual documents, the documents will be interpreted according to the following order:

1.5.2.1 the contract;

1.5.2.2 instructions to bidders and bidder notice;

1.5.2.3 general conditions;

1.5.2.4 technical specifications;

Moreover, complementary documents have precedence over the documents that they complete.

1.5.3 The plans serve only to guide the contractor and his sub-contractors as to the approximate number and location of conduits, pipes or other objects.

1.5.4 For purposes of work execution and in the event of an obstacle to overcome, the position of a duct, pipe, grill, diffuser, piece of equipment, regulation element, etc. may be moved within a radius of three (3) metres from the indicated location at no additional cost.

1.6 EQUIPMENT: REQUIREMENTS CONCERNING SETUP

1.6.1 To preserve uniformity, use only products from a single manufacturer when equipment of the same type or category is required, unless otherwise specified.

1.6.2 Follow the manufacturer's recommendations regarding safety, possibilities of inspection, maintenance and repair.

1.6.3 Ensure that maintenance and disassembly can be carried out with-out harming construction elements or other facilities.

1.6.4 Plan means for accessing equipment for maintenance purposes, including lubricated-for-life bearings.

1.6.5 When possible, align the edges of pieces of equipment, rectangular cleanouts and other similar items with the walls of the building.

1.7 RESPONSIBILITY DURING TEMPORARY TESTING

1.7.1 Protect the structure against loss or damage until it is accepted.

1.7.2 During temporary use, the guarantee period will not be affected.

1.7.3 The Departmental Representative may use facilities and equipment for testing purposes before accepting them. Supply the labour, equipment and instruments necessary for testing.

1.7.4 Clean and refurbish the facilities and equipment used and return them to a fully operational state before accepting them and isolating equipment that may be damaged.

1.7.5 Prevent dust, dirt and other foreign matter from entering through the openings of the facilities and equipment during their temporary use.

1.8 MOTORS

1.8.1 All motors will be high-energy performance.

1.8.2 According to the instructions, provide and install the motors necessary for the operation of the mechanical apparatus and facilities.

1.8.3 If waiting for the stipulated motor delays the delivery or installation of an apparatus, install a provisional motor of the same type. No apparatus will be definitively accepted before the stipulated motor has been installed.

1.8.4 Unless otherwise indicated, use 1,750 rpm motors, following guidelines.

1.8.5 Single-phase motors with less than 1/2 hp, 120 V, speed according to guidelines, continuous running, built-in overload protection, flexible mounting plates, unless otherwise indicated in the specifications.

1.8.6 Motors with a power equal to or greater than 1/2 hp: EEMAC Class B, three-phase, 600 V, induction, squirrel-cage, speed according to guidelines, continuous running, sheltered, ball bearing, maximum heating of 40°C, unless otherwise indicated in the specifications.

1.8.7 Motors with 30 hp or more are equipped with thermistor thermal protection. Motors with 125 hp or more are equipped with RTD thermal protection.

1.8.8 Single-phase two-speed motors will have two starting windings and two running windings.

1.8.9 Three-phase, two-speed motors will have two windings.

1.9 SCREWS AND BOLTS

1.9.1 Use ordinary commercial hardware with current sizes and models and whose material and finish are suitable for the needs and are similar in all respects.

1.10 SUPPORTS FOR PIECES OF EQUIPMENT

1.10.1 The contractor must provide all accessories and plywood necessary for installing electrical and mechanical equipment.

1.11 HOLES AND SLEEVES FOR OPENINGS

1.11.1 Except for the perforations indicated on structure and architecture plans, all others will be made by the contractor concerned.

1.11.2 Drilling work includes all drilling of foundations, the envelope and interior floors and walls, as well as all drilling necessary for installing equipment, conduits and their supports, insertions, bolts, etc.

1.11.3 Place sleeves in locations where the piping crosses masonry or concrete structures or fire-resistant structures, according to guidelines.

1.11.4 All sleeves, insertions, bolts, etc., will be installed before the walls and floors have been built and the concrete poured.

1.11.5 Use 40 Series steel pipes for sleeves and before installing them, apply a coat of dry zinc paint (accepted product: Sico "Corrostop").

1.11.6 Openings and materials must have sufficient dimensions for thermal and acoustic insulation to be installed and must allow for thermal movement. Openings and sleeves must be completely independent of the piping or the ventilation ducting that will be subsequently installed.

1.11.7 If additional drilling proves necessary, it could be carried out after having submitted a written request and obtained the authorization of the Departmental Representative and/or project manager and/or structural consultant.

1.11.8 At openings of exterior walls and watertight basins, use sleeves with flanges attached to the centre by a continuous weld.

1.11.9 Dimensions: leave a free annular space of at least 12 mm between the sleeve and the ducting without heat insulation or between the sleeve and the heat insulator.

1.11.10 Lay sleeves in such a way that they are flush with concrete surfaces, masonry and poured concrete floors and extend 50 mm beyond all other types of floors.

1.11.11 The contractor must fill all gaps around pipes, using pre-fabricated packing, when sleeves pass through foundation walls, exterior walls, concrete walls, walls of watertight basins and flagstones with a water-repellent membrane.

Acceptable products are of "Link Seal" type.

1.11.12 All piping and ventilation ducts passing through a roof must be equipped with counterflashing provided and installed by the specialty contractor concerned. Flashing and casing around pipes and ducts are including in this section of the specifications.

1.11.13 Any drilling made in the building envelope, floors, or interior walls must be watertight in compliance with the ministerial representative's instructions to maintain the quality of sound-proofing, insulation and/or fireproofing. The ministerial representative may call for products other than those proposed in the above subsections. The specialty contractor must conform to the approval and final decision of the ministerial representative.

1.11.14 All drilling in steel beams must be co-ordinated between the specialty contractor and the structural contractor and the final details will be specified on the structural shop drawings according to specific needs.

1.12 ESCUTCHEONS

1.12.1 Place escutcheons where the piping passes through finished walls, partitions, floors and ceilings.

1.12.2 Use nickel or chromed bronze escutcheons, one-piece or split type, equipped with lock screws.

1.12.3 The outer diameter of an escutcheon must be greater than that of the opening or sleeve that it covers.

1.12.4 When a sleeve extends beyond a finished floor, the escutcheon must hide the extension of the sleeve.

1.13 HIDDEN STRUCTURES

1.13.1 No structure can be concealed without approval.

1.13.2 If the specialty contractor happens to break this clause, he may be obligated to uncover the hidden structures. The resulting fees will be charged to the offender, whether the work had been well executed or not.

1.14 TESTING

1.14.1 Give written warning 24 hours before testing dates.

1.14.2 Do not heat-proof or cover structures before they have been tested and approved.

1.14.3 Carry out testing in the presence of the responsible persons and the Departmental Representative's.

1.14.4 Assume all costs, including those for retesting and restoration.

1.14.5 Piping:

1.14.5.1 Carry out hydrostatic testing on piping networks using a pressure equal to 1.5 times the network's working pressure, or at least 860 kPa; choose the higher of these two values.

1.14.5.2 Unless otherwise indicated, put the network under pressure and ensure that no leakage occurs during a 4-hour period.

1.14.5.3 Carry out tests of waste piping and ventilation in conformance with the requirements of the National Building Code and competent authorities.

1.14.5.4 Carry out tests in conformance with the instructions stipulated in the pertinent sections of the specifications.

1.14.5.5 Before proceeding with the tests, isolate or disconnect all pieces of equipment or other material not designed for resisting test pressures.

1.15 MATERIALS

1.15.1 Provide new materials, equipment and sets, of recognized quality and design, of recent model, whose characteristics are known and whose replacement parts are available on demand.

1.15.2 These materials will be in conformance with applicable standards and will bear the required seals for their use, including: CSA, CEMA, ASTM, ASME, UL, AWWA, CGSR, BNQ, etc.

1.16 DIELECTRIC FITTINGS

1.16.1 Plan for dielectric fittings for joining pipes and equipment made of different metals.

1.16.2 Fittings compatible with the network type and capable of withstanding the network's nominal pressure.

1.16.3 Use union fittings for joining pipes whose nominal diameter is equal to or less than DN 2 and dielectric flanges for joining pipes whose nominal diameter is greater than DN 2.

1.17 DIAMETER OF ACCESSORIES FOR PIPE NETWORKS

1.17.1 All accessories such as check valves, flexible hoses, closing valves, etc. must have the same diameter as the pipes and not of the pump connections.

1.18 TRAINING OF OPERATION AND MAINTENANCE PERSONNEL

1.18.1 Provide tools, equipment and the services of qualified instructors to ensure that operation and maintenance personnel are properly trained for operating, controlling, adjusting, diagnosing and maintaining all systems and equipment, during normal work hours and before the systems and equipment have been accepted and delivered.

1.18.2 When specified by the stipulations of divisions 21, 22 and 23, manufacturers must give demonstrations and provide training for personnel.

1.18.3 Training courses must be based on the operation and maintenance manual and drawings as built.

1.18.4 The requirements relating to the number of hours of training necessary are indicated in each pertinent section.

1.19 SPECIFIED PRODUCTS

1.19.1 When the drawings and specifications mention the names of equipment manufacturers and catalogue numbers corresponding to specified products, the bidder is obliged to refer to the Instructions to Bilders for information an how to proceed with the application for approval of materials or substitutes.

1.20 CONTRACT TIME

1.20.1 The general contractor has full responsibility for co-ordinating the project and following the implementation schedule. If the project is not complete by the date set by the contractual documents, the contractor must pay the ministerial representative, as damages for having prolonged the ministerial representative's duties, all costs incurred during the excess period for work supervision, including costs for movement, living expenses and lodging.

2. MATERIAL

Not applicable.

3. EXECUTION

Not applicable.

END OF SECTION

1. GENERAL

1.1 RELATED REQUIREMENTS

1.1.1 The works of the present section include, but without limiting itself to it: the supply, the handling, the transport, the implementation and the installation of all the systems and the accessories described farther and/or on the plans, every that must be operational for:

1.1.1.1 System of generation cold and hot water distribution.

1.2 REFERENCES

1.2.1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME)

1.2.1.1 ANSI/ASME B16.15, Cast Bronze Threaded Fittings, Classes 125 and 250.

1.2.1.2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.

1.2.1.3 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

1.2.1.4 ANSI/ASME B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.

1.2.2 ASTM International Inc.

1.2.2.1 ASTM A 307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

1.2.2.2 ASTM B 88M, Standard Specification for Seamless Copper Water Tube (Metric).

1.2.3 American National Standards Institute/American Water Works Association (ANSI)/ (AWWA)

1.2.3.1 ANSI/AWWA C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

1.2.4 Canadian Standards Association (CSA International): CSA B242, Groove and Shoulder Type Mechanical Pipe Couplings.

1.2.5 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).

1.2.5.1 MSS-SP-67, Butterfly Valves.

1.2.5.2 MSS-SP-70, Gray Iron Gate Valves, Flanged and Threaded Ends.

1.2.5.3 MSS-SP-71, Gray Iron Swing Check Valves, Flanged and Threaded Ends.

1.2.5.4 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.

1.2.6 National Research Council (NRC)/Institute for Research in Construction: NRCC 38728, National Plumbing Code of Canada (NPC).

1.2.7 Unless otherwise specified, to execute the works according to the requirements of the Canadian Plumbing Code 2015 and in the regulations (payments) of the city or the concerned body.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

1.3.1 Subject documents and samples required according to division 22.

1.3.2 Data sheets: submit data sheets required as well as documentation of the manufacturer concerning the piping, the joins and the products of waterproofness. These index cards also have to indicate the rate of emission of COV of adhesives and solvents during the application and the period of cure.

1.3.3 At the request of the Departmental Representative, submit the samples of the product or one of its components described in the present section.

1.3.4 Documents / elements to be handed to the completion of the works

1.3.4.1 Supply the index cards of exploitation, maintenance and required spare parts and join them to the manual worker mentioned in Division 22.

1.3.4.2 Provide reports of on-site signed controls by the Contractor with respect to facility monitoring, testings and commissioning. Inform the Departmental Representative at least 48 hours before proceeding starting up.

1.4 INSURANCE OF THE QUALITY

1.4.1 Reliability of the technical data: the data pulled from catalogs and documentation of the manufacturers will have to be reliable data, based on trial results having been made by the manufacturers or, on their behalf, by independent laboratories, and having allowed to certify the conformity of elements with the requirements of the codes and the existing standards.

2. MATERIAL

2.1 MATÉRIAUX/MATÉRIELS DURABLES

2.1.1 Requirements for sustainable development: materials and conforming products in Division 22.

2.1.2 Select materials and products containing recycled materials or with characteristics associated with the efficient use of resources.

2.1.3 Adhesives and sealants: in accordance with Division 22. Use sealants, adhesives, printing products, finishes and paints that are as less toxic as possible but that meet the needs of the work.

2.1.3.1 The VOC content of adhesives and sealants must be less than that indicated in the Green Seal GS-36 and SCAQMD Regulation 1168.

2.2 PIPES / TUBES

2.2.1 Pipings of hot water and cold water (distribution, supply) situated inside the building.

2.2.1.1 To install above ground: copper tubes forged, of the type L, corresponding in the standard ASTM B 88M.

2.3 FITTINGS

2.3.1 Bronze pipe flanges and flanged fittings, Class 150: to ANSI/ASME B16.24.

2.3.2 Cast bronze threaded fittings, Class 125 and 250: to ANSI/ASME B16.15.

2.3.3 Cast copper, solder type: to ANSI/ASME B16.18.

2.3.4 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.

2.3.5 Joins of equal nominal diameter or upper to DN 2: in tips grooved by rolling, corresponding to the standard B242 CSA.

2.4 JOINTS

2.4.1 Rubber sealing gasket, latex-free 1,6 mm in thickness: conforming to the standard AWWA C111 / A21.11.

2.4.2 Bolts with hexagonal head, nuts and washers: heavy series, corresponding to standard ASTM A 307.

2.4.3 Weld / brasure: brass pipe (tips) DN 2 and less and faucets will be welded with the unleaded weld of type (chap) "AQUASOL". Joints on pipes (tips) DN 2 ½ and more and faucets will be welded with the weld in type SILFOS's money (type SILFOS's silver, chap SILFOS's money, chap SILFOS's silver).

2.4.4 Ribbon in teflon: for screwed joints.

2.4.5 Grooved couplings: designed with angle bolt pads to provide rigid joint, complete with EPDM gasket.

2.4.6 Dielectric connections between dissimilar metals; complying to standard ASTM F492: with thermoplastic liner.

2.5 BALL VALVES

2.5.1 Faucets with spherical turning point (bend), of equal nominal diameter or lower than DN 2, to screw

2.5.1.1 Faucets of class 150, category 4 137 kPa.

2.5.1.2 Bronze body, spherical shutter in chrome-plated brass or stainless steel, side dish (of adjustable waterproofness in PTFE, press-side dish (press-filling) in brass, sits in PTFE Bunan, steel lever.

2.5.1.3 Acceptable products: see picture of the section 22 00 03 and\or in the plan.

2.5.2 Faucets with spherical turning point, of equal nominal diameter or lower than DN 2, to weld

2.5.2.1 Faucets corresponding to the standard ANSI/ASME B16.18, the class 150, the category 4 137 kPa.

2.5.2.2 Bronze body, spherical shutter in chrome-plated brass or stainless steel, side dish (filling) of adjustable waterproofness in PTFE, press-side dish (press-filling) in brass, sits in teflon, PTFE Bunan, steel lever, with adapters threading NPT / COPPER.

2.5.2.3 Acceptable products: see picture (board) of the section 22 00 03 and/or in the plan.

2.5.3 For all the faucets with spherical turning point (bend), installed (settled) on the recirculation of domestic hot water, to supply plates (patches) of location for indication of the position.

2.6 DRAIN VALVE

2.6.1 Faucet of diameter of at least DN ¾, unless otherwise specified. Bronze body with a tip female thread and a male tip for join with intestine including cork and necklace.

2.6.2

Pipe to be drained away	Pipe and faucet For emptying
DN 2 and less	DN 3/4
DN 2½ and DN 3	DN 1
DN 4 and more	DN 1½

2.6.3 Acceptable products: see the picture (board) of the section 22 00 03.

3. EXECUTION

3.1 APPLICATION

3.1.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

3.2.1 Unless opposite indications, link the piping with devices, sanitary and other, according to the instructions of the manufacturers.

3.2.2 Install the piping near walls and ceilings so as to reduce as much as possible the space reserved for the fur and to clear as much as possible the area of installation. Group pipes left visible and to install them in a parallel to walls.

3.2.3 Cut the tubes square, rid them of any foreign matter and trim the extremities; clean the inside of joins; join the elements without sticking them.

3.2.4 Install a shut-off valve on the bypass lines as well as on the supply lines for the sanitary equipment and appliances.

3.2.5 Provide equipment and chemicals for disinfection and disinfect the network in accordance with the requirements of competent authorities.

3.2.6 Supply and install a threaded tap for hose or drain valve to drain the entire system.

3.3 INSTALLATION OF THE PIPING

3.3.1 Install the piping according to the requirements of the Canadian Plumbing Code 2015 and the competent local authority.

3.3.2 Install the piping according to the present section.

3.3.3 Cut the tubes square, rid them of any foreign matter then trim and clean the extremities; clean the fittings of joins; join elements without jamming them.

3.3.4 Assemble the piping by means of joins made according to the standards ANSI.

3.3.5 Install the piping of cold water distribution below the piping of hot water distribution, of recirculation of hot water and any other piping of hot water, and at a certain distance of these, to be able to maintain the cold water in a temperature as low as possible.

3.3.6 Unless otherwise specified, link the piping with the sanitary and other facilities according to the written instructions of the manufacturer.

3.3.7 Install piping near walls and ceilings in order to optimize as much as possible the space in the room. Group the exposed pipes and install them parallel to the walls.

3.3.8 A pressure gauge graduated from 0 to 1100 kPa shall be installed on the main line of the system. Install a manometer valve between the main line and the pressure gauge.

3.3.9 Supply and install drain valves at the bottom of all risers, at the low points of the systems and at the locations indicated on the drawings.

3.4 FITTING

3.4.1 Isolate the bypass lines and the supply lines equipment and the sanitary facilities using faucets with ball valve.

3.5 PRESSURE TESTS

3.5.1 Conform to general sections in Division 22 the results of the works.

3.5.2 A minimum pressure of 860 kPa or 150% of design pressure shall be maintained without leakage for a period of at least two hours throughout the hot and cold water piping. This test should be carried out with cold water.

3.5.3 If it is impossible to test the entire installation at once, it may be divided into several parts and each of them shall be tested as described above.

3.5.4 All the joints shall be subjected to mechanical shocks with appropriate tools.

3.5.5 These tests, which meet or exceed the requirements of the Canadian Plumbing Code 2015, must be carried out in the presence of the plumbing inspectors or the Departmental Representative. In addition, submit the signed and dated test results to the Departmental Representative.

3.6 FLUSHING AND CLEANING

3.6.1 Rinse the system during an eight hour period. Rinse outlets during two hours.

3.7 PRE-START-UP INSPECTIONS

3.7.1 Systems to be complete, prior to flushing, testing and start-up.

3.7.2 Verify that system can be completely drained.

3.7.3 Ensure that pressure booster systems are operating properly.

3.7.4 Ensure that water hammer arrestors, expansion compensators are installed properly.

3.8 START-UP

3.8.1 Timing: start up after:

3.8.1.1 Pressure tests have been completed.

3.8.2 Provide continuous supervision during start-up.

3.8.3 Start-up procedures:

3.8.3.1 Establish circulation and purge air.

3.8.3.2 Check pressurization to ensure proper operation and to prevent water hammer, gas expansion and/or cavitation.

3.8.3.3 Bring slowly HWS storage tank up to design temperature.

3.8.3.4 Monitor HWS and HWC piping contraction/expansion movements of hot water piping (distribution / supply / recirculation).

3.8.4 Rectify start-up deficiencies.

3.9 PERFORMANCE VERIFICATION

3.9.1 Scheduling: Verify system performance after pressure and leakage tests and disinfection are completed, and Certificate of Completion has been issued by authority having jurisdiction.

3.9.2 Procedures:

3.9.2.1 Verify that flow rate and pressure meet Design Criteria.

3.9.2.2 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.

3.9.2.3 Make sure that the network meets health and safety requirements.

3.9.2.4 Check for proper operation of water hammer arrestors. Run an 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.

3.9.3 Reports:

3.9.3.1 In accordance with Division 22 submit reports and schematics using report forms as specified in Division 22.

3.9.3.2 Include certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

3.10 EXPLOITATION

3.10.1 Coordinate operation and maintenance requirements including, cleaning and maintenance of specified materials and products with Division 22.

END OF SECTION

1. GENERAL

1.1 REFERENCES

1.1.1 ASTM International Inc.

1.1.1.1 ASTM B 32, Standard Specification for Solder Metal.

1.1.1.2 ASTM B 306, Standard Specification for Copper Drainage Tube (DWV).

1.1.1.3 ASTM C 564, Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

1.1.2 Canadian Standards Association (CSA International).

1.1.2.1 CSA B67, Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories.

1.1.2.2 CAN/CSA-B70, Cast Iron Soil Pipe, Fittings and Means of Joining.

1.1.2.3 CAN/CSA-B125, Plumbing Fittings.

1.1.2.4 CSA-B602, Joins of evacuation of piping.

1.1.3 Green Seal Environmental Standards (GSES): Standard GS-36, Commercial Adhesives.

1.1.4 South Coast Air Quality Management District (SCAQMD), California State: SCAQMD Rule 1168, Adhesive and Sealant Applications.

1.1.5 Code of Plumbing of Quebec, last edition (publishing).

1.1.6 Underwriters Laboratories of Canada (ULC): ULC S201.2, Join of evacuation of piping.

1.2 ACTION AND INFORMATION SUBMITTALS

1.2.1 Provide submittals in accordance with Division 22.

1.2.2 Data sheets: provide data sheets required as well as specifications and documentation of the manufacturer concerning piping, joins and sealants. These records must indicate the VOC emission rate of adhesives and solvents during the application and curing period.

1.2.3 At request of the Departmental Representative, submit the samples of the product or one of its components described in the present section.

1.2.4 Documents / elements to be submitted upon completion of the work

1.2.4.1 Provide the required operating and maintenance records and join them to the manual referred to Division 22.

1.2.4.2 Provide reports of on-site inspections carried out and signed by the manufacturer and the Contractor with respect to the monitoring of the installation and start-up. Notify the Departmental Representative at least 48 hours prior to start-up and testings.

1.3 QUALITY INSURANCE

1.3.1 Reliability of technical data: technical data drawn from the manufacturers' documentation must be reliable data, confirmed by tests carried out by the manufacturers themselves, or on their behalf, by independent laboratories, certifying the conformity of the elements of the codes and the existing standards.

2. PRODUCTS

2.1 SUSTAINABLE MATERIAL

2.1.1 Sustainable Requirements: materials and products in accordance with Division 22.

2.1.2 Choose products and materials with recycled content or resource efficient characteristics.

2.1.3 Adhesives and sealants: in accordance with Division 22. The VOC rate must be lesser than that indicated in the standard Green Seal GS 36 and in the SCAQMD regulation 1168.

2.2 COPPER TUBE AND FITTINGS

2.2.1 Sanitary, storm drain and DWV vent pipes intended for above ground installation and related fittings shall conform to the standard ASTM B 306.

2.2.1.1 Fittings

2.2.1.1.1 Cast brass: according to the standard CAN / CSA-B125.

2.2.1.1.2 Wrought copper: according to the standard CAN / CSA-B125.

2.2.1.2 Solder: lead/tin, 50/50, according to the standard ASTM B 32 of type (chap) 50A.

2.3 CAST IRON PIPING AND FITTINGS

2.3.1 Sanitary and cast-iron ventilation pipes with a nominal diameter equal to or greater than DN 2, intended to be buried in the ground and associated fittings shall comply with CAN / CSA -B70 and covered with a layer of protective coating (resistant bituminous coating)

2.3.1.1 Joints:

2.3.1.1.1 Mechanical joints: Neoprene or butyl rubber compression gaskets: to CAN/CSA-B70 or ASTM C564

2.3.1.1.1.1 Stainless steel clamps.

2.3.1.1.2 Hub and spigot:

2.3.1.1.2.1 Caulking lead: to CSA B67.

2.3.1.1.2.2 Cold caulking compounds.

2.3.2 Above ground sanitary and vent have to be in accordance with the standard CAN / CSA-B70

2.3.2.1 Joints:

2.3.2.1.1 Mechanical joints: Neoprene or butyl rubber compression gaskets with stainless steel clamps.

2.3.2.1.2 Interlocking joints

2.3.2.1.2.1 Joint lead : conform with standard CSA B67.

2.3.2.1.3 Cast-iron couplings: couplings with neoprene fittings with stainless steel nuts and bolts.

2.4 URINAL VENTILATION AND DRAIN PIPE

2.4.1 All exhaust and vent pipes under the overflow level of a urinal shall not be made of copper, in accordance with the National Plumbing Code. The material used shall be PVC DWV XFR.

3. EXECUTION

3.1 APPLICATION

3.1.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

3.2.1 Install the piping according to the section 23 05 05 - Installation of the piping as well as in the prescriptions of the present section.

3.2.2 Unless otherwise indicated, install the components in accordance with the requirements of the Canadian Plumbing Code 2015 and local authorities.

3.2.3 In the case of interlocking pipes, install the piping to be buried on a bed of clean, washed sand, 150 mm thick and shaped so that it can conform to the shape of the female ends. Observe the slope, lines and levels indicated. Backfill with a layer of washed sand 150 mm thick.

3.2.4 Install exposed piping parallel to and adjacent to the walls to maximize the available space in the installation area.

3.2.5 Plug pipes and fittings with plugs or caps so that no debris enters the interior during work

3.3 TESTING

3.3.1 Pressure test buried systems before backfilling.

3.3.2 Hydraulically test to verify grades and freedom from obstructions and to make sure slope is appropriate.

3.3.3 Tests the piping as prescribed in Division 22 and this section.

3.3.4 All hose openings and mouths of the complete installation must be perfectly sealed. The entire installation (including rising vents, connections to fittings, horizontal drains and main ducts) must be filled with water to the highest level. Water should be maintained at this level for at least two hours. If it is impossible to test the whole installation at once, it may be divided into several parts and each of them tested in the manner described above. However, the water column must be at least 3 m higher than the tested part of the system.

3.3.5 Piping must always be tested to the roof.

3.3.6 These tests, which meet or exceed the requirements of the Canadian Plumbing Code 2015, must be carried out in the presence of the plumbing inspectors or the Departmental Representative. Submit the signed and dated test results to the Departmental Representative.

3.4 PERFORMANCE VERIFICATION

3.4.1 Cleaning vents:

3.4.1.1 Ensure that the manholes are accessible and that their inspection stamp is located in a suitable place.

3.4.1.2 Open manholes, cover with linseed oil and re-seal.

3.4.1.3 Verify that cleanout rods can probe as far as the next cleanout, at least.

3.4.2 Make sure that siphons are well primed and that they retain their water guard.

3.4.3 Make sure that the existing sanitary facilities are well anchored, that they are linked with the network and well ventilated.

3.4.4 Apply an appropriate identification label on the various piping as recommended of the section 23 05 53 – Identification of networks and mechanical devices.

END OF SECTION

1. GENERAL

1.1 REFERENCES

1.1.1 ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings, latest edition.

1.1.2 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings, latest edition.

1.1.3 ANSI/AWWA C700, Cold Water Meters – Displacement Type, latest edition.

1.1.4 ANSI/AWWA C701, Cold Water Meters – Turbine Type for Customer Service, latest edition.

1.1.5 ANSI/AWWA C702, Cold Water Meters – Compound Type, latest edition.

1.1.6 CSA-B64 Series, Backflow Preventers and Vacuum Breakers, latest edition of Selection and Installation of Backflow Preventers/Maintenance and Field Testing of Backflow Preventers.

1.1.7 CAN3-B79, Floor Drains and Trench Drains, latest edition.

1.1.8 CSA-B356, Water Pressure Reducing Valves for Domestic Water Supply Systems, latest edition.

1.1.9 PDI – G101, Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data, latest edition.

1.1.10 PDI – WH201, Water Hammer Arrestors, latest edition.

1.2 DOCUMENT/SAMPLE SUBMITTALS

1.2.1 Submit the shop drawings and the technical datasheets in accordance with the prescriptions of Section 21 05 01.

1.2.2 The technical datasheets must indicate the dimensions, construction details and manufacturing materials of all the systems prescribed in this section.

1.3 MAINTENANCE DATASHEETS

1.3.1 Provide the required maintenance datasheets and incorporate them into the maintenance manual mentioned in section 21 05 01.

1.3.2 The maintenance datasheets must include or indicate the following:

1.3.2.1 a description of the plumbing specialties and accessories, giving manufacturer's name, type, model, manufacturing year and power, flow rate or capacity;

1.3.2.2 the details of operation, servicing and maintenance;

1.3.2.3 a recommended spare parts list.

2. PRODUCTS

2.1 CLEANOUTS

2.1.1 Cleanout plugs: heavy cast iron male ferrule with brass screws and threaded brass or bronze plug, sealing-caulked lead seat or neoprene gasket.

2.1.2 Access covers

2.1.2.1 Floor access: rectangular round cast iron body and frame with adjustable secured nickel bronze top.

2.1.2.1.1 Plugs: bolted, bronze with neoprene gasket.

2.1.2.1.2 Covers for tile floors: polished nickel bronze with recessed cover for tile infill, complete with vandal-proof locking screws.

3. PRODUCTION

3.1 INSTALLATION

3.1.1 Install the specialties and accessories in accordance with National Plumbing Code of Canada, and local authorities having jurisdiction.

3.2 CLEANOUTS

3.2.1 As indicated, install cleanouts at the base of soil and waste stacks, and rainwater leaders.

3.2.2 Install cleanouts flush with the finished floor, unless they are floor mounted and serviceable from below the floor.

3.2.3 The diameter of the building drain cleanout and waste stack base cleanouts must be equal to the line size to maximum NPS4.

3.3 BACKFLOW PREVENTERS

3.3.1 Install backflow preventers in accordance with CSA-B64 Series, latest edition, where indicated and elsewhere as required by code.

3.3.2 Bring the discharge of each backflow preventer to terminate over the nearest drain and or service sink.

3.4 COMMISSIONING

3.4.1 For the purposes of this article, “verifying” a characteristic or “ensuring” a status or an action also means “demonstrating it” to the Department's Representative.

3.4.2 Only proceed with commissioning after defects have been detected during start-up.

3.4.3 Verify the dimensions of the inspection traps and their location in relation to the items to be inspected.

3.4.4 Modify the following prescriptions, as applicable, depending on the needs of the work.

3.4.4.1 Floor drains

3.4.4.1.1 Verify operations of flushing features.

3.4.4.2 Cleanouts

3.4.4.2.1 Verify covers are gas-tight, secure, yet readily removable for inspection or maintenance.

3.4.4.2.2 Ensure that the cleaning rod can easily reach the next cleanout.

3.4.4.3 Backflow preventers and vacuum breakers

3.4.4.3.1 Ensure that the appropriate specialities and accessories have been installed.

3.4.4.3.2 Make the necessary adjustments.

3.4.4.3.3 Ensure visibility of discharges.

3.4.4.3.4 Field test backflow preventers in accordance with CAN/CSA-B64.10.1, latest edition.

3.4.4.3.5 Provide a copy of the backflow preventer test and inspection report to the Department's Representative.

3.4.4.4 Pressure regulators

3.4.4.4.1 Adjust settings to suit locations and flow rates.

3.4.5 Commissioning reports

3.4.5.1 Record all the data collected during commissioning on the forms provided for this purpose.

3.4.5.2 Have the reports signed by the person responsible for testing and by the witness.

3.4.6 Verification of tests and test reports

3.4.6.1 Notify the Department's Representative 24 hours before starting the tests.

3.4.6.2 The tests and other similar activities must be performed in the presence of the Department's Representative.

3.4.6.3 The test reports must be verified by the person responsible for commissioning.

3.4.7 Training of personnel

3.4.7.1 Ensure training of the operating and maintenance personnel in the commissioning, operation, monitoring, servicing, maintenance and decommissioning of the specialities and accessories. The various means of training will be as follows: internships, courses, oral presentations, written documentation and audiovisual presentations.

3.4.8 Compliance demonstrations

3.4.8.1 Demonstrate the compliance of the specialties and accessories with the design criteria.

3.4.8.2 The compliance demonstrations shall allow evaluation of the degree of training of the operating and maintenance personnel.

END OF THE SECTION

1. GENERAL

1.1 RELATED REQUIREMENTS

1.1.1 The present section specifies the general requirements on the installation of the piping and the started.

1.2 REFERENCES

1.2.1 Canadian General Standards Board (CGSB): CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.

1.3 ACTION AND INFORMATION SUBMITTALS

1.3.1 Provide submittals in accordance with Division 22.

2. PRODUCTS

Not applicable.

3. EXECUTION

3.1 APPLICATION

3.1.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 CONNECTIONS TO EQUIPMENT

3.2.1 In accordance with manufacturer's instructions unless otherwise indicated.

3.2.2 Use valves and either unions or flanges for isolation and ease of maintenance and assembly.

3.2.3 Use double swing joints when equipment mounted on vibration isolation and when piping subject to movement.

3.3 CLEARANCES

3.3.1 Provide clearance around systems, equipment and components for observation of operation, inspection, servicing, maintenance and as recommended by manufacturer.

3.3.2 Provide space for disassembly, removal of equipment and components, if necessary, without interrupting operation of other system, equipment components. The space shall be of a size conforming to the drawings or to the manufacturer's recommendations, whichever is greater.

3.4 DRAIN

3.4.1 Install piping with grade in direction of flow except as indicated.

3.4.2 Install drain valve at low points in piping systems, at equipment and at section isolating valves.

3.4.3 Pipe each drain valve discharge separately to above floor drain. Discharge to be visible.

3.4.4 Drain valves: NPS 3/4 gate or globe valves unless indicated otherwise, with hose end male thread, cap and chain.

3.5 DIELECTRIC COUPLINGS

3.5.1 General: compatible with system, to suit pressure rating of system.

3.5.2 Use dielectric couplings where dissimilar metals are joined..

3.5.3 NPS 2 and under: isolating unions or bronze valves.

3.6 PIPEWORK INSTALLATION

3.6.1 Screwed fittings jointed with Teflon tape.

3.6.2 Protect openings against entry of foreign material.

3.6.3 Install to isolate equipment and allow removal without interrupting operation of other equipment or systems.

3.6.4 Assemble piping using fittings manufactured to ANSI standards.

3.6.5 Saddle type branch fittings may be used on mains if branch line is no larger than half size of main. Hole saw (or drill) and ream main to maintain full inside diameter of branch line prior to welding saddle.

3.6.6 Install exposed piping, equipment, rectangular cleanouts and similar items parallel or perpendicular to building lines.

3.6.7 Install concealed pipework to minimize furring space, maximize headroom, conserve space.

3.6.8 Install, except where indicated, to permit separate thermal insulation of each pipe.

3.6.9 Group piping wherever possible and as indicated.

3.6.10 Ream pipes, remove scale and other foreign material before assembly.

3.6.11 Use eccentric reducers at pipe size changes to ensure positive drainage and venting.

3.6.12 Provide for thermal expansion as indicated.

3.6.13 Valves

3.6.13.1 Install in accessible locations.

3.6.13.2 Remove interior parts before soldering.

3.6.13.3 Install with stems above horizontal position unless indicated.

3.6.13.4 Valves accessible for maintenance without removing adjacent piping.

3.6.13.5 Use ball valves at branch take-offs for isolating purposes except where specified.

3.7 SLEEVES

3.7.1 General: install where pipes pass through masonry, concrete structures, fire rated assemblies, and as indicated.

3.7.2 Material: schedule 40 black steel pipe.

3.7.3 Sizes: 6 mm minimum clearance between sleeve and uninsulated pipe or between sleeve and insulation.

3.7.4 Installation

3.7.4.1 Concrete, masonry walls, concrete floors on grade: terminate flush with finished surface.

3.7.4.2 Other floors: terminate 25 mm above finished floor.

3.7.4.3 Before installation, paint exposed exterior surfaces with heavy application of zinc-rich paint to CAN/CGSB-1.181.

3.7.5 Sealing

3.7.5.1 Foundation walls and below grade floors: fire retardant, waterproof non-hardening mastic.

3.7.5.2 Elsewhere, provide space for firestopping. Maintain fire rating integrity

3.7.5.3 Sleeves installed for future use: fill with lime plaster or other easily removable filler.

3.7.5.4 Ensure no contact between copper pipe or tube and sleeve.

3.8 ESCUTCHEONS

3.8.1 Install on pipes passing through walls, partitions, floors, and ceilings in finished areas.

3.8.2 Construction: one piece type with set screws. Chrome or nickel plated brass or type 302 stainless steel.

3.8.3 Sizes: outside diameter to cover opening or sleeve. Inside diameter to fit around pipe or outside of insulation if so provided.

3.9 PREPARATION FOR FIRE STOPPING

3.9.1 Install firestopping within annular space between pipes, ducts, insulation and adjacent fire separation in accordance with 21 00 05.

3.9.2 Insulated pipes and ducts: ensure integrity of insulation and vapour barriers.

3.10 FLUSHING OUT OF PIPING SYSTEMPS

3.10.1 Effectuer les travaux conformément à la section 23 08 02 – Nettoyage et mise en route des réseaux de tuyauterie d'installation mécanique.

3.10.2 Preparatory to acceptance, clean and refurbish equipment and leave in operating condition, including replacement of filters in piping systems.

3.11 PRESSURE TESTING OF EQUIPMENT AND PIPEWORK

3.11.1 Advise Departmental Representative 48 hours minimum prior to performance of pressure tests.

3.11.2 Pipework: test as specified in relevant sections of heating, ventilating and air conditioning work.

3.11.3 Maintain specified test pressure without loss for 4 hours minimum unless specified for longer period of time in relevant mechanical sections.

3.11.4 Prior to tests, isolate equipment and other parts which are not designed to withstand test pressure or media.

3.11.5 Conduct tests in presence of Departmental Representative.

3.11.6 Pay costs for repairs or replacement, retesting, and making good. Departmental Representative to determine whether repair or replacement is appropriate.

3.11.7 Insulate or conceal work only after approval and certification of tests by Departmental Representative.

3.12 EXISTING SYSTEMS

3.12.1 Connect into existing piping systems at times approved by Departmental Representative.

3.12.2 Request written approval by Departmental Representative 10 days minimum, prior to commencement of work.

3.12.3 Be responsible for damage to existing plant by this work.

3.12.4 Clean place daily.

END OF SECTION

1. GENERAL

1.1 REFERENCES

1.1.1 American Society of Mechanical Engineers (ASME)

1.1.1.1 ASME B31.1, Power Piping.

1.1.1.2 ANSI/MSS-SP-58, Pipe Hangers and Supports – Materials, Design and Manufacture.

1.1.2 ASTM International

1.1.2.1 ASTM A 125, Standard Specification for Steel Springs, Helical, Heat-Treated.

1.1.2.2 ASTM A 307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

1.1.2.3 ASTM A 563, Standard Specification for Carbon and Alloy Steel Nuts.

1.1.3 Factory Mutual (FM)

1.1.4 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)

1.1.4.1 MSS SP 58, Pipe Hangers and Supports - Materials, Design and Manufacture.

1.1.4.2 MSS SP 69, Pipe Hangers and Supports - Selection and Application.

1.1.4.3 MSS SP 89, Pipe Hangers and Supports - Fabrication and Installation Practices.

1.1.5 Underwriter's Laboratories of Canada (ULC)

1.2 CALCULATION CRITERIA

1.2.1 Design requirements (calculation criteria)

1.2.1.1 Piping support shall be made in accordance with manufacturers' recommendations, using common parts, components and assemblies.

1.2.1.2 Maximum nominal loads shall be determined based on indications for the allowed stresses constraints in standards ASME B31.1 or MSS SP 58.

1.2.1.3 Supports, guides and anchorages shall not transmit too much heat to structural members.

1.2.1.4 Supports and suspensions shall be designed to support piping, air ducts and mechanical appliances under operating conditions, permit contraction and expansion of the supported elements and prevent excessive stress on the devices to which they are connected.

1.2.1.5 Supports and suspensions shall be vertically adjustable after installation and during commissioning of installations. The adjustment must be in accordance with MSS SP 58.

1.2.2 Calculation criteria - Earthquake overloads: supports, suspensions, platforms and footbridges shall be designed to withstand earthquake overloads in accordance with the requirements of section 23 05 48.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

1.3.1 Provide documents and samples in accordance with Division 22.

1.3.2 Submit shop drawings and data sheets for:

1.3.2.1 Bases, hangers and supports.

1.3.2.2 Connections to equipment and structure.

1.3.2.3 Structural Assemblies.

1.3.2.4 Collars for rising columns.

1.3.2.5 Saddles and protective shields.

1.3.2.6 Bracing parts.

1.3.3 Upon request of Departmental Representative, submit products samples or component described in the present section.

1.3.4 Certificates: Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.3.5 Manufacturers' Instructions: Provide manufacturer's installation instructions.

1.3.6 Documents / elements to be submitted upon completion of work

1.3.6.1 Provide maintenance data for incorporation into manual specified in Division 22.

1.3.6.2 Provide reports of on-site control signed by the Contractor with respect to facility monitoring and quality control.

1.4 QUALITY CONTROL

1.4.1 Reliability of technical data: Reliability of technical data: data from manufacturers' catalogs and documentation should be reliable data, based on test results that have been performed by the manufacturers themselves or on their behalf by independent laboratories, and certified that the elements comply with the requirements of the applicable codes and standards.

2. PRODUCTS

2.1 SUSTAINABLE REQUIREMENTS

2.1.1 Materials and products in accordance with Division 22.

2.1.2 Choose products and materials with recycled content or resource efficient characteristics whenever possible.

2.2 GENERAL

2.2.1 Fabricate hangers, supports and sway braces in accordance ANSI B31.1 and MSS SP 58.

2.2.2 Use components for intended design purpose only. Do not use for rigging or erection purposes.

2.2.3 Supports and suspensions shall be secured to the framing elements. If there are no framing elements or if the anchors are not in the right place, supply and install all necessary additional structural elements ("J" profiles or steel angles).

2.3 PIPE HANGERS

2.3.1 Finishes:

2.3.1.1 Pipe hanger and supports: galvanizing or zinc rich paint is normally required only under conditions where corrosion is likely.

2.3.1.2 Elements: use electro-plating galvanizing process or hot dipped galvanizing process.

2.3.1.3 Ensure steel hangers in contact with copper piping are copper plated and epoxy coated.

2.3.2 Upper attachment structural: suspension from lower flange of I-Beam:

2.3.2.1 Cold piping NPS 2 maximum: malleable iron C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip.

2.3.2.1.1 Rod: 9 mm UL listed, 13 mm FM approved.

2.3.2.1.2 Accepted products: Anvil FIG 93, Tailor, Erico.

2.3.3 Upper attachment structural: suspension from upper flange of I-Beam:

2.3.3.1 Cold piping NPS 2 maximum: ductile iron top-of-beam C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip, UL listed, FM approved and conform to MSS SP 69. Accepted products: Anvil FIG 93, Tailor, Erico.

2.3.4 Steel beams

2.3.4.1 Cold pipe with diameter DN 2 maximum: steel backing plate, with two locking nuts. Acceptable products: Anvil FIG 60, Tailor, Erico.

2.3.5 Steel profiles or angle (inferior wing)

2.3.5.1 Cold pipe with diameter DN 2 maximum: "C" bracket, malleable cast iron, in compliance with standard MSS-SP58, type 23, approved ULC. Acceptable products: Anvil FIG 86, Tailor, Erico.

2.3.6 Steel profiles or angle (superior wing)

2.3.6.1 Cold pipe with diameter equal to or less than DN 2: bracket "C" (for beam top), malleable cast iron, in compliance with standard MSS-SP58, type 19, approved by ULC. Acceptable products: Anvil FIG 93, Tailor, Erico.

2.3.7 Upper attachment to concrete

2.3.7.1 Ceiling: carbon steel welded eye rod, clevis plate, clevis pin and cotters with weldless forged steel eye nut. Ensure eye [6] mm minimum greater than rod diameter.

2.3.7.2 Concrete inserts: wedge shaped body with knockout protector plate, approved by the UL, approved by the FM and corresponding to the standard MSS SP 69 for piping diameter DN ¾ to DN 8. Acceptable products: Anvil FIG 281, Tailor, Erico.

2.3.7.3 Carbon steel plate with bracket, for surface mounting, with forged steel seamless nut, and at least two expansible pins and two bolts for each suspension. Acceptable products: Anvil FIG 49, nut with eye, FIG 290, Tailor, Erico.

2.3.8 Shop and field-fabricated assemblies

2.3.8.1 Steel brackets.

2.3.9 2.3.9 Hanger rods: threaded rod material conform to standard MSS SP 58.

2.3.9.1 Ensure that hanger rods are subject to tensile loading only.

2.3.9.2 Provide linkages where lateral or axial movement of pipework is anticipated.

2.3.9.3 Do not use 22 mm or 28 mm rod. Acceptable products: Anvil FIG 146, Tailor, Erico.

2.3.10 Support elements: conform to standard MSS SP 58

2.3.10.1 For steel piping: galvanized carbon steel elements.

2.3.10.2 For copper piping: black steel elements with copper finish.

2.3.10.3 Protective shields shall be provided for hot insulated pipes. Acceptable products: Anvil FIG 260, Tailor, Erico.

2.3.10.4 Support elements must be oversized.

2.3.11 Adjustable clevis: conform to standard MSS SP 69, UL listed and FM approved, clevis bolt with nipple spacer and vertical adjustment nuts and a lock nut for cold or hot copper piping with horizontal movement no greater than 300 mm in length.

2.3.11.1 Ensure "U" has hole in bottom for riveting to insulation shields. Acceptable products: Anvil FIG CT-65, Tailor, Erico.

2.3.12 Non-metallic piping: adjustable clevis conform to standard MSS SP 69, typifies 9. Accepted products: Anvil FIG CT-69, Tailor, Erico.

2.3.13 Type of media

2.4 RISER CLAMPS

2.4.1 Steel or cast iron pipe: galvanized carbon steel to MSS SP 58, type 42, UL listed, FM approved. Accepted products: Anvil FIG 261, Tailor, Erico.

2.4.2 Steel or cast iron pipe: galvanized carbon steel to MSS SP 58, type 42. Accepted products: Anvil FIG CT-121, Tailor, Erico.

2.4.3 Non-metallic piping: carbon steel to MSS ST 69. Accepted products: Anvil FIG 261, Tailor, Erico.

2.4.4 Bolts: to ASTM A 307.

2.4.5 Nuts: to ASTM A 563.

2.5 INSULATIONPROTECTION SHIELDS

2.5.1 Insulated hot and cold piping

2.5.1.1 64 kg/m³ density insulation plus insulation protection shield to MSS SP 69, galvanized sheet carbon steel; length designed for maximum 3 m span. Accepted products: Anvil FIG 167, Tailor, Erico.

2.6 CONSTANT SUPPORT SPRING HANGERS

2.6.1 Springs: alloy steel to ASTM A 125, shot peened, magnetic particle inspected, with ±5% spring rate tolerance, tested for free height, spring rate, loaded height and provided with Certified Mill Test Report (CMTR).

2.6.2 Load adjustability: 10% minimum adjustability each side of calibrated load. Adjustment without special tools. Adjustments not to affect travel capabilities.

2.6.3 Provide upper and lower factory set travel stops.

2.6.4 Provide load adjustment scale for field adjustments.

2.6.5 Total travel to be actual travel + 20%. Difference between total travel and actual travel 25 mm minimum.

2.6.6 Individually calibrated scales on each side of support calibrated prior to shipment, complete with calibration record.

2.7 VARIABLE SUPPORT SPRING HANGERS

2.7.1 Vertical movement: 13 mm minimum, 50 mm maximum, use single spring pre-compressed variable spring hangers.

2.7.2 Vertical movement greater than 50 mm: use double spring pre-compressed variable spring hanger with [2] springs in series in single casing.

2.7.3 Variable spring hanger complete with factory calibrated travel stops. Provide certificate of calibration for each hanger.

2.7.4 Steel alloy springs: to ASTM A 125, shot peened, magnetic particle inspected, with +/-5% spring rate tolerance, tested for free height, spring rate, loaded height and provided with CMTR.

2.8 EQUIPMENT SUPPORTS

2.8.1 equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements for Structural Steel for Buildings. Submit calculations with shop drawings.

2.8.2 Supply and install all metal supports required for equipment, heat exchangers, tanks and accessories mentioned in drawings and specification for present section.

2.8.3 Supports shall be made of metal sections welded and constructed in accordance with good engineering practice and in accordance with standards of the provincial codes for this work. This work will have to be carried out by skilled labour.

2.9 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

2.9.1 Provide templates to ensure accurate location of anchor bolts.

2.10 OTHER EQUIPMENT SUPPORTS

2.10.1 Fabricate equipment supports from structural grade steel meeting requirements of section - Structural Steel for Buildings.

2.10.2 Submit structural calculations with shop drawings.

3. EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

3.2.1 Install in accordance with:

3.2.1.1 Manufacturer's instructions and recommendations.

3.2.1.2 All hot or cold piping supports shall be installed outside the heat insulator.

3.2.2 Vibration Control Devices: Install on piping systems at pumps, boilers, chillers, cooling towers, and as indicated.

3.2.3 Clamps on riser piping:

3.2.3.1 Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.

3.2.3.2 Bolt-tightening torques to industry standards.

3.2.3.3 Steel pipes: install below coupling or shear lugs welded to pipe.

3.2.3.4 Cast iron pipes: install below joint.

3.2.4 Clevis plates: Attach to concrete with 4 minimum concrete inserts, one at each corner.

3.2.5 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.

3.2.6 Use approved constant support type hangers where:

3.2.6.1 Vertical movement of pipework is 13 mm or more,

3.2.6.2 Transfer of load to adjacent hangers or connected equipment is not permitted.

3.2.7 Use variable support spring hangers where:

3.2.7.1 Transfer of load to adjacent piping or to connected equipment is not critical.

3.2.7.2 Variation in supporting effect does not exceed 25% of total load.

3.3 HANGER SPACING

3.3.1 Plumbing piping: meet the most rigorous requirements to Canadian Plumbing Code, Provincial Code or authority having jurisdiction.

3.3.2 Fire protection: to applicable fire code.

3.3.3 Gas and fuel oil piping: up to NPS 1/2: every 1.8 m.

3.3.4 Copper piping: up to NPS 1/2: every 1.5 m.

3.3.5 Flexible joint roll groove pipe: in accordance with table below for steel, but not less than one hanger at joints. Table listings for straight runs without concentrated loads and where full linear movement is not required.

3.3.6 Within 300 mm of each elbow.

3.3.7 Pipework greater than NPS 12: to MSS SP 69.

Maximal pipe size: NPS	Maximum spacing steel	Maximal spacing copper
Up to 1¼	2,1 m	1,8 m
1½	2,7 m	2,4 m
2	3,0 m	2,4 m
2½	3,7 m	3,0 m

3.4 HANGER INSTALLATION

3.4.1 Install hanger so that rod is vertical under operating conditions.

3.4.2 Adjust hangers to equalize load.

3.4.3 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members.

3.5 HORIZONTAL MOVEMENT

3.5.1 Angularity of rod hanger resulting from horizontal movement of pipework from cold to hot position not to exceed 4 degrees from vertical.

3.5.2 Where horizontal pipe movement is less than 13 mm, offset pipe hanger and support so that rod hanger is vertical in the hot position.

3.6 FINAL ADJUSTMENT

3.6.1 Adjust hangers and supports:

3.6.1.1 Ensure that rod is vertical under operating conditions.

3.6.1.2 Equalize loads.

3.6.2 Adjustable clevis:

3.6.2.1 Tighten hanger load nut securely to ensure proper hanger performance.

3.6.2.2 Tighten upper nut after adjustment.

3.6.3 C-clamps: Follow manufacturer's recommended written instructions and torque values when tightening C-clamps to bottom flange of beam.

3.6.4 Beam clamps: Hammer jaw firmly against underside of beam.

END OF SECTION

1. GENERAL

1.1 REFERENCES

1.1.1 Canadian General Standards Board (CGSB)

1.1.1.1 CAN/CGSB-1.60, Interior Alkyd Gloss Enamel.

1.1.1.2 CAN/CGSB-24.3, Identification of Piping Systems.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

1.2.1 Submittals: in accordance with Division 22.

1.2.2 Product data to include paint colour chips, other products specified in this section.

1.2.3 Submit samples to include nameplates, labels, tags, lists of proposed legends.

2. PRODUCTS

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

2.1.1 Metal or plastic laminate nameplate mechanically fastened to each piece of equipment by manufacturer.

2.1.2 Lettering and numbers raised or recessed.

2.1.3 Information to include, as appropriate:

2.1.3.1 Equipment: manufacturer's name, model, size, serial number, capacity.

2.1.3.2 Motor: voltage, Hz, phase, power factor, duty, frame size.

2.2 SYSTEM NAMEPLATES

2.2.1 Colours:

2.2.1.1 Hazardous: red letters, white background.

2.2.1.2 Elsewhere: black letters, white background (except where required otherwise by applicable codes).

2.2.2 Material and other manufacturing characteristics: plates 3 mm thick, laminated or white anodized aluminum, in the matte finish, with square corners, letters accurately aligned and machine engraved into core.

2.2.3 Sizes: Conform to following table:

Size	Sizes (mm)	No. of lines	Height of letters (mm)
1	10 x 50	1	3
2	13 x 75	1	5
3	13 x 75	2	3
4	20 x 100	1	8
5	20 x 100	2	5
6	20 x 200	1	8
7	25 x 125	1	12
8	25 x 125	2	8
9	35 x 200	1	20

2.2.3.1 Use maximum of 25 letters/numbers per line.

2.2.4 Locations

2.2.4.1 Terminal cabinets, control panels: Size #6.

2.2.4.2 Equipment in Mechanical Room: Size #9.

2.2.5 Identification for PWGSC Preventive Maintenance Support System (PMSS):

2.2.5.1 Use arrangement of Main identifier, Source identifier, Destination identifier.

2.2.5.2 Equipment in Mechanical Room:

2.2.5.2.1 Main identifier: size #9.

2.2.5.2.2 Source and Destination identifiers: size #6.

2.2.5.2.3 Terminal cabinets, control panels: size #5.

2.2.5.3 Equipment elsewhere: sizes as appropriate.

2.3 EXISTING IDENTIFICATION SYSTEMS

2.3.1 Apply existing identification system to new work.

2.3.2 Use where existing identification system does not include new mechanical systems installed as part of the work of this contract.

2.3.3 Before starting work, obtain written approval of identification system from Departmental Representative.

2.4 IDENTIFICATION OF PIPING SYSTEMS

2.4.1 Identify contents by background colour marking, pictogram (as necessary), legend; direction of flow by arrows. To CAN/CGSB 24.3 except where specified otherwise.

2.4.2 Water supply network is "UNDRINKABLE" and must have all standards required identifications.

2.4.3 Pictograms: Where required: Workplace Hazardous Materials Information System (WHMIS) regulations.

2.4.4 Legend: Block capitals to sizes and colours listed in CAN/CGSB 24.3.

2.4.5 Arrows showing direction of flow:

2.4.5.1 Outside diameter of pipe or insulation less than 75 mm: 100 mm long x 50 mm high.

2.4.5.2 Outside diameter of pipe or insulation 75 mm and greater: 150 mm long x 50 mm high.

2.4.5.3 Use double-headed arrows where flow is reversible.

2.4.6 Extent of background colour marking:

2.4.6.1 To full circumference of pipe or insulation.

2.4.6.2 Length to accommodate pictogram, full length of legend and arrows.

2.4.7 Materials for background colour marking, letters (legend), arrows:

2.4.7.1 Pipes and tubing 20 mm and smaller: waterproof and heat-resistant pressure sensitive plastic marker tags.

2.4.7.2 Other pipes: pressure sensitive plastic-coated cloth or 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.

2.4.8 Colours and Legends:

2.4.8.1 Where not listed, obtain direction from Departmental Representative.

2.4.8.2 Colours for legends, arrows: to following table.

2.4.8.3 Background colour marking and legends for piping systems.

CONTENT	BACKGROUND COLOUR	LEGEND
Domestic hot water supply	Green	Domestic hot water supply
Domestic cold water supply	Green	Domestic cold water supply
Plumbing vent	Green	Sanitary vent

2.5 IDENTIFICATION DUCTWORK SYSTEMS

2.5.1 Brass tags with 12 mm stamped identification data filled with black paint.

2.5.2 Colours: back, or co-ordinated with base colour to ensure strong contrast.

2.6 VALVES, CONTROLLERS

2.6.1 Brass tags with 12 mm stamped identification data filled with black paint.

2.6.2 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.

2.7 IDENTIFICATION OF NETWORKS AND DEVICES OF COMMAND / REGULATION

2.7.1 Identify all systems, equipment, components, controls, sensors with system nameplates specified in Division 22.

2.7.2 Inscriptions to include function and (where appropriate) fail-safe position.

2.8 LANGUAGE

2.8.1 2.8.1 Identification in French and English.

2.9 VALVES AND HVAC MARKINGS

2.9.1 Plastic markers type "pin", 22 mm in diameter and 12 mm tip to locate the concealed elements behind the suspended ceilings.

2.9.2 Markers will have colors specific to the different specialties: fire protection (red), plumbing (green), heating (yellow), cooling (blue), control units (orange), ventilation (white). Provide the Departmental Representative with the benchmark color schemes specific to each specialty.

3. EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

3.2.1 Perform work in accordance with CAN/CGSB-24.3 except as specified otherwise.

3.2.2 Provide ULC and/or CSA registration plates as required by respective agency.

3.3 NAMEPLATES

3.3.1 Locations: In conspicuous location to facilitate easy reading and identification from operating floor.

3.3.2 Standoffs: Provide for nameplates on hot and/or insulated surfaces.

3.3.3 Protection: Do not paint, insulate or cover.

3.4 LOCATION OF IDENTIFICATION ON PIPING

3.4.1 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.

3.4.2 Adjacent to each change in direction.

3.4.3 At least once in each small room through which piping or ductwork passes.

3.4.4 On both sides of visual obstruction or where run is difficult to follow.

3.4.5 On both sides of separations such as walls, floors, partitions.

3.4.6 Where system is installed in pipe chases, ceiling spaces, galleries, confined spaces, at entry and exit points, and at access openings.

3.4.7 At beginning and end points of each run and at each piece of equipment in run.

3.4.8 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.

3.4.9 Identification easily and accurately readable from usual operating areas and from access points. 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 LOCATION OF VALVES IDENTIFICATION ELEMENTS

3.5.1 Attach labels with closed "S" chains or hooks of non-ferrous metal on valves except those connected to sanitary fixtures or heating radiators and unless they are nearby and in view of the equipment to which they are connected to.

3.5.2 Install a copy of the block diagram and list of valves, framed under the anti-reflective glass, at the location determined by the Departmental Representative. Also insert a copy (smaller size, if necessary) in each of the operation and maintenance manuals.

3.5.3 Number in the order the valves of each network.

END OF SECTION

1. GENERAL

1.1 REFERENCES

1.1.1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE): ASHRAE Standard 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings (IESNA co-sponsored; ANSI approved; Continuous Maintenance Standard.

1.1.2 American Society for Testing and Materials International (ASTM)

1.1.2.1 ASTM B 209M, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate Metric.

1.1.2.2 ASTM C 335, Standard Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.

1.1.2.3 ASTM C 411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.

1.1.2.4 ASTM C 449/C 449M, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.

1.1.2.5 ASTM C 533, Calcium Silicate Block and Pipe Thermal Insulation.

1.1.2.6 ASTM C 547, Mineral Fiber Pipe Insulation.

1.1.2.7 ASTM C 795, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

1.1.2.8 ASTM C 921, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.

1.1.2.9 ASTM A167, Specification for Stainless and Heat Resisting Chromium Nickel Steel Plate, Sheet and Strip.

1.1.3 Canadian General Standards Board (CGSB)

1.1.3.1 CGSB 51-GP-52Ma, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.

1.1.3.2 CGSB 51 GP 9M, Thermal insulation, mineral fiber sheaths, for pipes and cylindrical conduits.

1.1.3.3 CGSB 51 GP 11M, Mineral fiber insulation mattress, for pipes, ducts, machinery and boilers.

1.1.3.4 CAN/CGSB 51.12 M, Thermal insulation and finishing cement.

1.1.3.5 CAN/CGSB 51.40 M, Thermal, flexible, elastomeric, unicellular, sheet and tubular insulation.

1.1.3.6 CGSB 51 GP 53M, Polyvinyl chloride sheaths for insulated pipes, pipes and conduits.

1.1.3.7 CAN/CGSB-51.60.53, Polyvinyl chloride sheaths for insulated cylindrical containers and conduits.

1.1.3.8 CAN4 S102, Surface burning characteristics of building materials and assemblies.

1.1.3.9 ANSI/NFPA 90A, Air Conditioning and Ventilating Systems, Installation.

1.1.3.10 ANSI/NFPA 90B, Warm Air Heating and Air Conditioning Systems.

1.1.4 Health Canada / system of information about hazardous materials used in the work (SIMDUT): identification sheets (FS).

1.1.5 Manufacturers' Trade Associations: Thermal Insulation Association of Canada (TIAC): National Insulation Standards (C2004).

1.1.6 Underwriters' Laboratories of Canada (ULC)

1.1.6.1 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.

1.1.6.2 CAN/ULC-S701, Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.1.6.3 CAN/ULC-S702, Thermal Insulation, Mineral Fibre, for Buildings

1.1.6.4 CAN/ULC-S702.2, Thermal Insulation, Mineral Fibre, for Buildings, Part 2: Application Guidelines.

1.1.7 CSA HA Series M CSA Standards for Aluminum and Aluminum Alloys.

1.2 DEFINITIONS

1.2.1 For purposes of this section:

1.2.1.1 "CONCEALED" - insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.

1.2.1.2 "EXPOSED" - will mean "not concealed" as specified.

1.2.1.3 Spaces such as room of mechanics, electric room, boiler room, lean-to, tunnel and/or gallery and any space of this nature are considered occupables.

1.2.1.4 "Material" means any component used for the insulation including, besides the jacket or the insulating material itself, the glues, the ribbons, the coverings (collections), adorns vapors, jacketings, sealings, ties, coated and any necessary product to complete the works.

1.2.1.5 "Network" means piping including accessories, garnish, etc. such as valves, elbows, pumps, tees, etc., which are incorporated.

1.2.1.6 "Domestic" means drinkable and not used exclusively to this end.

1.2.1.7 "Waste water" means any waters of evacuation except rainwaters.

1.2.1.8 "Throats" means drain of floor, drain of roof, funnel, etc., connected with a pipe of evacuation of waste water, or with a piping of rainwater.

1.2.1.9 "Condensat" means water resulting from the condensation of the vapor which returns to the boiler in the vapor via diverse progresses. In this water, can be added by some softened water, drinking water or vapor without losing this definition. Also mean water generated in an air conditioning system.

1.2.2 TIAC ss:

1.2.2.1 CRF: Code Rectangular Finish.

1.2.2.2 CPF: Code Piping Finish.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

1.3.1 Subject documents and samples required according to Division 22.

1.3.2 Data sheets: Submit manufacturer's printed product literature, specifications and datasheet. Include product characteristics, performance criteria, and limitations and the finish. They also have to indicate the VOC emission rate of adhesives and solvents during application and curing period.

1.3.3 Samples

1.3.3.1 Upon request by the Departmental Representative, submit samples required by the product described in the present section.

1.3.3.2 Submit for approval: complete assembly of each type of insulation system, insulation, coating, and adhesive proposed. Mount sample on 12 mm plywood board. Affix label beneath sample indicating service.

1.3.4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.3.5 Instructions: submit manufacturer's installation instructions.

1.3.6 Have the documentation provided by the manufacturer concerning the methods of laying the insulation, the manufacturing details of insulation elements for pipes, fittings and valves approved as well as the recommendations for the joints execution.

1.3.7 Documents / items to be returned upon completion of works

1.3.7.1 Provide the required operating and maintenance records and join them manual mentioned in Division 22.

1.3.7.2 Provide reports of signed on-site inspections performed by supplier and contractor for facility monitoring.

1.4 QUALITY ASSURANCE

1.4.1 Reliability of technical data

1.4.1.1 Data from manufacturer’s catalogs and documentation have to be reliable data, based on test results which have been carried out by the manufacturers themselves or, on their behalf, by independent laboratories, and having allowed certifying elements conformity to the requirements of codes and the existing standards.

1.4.1.2 The installer must be an expert in the workfield.

1.5 PARTICULARITY

1.5.1 The insulation Contractor must confirm with the mechanics contractor the kind of piping and equipment to insulate.

1.5.2 Unless otherwise specified, "concealed" insulation does not have to be subject to a finish and/or other covering other than that integrated in the factory. On the other hand, joints must be perfectly sealed.

1.5.3 All the "visible" insulation have to be finished and/or covered.

1.5.4 Use and location: refer to list of application of the various types of insulations shown in part 3 of the present section to obtain precision for details on their location and use.

1.5.5 Insulation has to continue through partitions and floors when the piping crosses these.

1.5.6 Insulation must be carried out in accordance with good engineering practice by an expert installer in the field and a member of the ACIT.

1.5.7 Unless otherwise specified in Table A in this section, all piping shall be insulated over its entire length.

1.6 DELIVERY, STORAGE AND HANDLING

1.6.1 Storage and protection

1.6.1.1 Protect from weather, construction traffic.

1.6.1.2 Protect against damage.

1.6.1.3 Store at temperatures and conditions required by manufacturer.

2. PRODUCTS

2.1 SUSTAINABLE REQUIREMENTS

2.1.1 Choose products and materials with recycled content or resource efficient characteristics whenever possible. If applicable, verify with the manufacturer the pre-consumption and post-consumer recycled content of the products offered.

2.1.2 Adhesives and sealants:

2.1.3 Use least toxic sealants, adhesives, sealers and finishes necessary to comply with the requirements of the project.

2.1.3.1 The VOC content of adhesives and sealants must be less than that specified in the Green Seal GS-36 standard and SCAQMD regulation 1168.

2.1.3.2 Paint: VOC of up to 250 g/L according to GS-11 standard according to SCAQMD regulation number 1113.

2.2 FIRE AND SMOKE RATING

2.2.1 In accordance with CAN4 S102, the materials used shall have a maximum flame spreading rating of 25 and maximum smoke developed rating of 50.

2.3 GENERAL

2.3.1 Materials shall have been tested according to ASTM C411.

2.3.2 Pre-molded PVC coverings for fittings, elbows and all piping in mechanical rooms.

2.4 TABLE 1

2.4.1 Thickness of insulating material according to the temperatures of networks, according to CMNE B.

Vapour pressure Saturated (kPa or condensat)	Temperature of the fluid (°C)	Thickness of the minimal insulation (mm)			
		Nominal diameter of pipes (DN)			
		1 and less	1 ¼ in 2	2½ in 4	5 and more
827 and more	177 and more	64	64	76	89
104 in 826	122-176	51	64	64	89
0 in 103	94-121	38	38	51	51
Pumped Condensate	61-93	25	25	38	38
---	30-60	25	25	38	38
---	21-29	25	25	25	38
---	5-20	25	25	25	25
---	Less of 5	25	38	38	38
Condensate in low-pressure gravity		25	38	51	51

2.5 TYPE P-1 INSULATION: MINERAL FIBERS; PREFORMED WITH VAPOUR RETARDER, SERVICE TEMPERATURE BETWEEN 4 °C À 200 °C

2.5.1 Usages: type P-1 insulation for pipes and fittings. Service temperature between 4 °C à 200 °C.

2.5.2 Materials

2.5.2.1 Rigid mineral envelope conforming to CGSB 51 GP 9M, with vapor barrier, jacket and coating material conforming to standard CGSB 51 GP 52M.

2.5.2.2 Acceptable products: Manson, Alley-K APT, Knauf and Johns's Manville.

2.5.2.3 Insulation with a thermal conductivity "K" of not more than 0.034 W / m °C at an average temperature of 24 °C when tested in accordance with the requirements ASTM C335.

2.6 TYPE P-2 INSULATION: FLEXIBLE IN MINERAL FIBERS, WITH VAPOUR RETARDER; SERVICE TEMPERATURE (T) UNTIL 85 °C

2.6.1 Materials

2.6.1.1 Mattress of mineral fibers (for insulation of pipings) in compliance with the standard CGSB 51-GP-9M with vapour retarder, jacket and cover material corresponding to the standard CGSB 51-GP-52M.

2.6.1.2 Acceptable products: Manson Alley Wrap FSK, Knauf and some teed type Of John Manville.

2.6.2 Thickness of the insulation: refer to the picture 1, the art. 2.4.

2.7 TYPE P-3 FLEXIBLE INSULATION, IN ELASTOMER, SERVICE TEMPERATURE (T) BETWEEN 0 °C AND 100 °C

2.7.1 Uses: Insulation of the type (P-3 for pipes) and joins installed in rooms with mechanical installations and outside above ground level, used in the case of the following networks: (supply) of cold domestic water.

2.7.2 Materials

2.7.2.1 Flexible insulation, in elastomer, unicellular, in sheet leaf and tubular, in compliance with the standard CAN / ONGC 51.40 M80.

2.7.2.2 Inside: paint when apparent inside, the insulating material will be covered with an appropriate white paint, two coats of thickness such as Armstrong finished Armaflex WB.

2.7.2.3 Thermal conductivity coefficient "K" not exceeding 0,036 W/m °C at an average temperature of 24 °C when tested according to the requirements of the standard ASTM C335.

2.7.2.4 Permeability to water vapor in perm/po: 0.05: in compliance with the standard ASTM E965.

2.7.2.5 Acceptable products: Armstrong Armaflex AP, equivalent: Insul-Tube.

2.7.3 Thickness of the insulation: 13 mm or such as indicated.

2.8 ADHESIVES, RIBBONS AND FASTENERS

2.8.1 Use glues with very low content in COV.

2.9 ADHESIVES FOR SEALING VAPOR BARRIER OVERLAPPING

2.9.1 Water-based adhesive, flame resistant, compatible with heat-insulating material.

2.10 VAPOR BARRIER COATING FOR INTERIOR PIPINGS

2.10.1 Acrylic vinyl emulsion, compatible with heat-insulating material.

2.11 JACKETS

2.11.1 Vinyl polyvinyl chloride jacket (PVC)

2.11.1.1 Jackets used on all elements in mechanical rooms except for steam piping.

2.11.1.2 Apply a PVC liner to the pipe insulation and fasten it with the required fasteners to 100 mm center to center.

2.11.1.3 Cover the longitudinal and circumferential joints with a tight fitting trim strip.

2.11.1.4 The PVC liner shall have a thickness of 0.15 mil, fire index 25 and smoke index 50.

2.11.1.5 Acceptable product: Proto or approved equivalent.

2.11.2 Canevas

2.11.2.1 Jackets used on exposed elements other than mechanical rooms: cotton canvas, plain weave, approved by the "ULC", with a mass of 220 g / m².

2.11.2.2 Jackets used on tap fittings and hidden fittings: solid-woven cotton canvas, approved by ULC, with a mass of 120 g / m2.

2.11.2.3 Acceptable product: Alpha Maritex 3451-RW, Clairmont Diplag 60, S. Fattal Thermocanvas.

2.12 ENVELOPES AND REMOVABLE PREFABRICATED INSULATION

2.12.1 Uses: expansion joints faucet factory.

2.12.2 Design: Designed to allow free movement of expansion joints and to be removed and replaced periodically without risk of damage to the adjacent insulation.

2.12.3 Insulation

2.12.3.1 Mold to conform the shape of elements to be insulated.

2.12.3.2 Same thickness as adjacent jacket.

2.12.3.3 Water cooling installations: including a vapor barrier.

2.12.3.4 Wrap: aluminum 1,3 mm in thickness.

2.13 FITTINGS AND ELBOWS

2.13.1 Insulate joints and elbows with miter cut pipe insulation sections. Alternatively, insulate the fittings and elbows with a tight fitting flexible insulation of the same thickness as the rigid insulation on the pipe.

3. EXÉCUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

3.2.1 Install in accordance with TIAC National Standards.

3.2.2 Put the insulating material only once the ended compulsory and the results approved by the Departmental Representative. Make sure that the surfaces of the insulation and the elements to be insulated are clean and dry during the installation of the insulation and during the application of a filler of finish. Put the insulation and the accessories and apply fillers of finish according to the recommendations of the manufacturer and the present prescriptions.

3.2.3 In the case of piping covered with insulation and vapor barrier, install a high-density insulation where protective shields are provided for insulated pipes. The vapor barrier must not be punctured to allow the elements of the supports to pass through or be interrupted at the location of the sleeves, fittings and supports.

3.2.4 When the insulation is susceptible to be damaged by shocks due to its proximity to access doors, doors, access plates, etc., protect it with a steel pre-wired steel sheath of 1.3 mm (18 gauge).

3.2.5 Install the heat-insulating material so as to produce a smooth and uniform surface.

3.2.6 For the heat-insulating material, apply the coatings and finishing products in accordance with the recommendations and precautions of the insulating, adhesive and coating manufacturers.

3.2.7 All supports of all types of piping, hot or cold, shall be installed completely outside the heat insulator.

3.2.7.1 For insulated piping of an insulator of elastomer or soft mineral fibers, a rigid material of the "Foamglass" or "Styrofoam" type is used on each support and a steel saddle of an appropriate length is installed to distribute weight.

3.2.7.2 For insulated piping of preformed mineral fiber insulation or other rigid material, the insulating material shall be extended to each support and a steel saddle of an appropriate length shall be installed to distribute the weight

3.2.7.3 This material shall be supplied and installed by the heat insulation contractor. The steel supports and saddles shall be provided and installed by each relevant mechanical contractor to the satisfaction of the Insulation contractor.

3.2.8 Install a high compressive strength insulation suitable for operating conditions where no insulation shield can be installed.

3.3 INSULATION

3.3.1 Install insulation according to the standards ANSI / NFPA 90A and ANSI / NFPA 90B.

3.3.2 Preformed insulation: use a shell insulation for pipes with a diameter of DN ½ or less, and a heat insulator in shells or curved segments for pipes larger than DN ½.

3.3.3 Multi-thickness insulation: offset the abutment joints of each insulation thickness.

3.3.4 Vertical pipings of diameter upper to DN 3: use supports of insulation which will be welded or screwed on pipes, directly over the lowest join, then in 4,5 m of interval.

3.3.5 Expansion joints of the insulation: cut very straight the extremity of every thickness of insulation, according to the instructions of the manufacturer. Leave a space of 25 mm between both successive sections and fill with flexible insulation in type P-2's mineral fibers without compressing that this.

3.3.6 Seal and end the visible extremities of the insulation and others with some insulating cement.

3.3.7 Expansion joints of the piping: allow the free dilation / contraction of the expansion joint without risk to damage the insulation or its cover.

3.3.8 Flanges for fitting orifice plates, flanges and fittings to the inlet and outlet of appliances, expansion joints, valves, valves and other items requiring periodic maintenance: leave these

parts uncovered and cut the adjacent insulation Bevelled at the studs and nuts so that these elements can be removed without damaging the insulation.

3.3.9 Do not put insulation on the following elements:

3.3.9.1 Chrome pipes, valves and fittings.

3.3.9.2 Unions and flange connections of heating systems at 48 °C and below.

3.4 FIXATION (BINDING) OF THE INSULATION

3.4.1 Secure each heat insulating section with end tapes and intermediate tapes at intervals of not more than 900 mm.

3.5 APPLICATION TABLE FOR INSULATION

3.5.1 Refer to the TABLE A.

This enumeration, without being exhaustive, includes in a general way the list of application of the various types of insulating material and the jacketing required on the various pipings within the framework of the project.

TABLE A

JACKET FOR PIPING

PIPING	OPERATING TEMPERATURE	LOCATION	TYPE	JACKET
Domestic hot water	60 °C		P-1	PVC
Domestic cold water	5-20 °C		P-3	PVC
Vent		**3 m inside the thermal envelope**	P-2	
Steam			P-1	Canevas
Condensate			P-1	Canevas

3.6 QUALITY CONTROL

3.6.1 Controls made on the spot by the manufacturer

3.6.1.1 Make arrangements for the manufacturer of the products supplied under this section to review work relating to the handling, installation / application, protection and cleaning of his product or products, And submit written reports, in an approved format, that will verify whether the work was done under the terms of the contract.

3.6.1.2 The manufacturer shall make recommendations on the use of the product (s) and carry out a start-up and inspection to verify compliance with the instructions.

END OF SECTION

1. GENERAL POINTS

1.1 REFERENCES

1.1.1 CSA Group

1.1.1.1 CAN/CSA-C22.2 No. 130-03(R2013), Requirements for Electrical Resistance Heating Cables and Heating Device Sets.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

1.2.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

1.2.2 Product Data:

1.2.2.1 Submit manufacturer's instructions, printed product literature and data sheets for radiant heating electrical cables and include product characteristics, performance criteria, physical size, finish and limitations.

1.2.3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.3 CLOSEOUT SUBMITTALS

1.3.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

1.4 DELIVERY, STORAGE AND HANDLING

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

2. PRODUCTS

2.1 GENERAL

2.1.1 Heating cables: to CAN/CSA-C22.2 No.130.

2.2 ELECTRIC HEAT TRACING WITH TRACE CONDUIT

2.2.1 The electric heat tracing shall be constant watt parallel resistance. THERMOCABLE is specifically designed for freeze protection and is pre-insulated pipe of fluoropolymère.

2.3 ACCESSORIES

2.3.1 PKF-1: Power feed kit contains all necessary material to connect one or two THERMOCABLE on pre-insulated pipe to a electronic thermostat.

2.3.2 PKF-4 : Power feed kit contains all necessary material to connect a 120Vca THERMOCABLE on pre-insulated pipe to a electronic thermostat.

2.4 CONTROLS

2.4.1 For plastic pipe: part number #UTC-2030-01/2230-01 with ground fault detection circuitry, 120-240Vca, 30A, 2-pole circuit breaker and contactor in a NEMA 4 painted steel enclosure. Factory set @ control: 3 °C , high limit : 65°C for protection of plastic piping.

2.4.2 For metal pipe: part number #UTC-2030-21/2230-21 with ground fault detection circuitry, 120-240Vca, 30A, 2-pole circuit breaker and contactor in a NEMA 4 painted steel enclosure. Factory set @ control: 3 °C.

2.5 TEMPERATURE SENSORS

2.5.1 100 ohms RTD temperature sensor # URTD-06/15/30-G/R with 6,15,30 meters of gray, red PVC lead wire.

3. EXECUTION

3.1 EXAMINATION

3.1.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for radiant heating electrical cables installation in accordance with manufacturer's written instructions.

3.2 INSTALLATION

3.2.1 Install cables in accordance with manufacturer's instructions.

END OF SECTION

1. GENERAL POINTS

1.1 REFERENCES

1.1.1 Canadian Standards Association (CSA)/CSA International

1.1.1.1 CSA C22.10-10, Canadian Electrical Code with Quebec modifications, First part (24st edition), Safety standard related to electrical installations.

1.1.1.2 CSA C22.10, Code de construction du Québec – Chapitre V – Électricité, 2018.

1.1.1.3 CAN/CSA-C22.3 number 1, Overhead systems.

1.1.1.4 CAN3-C235, Recommended voltages for systems having alternating currents from 0 to 50 000 V.

1.1.2 Electronic and Electrical Manufacturers' Association of Canada (EEMAC)

1.1.2.1 EEMAC 2Y-1, Light Gray Colour for Indoor Switch Gear.

1.1.3 Health Canada – Workplace Hazardous Materials Information System (WHMIS)

1.1.3.1 Material safety data sheet.

1.2 DESIGN REQUIREMENTS

1.2.1 Operating voltages must be in accordance with standard CAN3-C235.

1.2.2 The motors, electrical heating devices, control/regulation devices and distribution devices have to operate in the proper manner at a frequency of 60 Hz and within the limits established in the above mentioned standard.

1.2.2.1 The materials must be capable of operating without sustaining any damage under the extreme conditions of this standard.

1.2.3 Operational and display language: make provisions for the identification and display of identification signs in English and French for control devices.

1.3 DOCUMENTS/SAMPLES TO BE SUBMITTED

1.3.1 Submit the required documents and samples in accordance with section 01 33 00 - Documents and samples to be submitted.

1.3.2 Submit, for examination purposes, the single-line schematics framed under plexiglass and place them in the designated areas.

1.3.2.1 Electrical distribution networks: in the main room of electrical facilities.

1.3.2.2 Electrical production and distribution networks: in the power plant rooms.

1.3.3 Shop drawings

1.3.3.1 The shop drawings must display the seal and signature of an engineer recognized and competent to work in Canada.

1.3.3.2 Submit five (5) copies of the drawings and data sheets to the ministerial representative.

1.3.3.3 If changes are needed, notify the ministerial representative before they are executed.

1.3.4 Quality control: in accordance with section 01 45 00 - Quality control.

1.3.4.1 Make provisions for CSA certified equipment and materials.

1.3.4.2 In the case where it is not possible to obtain CSA certified equipment and materials, submit the proposed equipment to the ministerial representative for approval purposes, before delivering them to the site.

1.3.4.3 Submit the test results of the installed systems and electrical instruments.

1.3.4.4 Permits and rights: in accordance with the general conditions of the contract.

1.3.4.5 Once the work has been completed, submit a balance report pertaining to loads in accordance with article LOAD BALANCING, from PART 3.

1.3.4.6 Once the work has been completed, submit to the Client representative and the ministerial representative the acknowledgement of receipt delivered by the competent authority.

1.4 QUALITY ASSURANCE

1.4.1 Quality assurance: in accordance with section 01 45 00 - Quality assurance.

1.4.2 Qualifications: the electrical work must be executed by certified and qualified electricians, a master electrician or by a contractor-electrician who holds a licence issued by the province in which the work will take place.

1.5 TRANSPORT, STORAGE AND HANDLING

1.5.1 Schedule for equipment deliveries: hand in a delivery schedule to the ministerial representative in the two (2) weeks following the contract assignment.

1.5.2 Construction/demolition waste management and disposal: in accordance with section 01 74 21 - Construction/demolition waste management and disposal

1.6 START-UP OF THE INSTALLATION

1.6.1 Instruct the operational personnel on how to use the facility, its equipment and components and on how to maintain it.

1.6.2 Hire and pay for the services of an engineer independent of the manufacturing plant who will monitor the start-up of the installation, verify, adjust, balance and calibrate the various elements and who will instruct the operational personnel about door control system.

1.6.3 Provide these services for a duration that is 4 hours, taking into account of necessary visit required to start-up the equipment and to have the operational personnel become familiar with all aspects of their maintenance and functioning.

2. PRODUCTS

2.1 MATERIALS/EQUIPMENT

2.1.1 Provide the materials and equipment in accordance with section 01 61 00 – General requirements regarding products.

2.1.2 The equipment must be CSA certified. In cases where this is not possible, submit the replacement equipment and materials to the inspection authorities before delivering them to the site, in accordance with article DOCUMENTS/ELEMENTS TO BE SUBMITTED, from PART 1.

2.1.3 Command/control panels and all components must be factory assembled.

2.2 ELECTRIC MOTORS, EQUIPMENT AND COMMAND/CONTROLS

2.2.1 Verify the responsibilities pertaining to installation and coordination so that there may be motors, equipment and command/controls, in accordance with specifications.

2.3 CAUTION SIGNS

2.3.1 Caution signs: 175 mm x 250 mm.

2.4 CABLING PARKING STANDS

2.4.1 Make certain that the thimbles, terminals and screws and cabling terminations are as suitable for the copper conductors as for the aluminum ones.

2.5 IDENTIFICATION OF MATERIAL

2.5.1 In order to identify electrical material, use identification signs in accordance to the following specifications:

2.5.1.1 Identification signs: 3 mm thick plastic lamicoid etching plates, with white mat finish coloured front and black web, mechanically attached with tapping screws, with inscriptions in properly aligned letters, etched into the plate's web.

2.5.1.2 Format in accordance with the following table.

FORMAT FOR IDENTIFICATION PLATES

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

2.5.1.3 The inscriptions on the identification plates must be approved by the Minister's representative before being made.

2.5.1.4 The identification plates for terminal board boxes and junction boxes must display the network characteristics and/or the voltage.

2.5.1.5 The identification plates for the isolating switches, starters and contactors must indicate the device controlled and voltage.

2.5.1.6 The identification plates for the terminal board boxes and pull boxes must display the network and voltage.

2.5.1.7 The identification plates for the transducers must display the strength as well as the primary and secondary voltages.

2.6 CABLING IDENTIFICATION

2.6.1 The two-phase conductor extremities for each feeder and for each branch circuit must be permanently identified in a smear proof manner using numbered or coloured plastic tape.

2.6.2 Preserve the order of phases and the same colour code for the entire installation.

2.6.3 The colour code must be in accordance with standard CSA C22.1.

2.6.4 Use communication cables made with conductors that have a uniform colour registration throughout the network.

2.7 IDENTIFICATION OF CONDUITS AND CABLES

2.7.1 Assign a colour code to conduits, boxes and metal sheathed cables.

2.7.2 Apply plastic tape or paint, for recognition purposes, on cables or conduits every 15 m and at wall bushings, ceilings and floors.

2.7.3 The base colour bands must be 25 mm in length and those for complementary colours must be 20 mm thick.

	Base Colour	Complementary colour
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 networks	green	blue
Fire alarm	red	
Emergency communication	red	blue
Other security systems	red	yellow

2.8 FINISH

2.8.1 The metallic covering surfaces must be fished in the shop and coated with an anti-rust layer, inside and outside, and with at least two layers of finishing enamel paint.

2.8.1.1 The electrical devices installed outdoors must be painted in a ¨machine green¨ colour.

2.8.1.2 The communication and distribution device cabinets must be painted a pale grey colour in accordance with standard EEMAC 2Y-1.

3. EXECUTION

3.1 INSTALLATION

3.1.1 Unless otherwise specified, execute all of the installation in accordance with standard CSA C22.1.

3.1.2 Unless otherwise specified, install the overhead and underground systems in accordance with standard CSA C22.3 number 1.

3.2 LABELS, IDENTIFICATION PLATES AND NAME PLATES

3.2.1 Make certain that CSA labels and identification and name plates are visible and legible once the materials have been installed.

3.3 INSTALLATION OF CONDUITS AND CABLES

3.3.1 Install conduits and sleeves before the concrete is poured.

3.3.1.1 Concrete work rail sleeves: series 40 steel pipe, being of a diameter that allows the unobstructed passage of the conduit and that surpasses the concrete surface by 50 mm on each side.

3.3.2 When plastic sleeves are used for wall or bushings that have a fire endurance rating, remove them before installing the conduits.

3.3.3 Install cables, conduits and connections that have to be embedded or coated by placing them carefully against the building's framework so as to minimize the thickness of the backfill.

3.4 PLACEMENT OF OUTLETS AND ELECTRICAL OUTLETS

3.4.1 Place the outlets and electrical outlets in the designated areas in accordance with section 26 05 32 – Outlet, junction and accessory boxes.

3.4.2 Do not install outlets or electrical outlets back to back in a wall; leave a horizontal space of at least 150 mm between boxes.

3.4.3 The location of outlets and electrical outlets can be changed without additional costs or credit, as long as the move does not exceed 3,000 mm and that notification is given before the move.

3.4.4 Place light switches near doors, on the handle side.

3.4.4.1 In mechanical facility rooms and elevator machinery rooms, place the switches near doors, on the handle side.

3.5 HEIGHT OF MOUNTING

3.5.1 Unless otherwise specified or stipulated, measure material mounting heights from the coated floor surface up to the device's axis.

3.5.2 In the case where the mounting height is not specified, consult competent persons before commencing the installation.

3.5.3 Unless otherwise specified, install material at the following heights.

3.5.3.1 Light switches: 1,400 mm.

3.5.3.2 Wall outlets

3.5.3.2.1 General: 300 mm.

3.5.3.2.2 Above continuously heating base-board units: 200 mm.

3.5.3.2.3 Above counter tops or their back splashes: 175 mm.

3.5.3.2.4 In mechanical facility rooms: 1,400 mm.

3.5.3.3 Panelboards: in accordance with the Code or specifications.

3.5.3.4 Telephone and intercom outlets: 300 mm.

3.5.3.5 Wall outlets for telephones and intercoms: 1,500 mm.

3.5.3.6 Fire alarms: 1,400 mm.

3.5.3.7 Fire alarm bells: 2,100 mm.

3.5.3.8 Television outlets: 300 mm.

3.5.3.9 Wall-mounted speakers: 2,100 mm.

3.5.3.10 Clock outlets: 2,100 mm.

3.5.3.11 Door bell buttons: 1,500 mm.

3.6 COORDINATION OF PROTECTIVE DEVICES AND ARC FLASH

3.6.1 Make certain that circuit protective devices such as overload releases, relays and fuses are installed, that they are of the proper calibre and are adjusted to the required values.

3.6.2 With submitting drawings shop, include coordination study for main protection devices.

3.6.3 Installation should be in accordance with article 2-306 «Protection contre les arcs et les chocs électriques» of the Canadian Construction Code chap. V – Electricity, 2018.

3.7 ONSITE QUALITY CONTROL

3.7.1 Load balancing

3.7.1.1 Measure the phase current for the panelboards under nominal loads (lighting) at the moment the work is received. Spread out the branch circuit connections so as to obtain the best balance of current between phases and make note of the modifications made to the original connections.

3.7.1.2 Measure the phase voltages of devices and adjust the transducer outlets so as to obtain a voltage that is within 2 % of the devices' nominal voltages.

3.7.1.3 Once the measurements have been completed, hand in the load balancing report stipulated in article DOCUMENTS/SAMPLES TO BE SUBMITTED, from PART 1. This report must specify the current of conditions under normal loads recorded on the phases and the neutral conductor panelboards, dry-type transformers and motor control centres. Specify the time and date on which the load was measured, as well as the circuit voltage at the time of measurement.

3.7.2 Execute the testing of the following elements, in accordance with section 01 45 00 – Quality control.

3.7.2.1 Generating facilities and electrical distribution, including phase, voltage and grounding control, and the balancing of loads.

3.7.2.2 Circuits originating from distribution panelboards.

3.7.2.3 Lighting systems and control/regulation devices.

3.7.2.4 Motors, heating devices and related control/regulation devices, including the control of sequential operations of systems if need be.

3.7.2.5 Fire alarm system and communication network.

3.7.2.6 Insulation resistance measurements.

3.7.2.6.1 Measure, using a 500 V megohmeter, the insulating value of circuits, distribution feeders and equipment having a nominal voltage greater than 350 V.

3.7.2.6.2 Measure, using a 1,000 V megohmeter, the insulating value of circuits, feeders and equipment having a nominal voltage between 350 V and 600 V.

3.7.2.6.3 Verify the resistance to earth value before turning on the current.

3.7.3 Execute the testing in the presence of the ministerial representative.

3.7.4 Provide the measuring devices, the indicators, equipment and personnel required to execute tests during the work execution and upon completion of the work.

3.8 CLEANING

3.8.1 Clean and touch up painted surfaces in the shop that have been scratched or damaged during operations and installations; use a paint that is of the same type and colour as the original paint.

3.8.2 Clean hooks, supports, fasteners and other visible fastening devices, and apply a finishing coat to protect against rust.

END OF SECTION

1 GENERAL

1.1 REFERENCES

1.1.1 Canadian Standards Association (CSA International)

1.1.1.1 CAN/CSA-C22.2 No.18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.

1.1.1.2 CSA C22.2 No.65-Wire Connectors.

1.1.2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)

1.1.2.1 EEMAC 1Y-2, 1961 Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

1.1.3 National Electrical Manufacturers Association (NEMA)

1.2 WASTE MANAGEMENT AND DISPOSAL

1.2.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

1.2.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

1.2.3 Collect and separate for disposal paper, plastic polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

1.2.4 Divert unused wiring materials from landfill to metal recycling facility as approved by the ministerial representative.

2 PRODUCT

2.1 MATERIALS

2.1.1 Pressure type wire connectors to: with current carrying parts of copper sized to fit copper conductors as required.

2.1.2 Fixture type splicing connectors with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

2.1.3 Bushing stud connectors: to EEMAC 1Y-2 NEMA to consist of:

2.1.3.1 Connector body and stud clamp for copper

2.1.3.2 Clamp for stranded copper conductors.

2.1.3.3 Clamp for stranded aluminum ACSR conductors

2.1.3.4 Stud clamp bolts.

2.1.3.5 Bolts for copper conductor or bar.

2.1.3.6 Bolts for aluminum conductor bar.

2.1.3.7 Sized for conductors and bars as indicated.

2.1.4 Clamps or connectors for armored cable, aluminum sheathed cable, mineral insulated cable, flexible conduit, non-metallic sheathed cable as required

2.1.5 Watertight approved for TECK Cable

3 EXECUTION

3.1 INSTALLATION

3.1.1 Install the connectors as per manufacturer`s recommendations for bar connection.

3.1.2 Remove insulation carefully from ends of conductors and:

3.1.2.1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.

3.1.2.2 Install mechanical pressure type connectors and tighten screws [with appropriate compression tool recommended by manufacturer]. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.

3.1.2.3 Install fixture type connectors and tighten. Replace insulating cap.

3.1.2.4 Install bushing stud connectors in accordance with EEMAC 1Y-2, NEMA.

3.1.2.5 Contractor must prove that each screw has been tightened as per manufacturer`s recommendation.

END OF SECTION

1 GENERAL

1.1 REFERENCES

1.1.1 National Building code 2015

1.1.2 CSA C22.2 no 0.3, Testing methods for Electrical Cables and Wires.

1.2 PRODUCT DATA

1.2.1 Provide product data in accordance with Section 01 33 00 - Submittal Procedures et 26 05 00 – Electrical General Requirements.

1.2.2 perform electrical test methods in accordance with section 26 05 00 – Electrical General Requirements.

1.3 DELIVERY, STORAGE AND HANDLING

1.3.1 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

2 PRODUCT

2.1 BUILDING WIRES

2.1.1 Where cables assemblies are specified to have a PVC overall covering it may be required to comply to the Vertical Tray Fire Test of CSA C22.2 No.0.3 for the applicable Building Code classification of the project as it relates to the actual installed location.

2.1.2 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.

2.1.3 Copper conductors: size as indicated, with 600 or 1000V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE or RWU90 XLPE.

2.1.4 Use insulated wiring of 1000 V for motors controlled by variable frequency.

2.1.5 An insulated GREEN conductor of minimum size 12 AWG is required.

2.1.6 Neutral supported cable: 1, 2, 3 phase insulated conductors of Copper or Aluminum and one neutral conductor of Copper or Aluminum steel reinforced, size as indicated. Type: NS75 or NS90 Insulation: Type NS-1 rated 300 V and Type NSF-2 flame retardant rated 600 V.

2.2 TECK 90 CABLE

2.2.1 NS-1, for rate voltage of 300 V and NSF-2, Fireproof for rate voltage of 600 V.

2.2.2 Cable: in accordance with Section 26 05 00 - Common Work Results for Electrical.

2.2.2.1 Grounding conductor: copper.

2.2.3 Circuit conductors: copper size as indicated.

2.2.4 Insulation: Cross-linked polyethylene XLPE. Rating: 600 V. Inner jacket: polyvinyl chloride material. Armour: galvanized steel.

2.2.5 Teck Cables used for control and communication not exceeding 300 V should be isolated at 600 V and should be of metal armour with galvanized steel tape. The conductors should be copper 12 gauge minimum or a gauge superior considering charges and voltage drop and the number of conductors per cable.

2.2.6 All Teck Cables will be of type 90 with exterior PVC sheathing. Comply with CAN/CSA-C22.2 no 131 and 174 for hazardous locations (HL) and Fire retardant (FT-4).

2.2.7 Teck Cables, when installed in cable trays, must meet the Canadian Electrical code, part1 as well as adjustment factors relevant to tables 5A and 5D.

2.2.8 Overall covering: thermoplastic polyvinyl chloride, [compliant to Building Code classification for this project].

2.2.9 Fastenings:

2.2.9.1 One-hole steel straps to secure surface cables 50 mm and smaller. Two-hole steel straps for cables larger than 50 mm.

2.2.9.2 Channel type supports for two or more cables at 1.5 mm centers.

2.2.9.3 Threaded rods: 6 mm diameter to support suspended channels.

2.2.10 Connectors:

2.2.10.1 Watertight, explosion-proof approved for TECK cable.

2.3 ARMOURED CABLES

2.3.1 Conductors: insulated, copper size as indicated.

2.3.2 Type: AC90

2.3.3 Armour: interlocking type fabricated from galvanized steel aluminum strip.

2.3.4 Type: ACWU90, PVC, flame retardant jacket over armour and compliant to applicable National Building Code of Canada classification for this project - wet locations.

2.3.5 Connectors: anti short connectors.

2.4 ALUMINUM SHEATHED CABLE

2.4.1 Conductors: copper size as indicated.

2.4.2 Insulation: cross linked polyethylene type RA90, rated 600 or 1000V.

2.4.3 Sheath: aluminum applied to form continuous corrugated sheath.

2.4.4 Outer jacket: thermoplastic applied over sheath and to be compliant with the Building Code classification for this project, direct burial in wet or corrosive locations. PVC type, fire retardant and sun resistant.

2.4.5 Fastenings for aluminum sheathed cable:

2.4.5.1 One hole aluminum or malleable iron straps to secure surface cables 25 mm and smaller. Two hole steel straps for cables larger than 25 mm. Use access plates, bushings, washers and clamps non ferrous cable with single core not incorporating more than 200A.

2.4.5.2 Channel type supports for two or more cables at 1 mm centers.

2.4.5.3 Threaded rods: 6 mm diameter to support suspended channels.

2.5 CONTROL CABLES

2.5.1 Type: LVT: 2 soft annealed copper conductors, sized as indicated. Thermoplastic insulation, thermoplastic jacket sheathing, and armor of closely wound aluminum wire.

2.5.1.1 Type: low energy 300 V control cable: stranded annealed copper conductors sized as indicated LVT: 2 soft annealed copper conductors, sized as indicated, PVC Insulation type TW or TWH.

2.5.1.2 Type: 600 V or less, stranded, annealed copper conductors, sizes as indicated. Insulated in PVC, type TW, TWH, RW90 (XLPE). PVC overall covering. All cable must conform to section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.

2.6 NON-METALLIC SHEATHED CABLE

2.6.1 Non-metallic sheathed copper cable type: NMD90XLPE, NMW, NMWU, size as indicated.

2.7 FIRE ALARM SYSTEM CABLES

2.7.1 Standards CSA C22.2, no 208 (latest edition)

2.7.2 Standards CSA FAS-105, 300 volts, FT-4

2.7.3 unshielded cable without armour

2.7.3.1 for conventional system none addressable.

2.7.3.2 installation in metal conduit, type EMT only, with identification under section 26 05 00.

2.7.4 unshielded cable with armour

2.7.4.1 for conventional systems non addressable.

2.7.4.2 Installation in ceilings and drywall with identification in accordance with section 26 05 00.

2.7.5 shielded cable without armour

2.7.5.1 for all conventional addressable systems.

2.7.5.2 Metal conduit installation type EMT only, with identification according to section 26 05 00

2.7.6 Shielded cable with armour

2.7.6.1 for all conventional addressable systems.

2.7.6.2 identification according to section 26 05 00

2.7.7 Shielded cable with armour

2.7.7.1 For all systems, and in all places, except classified places, when used with appropriate connectors.

2.7.8 Provide approval for the type of cable in shop drawings.

2.8 FIRE RESISTANT WIRING

2.8.1 The sub-section applies to wiring installed outside confinement or service space that must have fire proofing, in accordance with the National Building Code of Canada 2010 requirements and standards ULC and CSA and municipal regulations for

2.8.1.1 Powered electrical circuits such as:

2.8.1.1.1 Emergency lighting (power panels and emergency first fixture if it is located on another floor area)

2.8.1.1.2 Fire pump

2.8.1.1.3 Emergency power

2.8.1.1.4 Fireman Lift (elevator)

2.8.1.1.5 Fire alarm station and control (high building)

2.8.1.1.6 Voice communication (high building)

2.8.1.1.7 Other charges according to indications

2.8.2 Polymer sheathed type conductors

2.8.2.1 copper conductors, size as indicated

2.8.2.2 low-smoke emission sheaths, halogen free (XLPO)

2.8.2.3 2-hour smoke resistant conductors complies with C22.2 no 38 and ULC S139-00

2.8.2.4 tools and accessories:

2.8.2.4.1 Use tools and accessories necessary to complete the installation of the wiring in accordance with the requirements and recommendation of the manufacturer.

2.8.2.5 Supply data sheet for approval

2.8.2.6 Acceptable products :

2.8.2.6.1 Tyco Thermal Controls Raychem «RHW» approved ULC RW75 in humid areas and dry areas and approved CSA R90 in dry areas

2.8.2.6.2 Draka «Lifeline R90» approved CSA R90 in dry areas.

2.8.3 Mineral insulated cable

2.8.3.1 copper conductors, size as indicated

2.8.3.2 copper sheathing for interior use and/or dry areas

2.8.3.3 stainless steel copper sheathing for external use, in wet and corrosive locations.

2.8.3.4 conductors having a 2-hour fire resistance ULC S139-00.

2.8.3.5 Tools and accessories:

2.8.3.5.1 Use tools and accessories necessary to complete the cable installation in accordance with the requirements and recommendations of the manufacturer.

2.8.3.6 Supply data sheet for approval

2.8.3.7 Acceptable products :

2.8.3.7.1 Tyco Thermal Controls Pyrotenax 1850

2.8.4 Fire alarm cables

2.8.4.1 Copper conductors, size as indicated.

2.8.4.2 low-smoke emission sheaths, halogen free (XLPO)

2.8.4.3 2-hour smoke resistant conductors comply with FAS105-FT4 and comply with C22.2 no 208 and ULC S139-00.

2.8.4.4 tools and accessories: Use tools and accessories necessary to complete the cable installation in accordance with the requirements and recommendations of the manufacturer.

2.8.4.5 Supply data sheet for approval

2.8.4.6 Acceptable products : Typo Thermal Controls Raychem «CI»

2.9 CONDUCTORS EXPOSED TO SUNLIGHT

2.9.1 Insulated wires and power cables directly exposed to sunlight have to be protected specifically approved for such use and be labeled accordingly.

2.10 NUAL CONDUCTORS

2.10.1 The use of conductive aluminum alloy NUAL is accepted for branch circuits 100A or more for projects with wiring inside electrical metallic tubing, rigid metallic conduits and/or in rigid PVC. It will be the responsibility of the contractor to calculate the diameter of the pipe to meet the quantity laid down by Canadian Electrical Code, part 1.

3 EXECUTION

3.1 FIELD QUALITY CONTROL

3.1.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

3.1.2 Perform test’s using method appropriate to site conditions and approval from the ministerial representative and local authority having jurisdiction over installation.

3.1.3 Perform tests before energizing electrical system.

3.2 GENERAL CABLE INSTALLATION

3.2.1 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).

3.2.2 Cable Color Coding: to Section 26 05 00 Common Work Results for Electrical.

3.2.3 Conductor length for parallel feeders to be identical.

3.2.4 Lace or clip groups of feeder cables at distribution centers, pull boxes, and termination points.

3.2.5 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.

3.2.6 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

3.2.7 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.

3.3 INSTALLATION OF BUILDING WIRES

3.3.1 Unless otherwise stated, all wiring must be under conduit.

3.3.2 Use the types of conduits or pipe in accordance to the requirements of the respective section.

3.4 INSTALLATION OF TECK90 CABLE (0-1000 V)

3.4.1 Install cable as indicated securely supported by staples, straps or hangers.

3.4.2 when there are 2 cables in the same course, bind them in a «U».

3.4.3 When there are two cables on the same path in the building, Teck cables must be installed in cable shelves.

3.4.4 Cable terminations in accordance with section 26 05 20 - Wire and Box Connectors 0 - 1000V.

3.5 INSTALLATION OF ARMOURED CABLES

3.5.1 In ceilings and drywall, the contractor may use armored cables AC-90 between light fixtures so that the length between fixtures and junction boxes do not exceed 3000mm.

3.5.2 In the ceilings and drywall, the contractor may use armored cables AC-90 between plugs on the same circuit so that the length of cable used between two plugs or between two junction boxes does not exceed 6000mm.

3.5.3 A maximum of groups of 3 cables wherever possible. Support at each 1.5 meters. Cables should follow structural lines of the building. No horizontal cables in the wall will be accepted.

3.5.4 Use of armored cable AC-90, apparent on the surface is prohibited.

3.5.5 Terminate cables in accordance with section 26 05 20- Wire and Box Connectors 0-1000V.

3.6 INSTALLATION OF ALUMINUM SHEATHED CABLE

3.6.1 Group cables wherever possible on channels.

3.6.2 Support at each 1.5 meters. Cables should follow structural lines of the building. No horizontal cables in the wall will be accepted.

3.7 INSTALLATION OF CONTROL CABLES

3.7.1 Install control cables in conduit as indicated.

3.7.2 Ground control cable shield.

3.8 CABLE INSTALLATION FOR FIRE ALARM

3.8.1 Install cables as recommended by manufacturer.

3.8.2 Ground control cable shield.

3.8.3 Connect cable shield at one end only, or the starting end and ensure the continuity of grounding the shield.

3.9 CABLE INSTALLATION, WITH FIRE RESISTANT WIRING

3.9.1 Install all wiring having a degree of fire resistance in threaded rigid steel conduits

3.9.2 Lay cables and /or as not to decrease the clearance of the room and using as little space as possible.

3.9.3 Conceal the cables and /or ducts except those installed in the mechanical and electrical rooms and premises unfinished.

3.9.4 At the ends of cables, insert bare ends of the conductors in thermoplastic sleeves.

3.9.5 Lay sleeves at entrance and exit of cables embedded in concrete structures cast in place or masonry.

3.9.6 Unless otherwise indicated, it is prohibited to make splices in cables. If required, make in areas that are dry and accessible.

3.9.7 Identify cables every 3 meters and on both sides as they pass through walls and floors using tape indicator with the reference « 120V cable », « 600V cable ».

3.9.8 Finish the installation with end fittings (factory-made) and in accordance with the requirements and recommendations of the manufacturer.

END OF SECTION

1 GENERAL

1.1 REFERENCES

1.1.1 Canadian Standards Association, (CSA International)

1.1.2 Grounding equipment based on CSA C22.2 No. 41.

1.1.3 CAN/CSA Z32, Electrical Safety and Essential Electrical Systems in Health Care Facilities.

1.2 WASTE MANAGEMENT AND DISPOSAL

1.2.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

1.2.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

1.2.3 Collect and separate for disposal paper, plastic polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

1.2.4 Divert unused metal materials from landfill to metal recycling facility as approved by the ministerial representative.

1.2.5 Fold up metal banding, flatten and place in designated area for recycling.

2 PRODUCT

2.1 EQUIPMENT

2.1.1 Clamps for grounding of conductor: size as required to electrically conductive underground water pipe.

2.1.2 Copper conductor: minimum 6 m long for each concrete encased electrode, bare, stranded, tinned, soft annealed, size as indicated.

2.1.3 Rod electrodes: copper clad steel 19 mm diameter by 3 m long.

2.1.4 Plate electrodes: copper, surface area 0.2 m², 1.6 mm thick.

2.1.5 Grounding conductors: bare stranded copper, tinned, soft annealed size as indicated.

2.1.6 Insulated grounding conductors: green, type RWU-90 when ground or surroundings are humid and type RW-90 in other areas, size as indicated.

2.1.7 Ground bus: copper, size as indicated, complete with insulated supports, fastenings, connectors.

2.1.8 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:

2.1.8.1 Grounding and bonding bushings.

2.1.8.2 Protective type clamps.

2.1.8.3 Bolted type conductor connectors.

2.1.8.4 Thermit welded type conductor connectors.

2.1.8.5 Bonding jumpers, straps.

2.1.8.6 Pressure wire connectors.

2.1.8.7 Compression connectors

2.1.9 Junction box (access) brand name «SYNERTECH» or approved equivalent.

2.2 MANUFACTURER

2.2.1 Accepted Products: Thomas & Betts, Cadwell or Thermoweld or Burndy.

3 EXECUTION

3.1 INSTALLATION GENERAL

3.1.1 Install complete permanent, continuous grounding system including, electrodes (minimum 3 per site), conductors, connectors, as indicated, to satisfy the requirements of the ministerial representative and local authorities.

3.1.2 Install connectors in accordance with manufacturer's instructions.

3.1.3 Protect exposed grounding conductors from mechanical injury.

3.1.4 Make buried connections, and connections to conductive water main, electrodes, using copper welding by thermit process.

3.1.5 Use mechanical connectors for grounding connections to equipment provided with lugs.

3.1.6 Soldered joints not permitted unless they complete the installation of a compression joint.

3.1.7 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

3.1.8 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.

3.1.9 Install separate ground conductor to outdoor lighting standards.

3.1.10 Make grounding connections in radial configuration only, with connections terminating at street side of water pipe. Avoid loop connections.

3.1.11 Bond single conductor, metallic armored cables to cabinet at supply end, and provide non-metallic entry plate at load end.

3.1.12 Ground secondary service pedestals.

3.2 SYSTEM AND CIRCUIT GROUNDING

3.2.1 Install system and circuit grounding connections to neutral of primary 347/600 V system, secondary 120/208 V, 120/240 V system.

3.3 EQUIPMENT GROUNDING

3.3.1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, transformers, switchgear, duct systems, frames of motors, motor control centers, starters, control panels, building steel work, generators, elevators and escalators, distribution panels, outdoor lighting.

3.4 GROUNDING BUS

3.4.1 Install copper grounding bus mounted on insulated supports on wall of electrical room.

3.4.2 Ground items of electrical equipment in electrical room to ground bus with individual bare stranded copper connections, size as indicated.

3.5 FIELD QUALITY CONTROL

3.5.1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.

3.5.2 Perform ground continuity and resistance tests using method appropriate to site conditions and approval from the engineer DCC Representative and local authority having jurisdiction over installation. Provide a copy of the results to the engineer. Tests should be performed by a specialized firm and signed by an engineer.

3.5.3 Perform tests before energizing electrical system.

3.5.4 Disconnect ground fault indicator during tests.

END OF SECTION

1 GENERAL

1.1 WASTE MANAGEMENT AND DISPOSAL

1.1.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

1.1.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

1.1.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard and packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

1.1.4 Divert unused metal materials from landfill to metal recycling facility as approved by the ministerial representative.

1.1.5 Fold up metal banding, flatten and place in designated area for recycling.

2 PRODUCT

2.1 SUPPORT CHANNELS

2.1.1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted, suspended, or set in poured concrete walls and ceilings.

2.1.2 Installation accessories such as threaded rods, bolts, washers, nuts, spring nuts, etc., or steel plated, chrome or zinc.

2.1.3 Galvanized products according to CAN/CSA-G164 standards.

2.1.4 Fasteners used outdoors or in wet areas must be stainless steel.

2.1.5 Fasteners, brackets and installation accessories must conform to the requirements of section 26 10 00 – Seismic Mountings.

3 EXECUTION

3.1 INSTALLATION

3.1.1 Refer to Section 01 61 00 - Common Product Requirements for fastenings and supports.

3.1.2 Secure equipment to hollow, solid, masonry, tile and plaster surfaces with lead anchors or nylon shields.

3.1.3 Secure equipment to poured concrete with expandable inserts.

3.1.4 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.

3.1.5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

3.1.6 Fasten exposed conduit or cables to building construction or support system using straps.

3.1.6.1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.

3.1.6.2 Two-hole steel straps for conduits and cables larger than 50 mm.

3.1.6.3 Beam clamps to secure conduit to exposed steel work.

3.1.7 Suspended support systems.

3.1.7.1 Support individual cable or conduit runs with 6 mm Ø threaded rods and spring clips.

3.1.7.2 Support 2 or more cables or conduits on channels supported by 6 mm Ø threaded rod hangers where direct fastening to building construction is impractical.

3.1.8 For surface mounting of two or more conduits use channels at 1 m on centre spacing.

3.1.9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

3.1.10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

3.1.11 Do not use wire lashing or perforated strap to support or secure raceways or cables.

3.1.12 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of DCC Representative.

3.1.13 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

3.1.14 Coat with galvanized parts all surfaces that are scratched, altered or cut.

END OF SECTION

1 GENERAL

1.1 REFERENCES

1.1.1 Canadian Standards Association (CSA International)

1.1.1.1 CSA C22.1-[06], Canadian Electrical Code, Part 1, current edition.

1.1.1.2 Splitters are referenced to comply with CSA C22.2 No. 76.

1.1.1.3 Junction and pull boxes are referenced to comply with CSA C22.2 No. 40.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

1.2.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures and 26 05 00 – Common Work Results For Electrical.

1.2.2 Product Data:

1.2.2.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

1.2.3 Provide shop drawings: in accordance with Section 26 05 00 - Common Work Results For Electrical.

1.3 DELIVERY, STORAGE AND HANDLING

1.3.1 Waste Management and Disposal:

1.3.1.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/ Demolition Waste Management and Disposal.

1.4 ELECTRICAL EQUIPMENT PROTECTED BY SPRINKLERS

1.4.1 Supply and install the equipment in accordance with section 26 05 00 - Common Work Results For Electrical.

2 PRODUCT

2.1 SPLITTERS

2.1.1 Construction: sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.

2.1.2 Terminations: main and branch lugs, connection blocks to match required size and number of incoming and outgoing conductors as indicated.

2.1.3 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

2.2.1 Construction: welded steel enclosure.

2.2.2 Covers Flush Mounted: 25 mm minimum extension all around.

2.2.3 Covers Surface Mounted: 150 x 150, must be fitted with hinges.

2.3 CABINETS

2.3.1 Type E Empty: Sheet steel enclosure for surface mounting with sides and folded edges overlapping fitted with hinged door, handle, lock and a latch.

2.3.2 Type T Terminal: surface return flange, flush overlapping sides mounting as indicated containing 19 mm thick, sheet steel backboard.

2.3.3 Cabinets for transformers in steel sheets, for surface mounting with lock and padlock device, standard knockouts, removable backplate, as indicated.

2.4 CONNECTIONS

2.4.1 Insulated metal bushings and connectors with nylon insulated groove, size no. 8 AWG or more.

2.4.2 Pressure pads to prevent debris to penetrate the outlets.

2.4.3 Access fittings for pipes up to 35 mm in diameter and pull boxes for larger conduits.

2.4.4 Locking nuts and insulated metal bushings on sheet metal box.

3 EXECUTION

3.1 SPLITTER INSTALLATION

3.1.1 Mount plumb, true and square to building lines.

3.1.2 Extend splitters full length of equipment arrangement except where indicated otherwise.

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

3.2.1 Install pull boxes in inconspicuous but accessible locations.

3.2.2 Mount cabinets with top not higher than 2 m above finished floor except where indicated otherwise.

3.2.3 Install terminal block as indicated in Type T cabinets.

3.2.4 Only main junction and pull boxes are indicated. Install additional pull boxes so as not to exceed 30 m of conduit run between pull boxes or 4-90 degree elbows.

3.2.5 Supply thermal blocks in the junction boxes containing more than 4 joints.

3.3 IDENTIFICATION

3.3.1 Equipment Identification: to Section 26 05 00- Common Work Results for Electrical.

3.3.2 Identification Labels: size 2 indicating system name voltage and phase or as indicated.

END OF SECTION

1 GENERAL

1.1 REFERENCES

1.1.1 Canadian Standards Association (CSA International)

1.1.1.1 CSA C22.1, Canadian Electrical Code, Part 1, 20th Edition.

1.1.1.2 Outlet boxes, conduit boxes and fittings are based on CSA C22.2 No. 18.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

1.2.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures and Section 26 05 00 – Common work results for electrical

1.2.2 Submit samples for floor box in accordance with Section 01 33 00 - Submittal Procedures and Section 26 05 00 – Common work result for electrical.

1.3 DELIVERY, STORAGE AND HANDLING

1.3.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

1.3.2 Waste Management and Disposal:

1.3.2.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction / Demolition Waste Management and Disposal.

2 PRODUCT

2.1 OUTLET AND CONDUIT BOXES GENERAL

2.1.1 Size boxes in accordance with the Canadian Electrical Code, part 1.

2.1.2 102 mm square or larger outlet boxes as required.

2.1.3 Gang boxes where wiring devices are grouped.

2.1.4 Blank cover plates for boxes without wiring devices.

2.1.5 347 V outlet boxes for 347 V switching devices.

2.1.6 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 GALVANIZED STEEL OUTLET BOXES

2.2.1 One-piece electro-galvanized construction. Single and 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.

2.2.2 Utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.

2.2.3 102 mm square or octagonal outlet boxes for lighting fixture outlets.

2.2.4 102 mm extension and plaster rings for flush mounting devices in finished plaster or tile walls.

2.3 MASONRY BOXES

2.3.1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.

2.4 CONCRETE BOXES

2.4.1 Electro-galvanized sheet steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.

2.5 FLOOR BOXES

2.5.1 Concrete tight electro-galvanized sheet steel floor boxes with adjustable finishing rings to suit floor finish with brass brushed aluminum faceplate. Device mounting plate to accommodate short or long ear duplex single receptacles. Minimum depth: 73 mm for receptacles and communication outlets.

2.5.2 Adjustable, watertight, concrete tight, cast floor boxes with openings drilled and tapped for [16, 21 and 27] mm conduit. Minimum size: 73 mm deep.

2.6 CONDUIT BOXES

2.6.1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of devices.

2.7 OUTLET BOXES FOR NON-METALLIC SHEATHED CABLE

2.7.1 Electro-galvanized, sectional, screw ganging steel boxes, minimum size 76 x 50 x 63 mm with two double clamps to take non-metallic sheathed cables.

2.8 OUTLET BOXES FOR NON-METALLIC SHEATHED CABLE

2.8.1 Bushing and connectors with nylon insulated throats for no 8 AWG caliber and up.

2.8.2 Knock-out fillers to prevent entry of debris.

2.8.3 Conduit outlet bodies for conduit up to 35 mm and pull boxes for larger conduits.

2.8.4 Double locknuts and insulated bushings on sheet metal boxes.

2.9 SERVICE FITTINGS

2.9.1 'High tension' receptacle fitting made of 2 piece stainless steel or die-cast aluminum with brushed aluminum or satin aluminum housing finish for 1 single, 1 duplex or two duplex receptacles. Bottom plate with two knockouts for centered or offset installation. 12 x 102 mm extension piece as indicated.

2.9.2 Pedestal type 'low tension' fitting made of 2 piece stainless steel or die cast aluminum with brushed aluminum or satin aluminum housing finish to accommodate one or two amphenol jack connectors.

3 EXECUTION

3.1 INSTALLATION

3.1.1 Support boxes independently of connecting conduits.

3.1.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

3.1.3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

3.1.4 Provide correct size of openings in boxes for conduit, mineral insulated and armored cable connections. Do not install reducing washers.

3.1.5 Vacuum clean interior of outlet boxes before installation of wiring devices.

3.1.6 Identify systems for outlet boxes as required.

END OF SECTION

1 GENERAL

1.1 DUCTS LOCATION

1.1.1 All ducts are not shown on the drawings. Those who are represented are on a schematic form.

1.2 SEISMIC FASTENERS

1.2.1 Supply and install all necessary equipment for seismic mountings as indicated in Section 26 10 00 – Seismic Fasteners.

1.3 ELECTRICAL APPARATUS PROTECTED BY SPRAY NOZZLES

1.3.1 Provide and install material in accordance with Section 26 05 00 – General Requirements.

1.4 REFERENCES

1.4.1 Canadian Standards Association (CSA International).

1.4.1.1 CAN/CSA-C22.2 No. 18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.

1.4.1.2 CSA C22.2 No. 45, Rigid Metal Conduit.

1.4.1.3 CSA C22.2 No. 56, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.

1.4.1.4 CSA C22.2 No. 83, Electrical Metallic Tubing.

1.4.1.5 CSA C22.2 No. 211.2, Rigid PVC Unplastified Conduit.

1.4.1.6 CAN/CSA-C22.2 No. 227.3, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada.

1.4.2 Canadian Electrical Code, part 1

1.5 ACTION AND INFORMATIONAL SUBMITTALS

1.5.1 Submit required samples and documents in accordance with Sections 01 33 00 – Submittal Procedures and 26 05 00 – General Requirements.

1.5.2 Product data: submit manufacturer’s printed product literature, specifications and datasheets.

1.6 WASTE MANAGEMENT AND DISPOSAL

1.6.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.6.2 Place materials defined as hazardous or toxic waste in designated containers.

1.6.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

2 PRODUCT

2.1 CONDUITS

2.1.1 Rigid metallic conduits: in accordance with standard CSA C22.2 no 45, threaded galvanized steel.

2.1.2 Epoxy coated conduits: in accordance with standard CSA C22.2 no 45, with zinc coating and anti-corrosive finishing coat with an epoxy based resin, inside and outside.

2.1.3 Electrical metallic tubing (EMT): in accordance with standard CSA C22.2 no 83, equipped with “Raintight” connectors.

2.1.4 Rigid PVC conduits: in accordance with standard CSA C22.2 no 211.2.

2.1.5 Flexible metal conduit: to CSA C22.2 no 56, liquid-tight flexible metal.

2.1.6 FRE conduit: CSA C22.2

2.1.7 Flexible PVC conduit: to CAN/CSA-C22.2 no 227.3.

2.2 CONDUIT FASTENINGS

2.2.1 One hole steel straps to secure surface conduits 50 mm and smaller.

2.2.1.1 Two hole steel straps for conduits larger than 50 mm.

2.2.1.2 Use stainless steel fasteners when installed outside or in damp locations.

2.2.2 Beam clamps to secure conduits to exposed steel work.

2.2.3 Channel type supports for two or more conduits at 2 m on centre.

2.2.4 Threaded rods, 6 mm diameter, to support suspended channels.

2.2.5 Quantities and dimensions mentioned above for various fasteners are a minimum and must meet the requirements of the section on seismic fasteners.

2.3 CONDUIT FITTINGS –GENERAL

2.3.1 Connectors: to CAN/CSA C22.2 no 18 manufactured for use with conduit specified. Coating: same as conduit.

2.3.2 Ensure factory “ells” where 90 degrees bends for 25mm and larger conduits.

2.3.3 Watertight connectors and couplings for EMT.

2.3.3.1 Set-screws are not acceptable.

2.3.4 Ferrules for fittings in boxes, when required, Canadian electrical code, part 1

2.4 EXPANSION FITTINGS

2.4.1 Provide expansion fittings required for all conduits:

2.4.1.1 Embedded in concrete and crossing expansion joints through the building;

2.4.1.2 Apparent and undergoing significant changes in temperature;

2.4.1.3 Exceeds the limit allowed by the manufacturers.

2.4.2 Weatherproof expansion fittings with internal bonding assembly suitable for 200mm linear expansion.

2.4.3 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19mm deflection.

2.4.4 Weatherproof expansion fittings for linear expansion at entry of panel.

2.5 FISH CORD

2.5.1 Polypropylene 6 mm.

2.6 BONDING

2.6.1 IN all conduits other than those mentioned in 2.1.1, a green insulated conductor with a minimum calibre of 12 AWG must be installed.

2.7 CONDUITS EXPOSED TO SUN LIGHT

2.7.1 Non-metallic pipes that are entirely exposed to sunlight have to be specifically approved for this usage and be marked in accordance.

3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

3.2.1 Install the visible conduits so as to diminish the part's head-way and by using the least amount of space possible.

3.2.2 Conceal conduits except those which are installed in mechanical and electrical facility rooms.

3.2.3 Use electrical metallic tubes (EMT) with tight connectors in technical rooms, warehouses, service garages etc. and standard fittings for ordinary locations.

3.2.4 Use rigid PVC conduits in underground facilities.

3.2.5 Use rigid threaded galvanized steel conduit in places classified explosion proof, in tunnels and wetlands.

3.2.6 Use epoxy coated conduit in corrosive or saline installations.

3.2.7 Use over a maximum length of 3m flexible metallic conduits when connecting to motors, transformers and equipment capable of vibration located in dry areas, incandescent bulbs, built-in and without pre-threaded outlet box, mounted fluorescent light fixture connection, projecting or built-in, works or elements in movable metal partitions.

3.2.8 Use flexible metal conduit and liquid-tight connections when connecting to motors and / or equipment which may vibrate or transformers located in damp or wet or corrosive environments.

3.2.9 Use explosion proof flexible connections for connection to explosion proof motors.

3.2.10 Install waterproof connections on conduits installed in dangerous locations. Fill them with sealing compound.

3.2.11 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.

3.2.12 Mechanically bend steel conduit over 21mm diameter.

3.2.13 Use conduits of at least 21 mm for lighting and power circuits.

3.2.14 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

3.2.15 Install fish cord in empty conduits.

3.2.16 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.

3.2.17 Dry conduits out before installing wire.

3.2.18 For every flush-mounted panel, install three Ø 27 mm conduits from panel into ceiling space and three Ø 27 mm conduits from panel into the lower floor ceiling space (if applicable) . If no ceiling was provided for in these parts, install conduits as high as possible between the floor and the structure or provide an access door 300 x 600 mm to 300 mm above the panel.

3.3 VISIBLE CONDUITS

3.3.1 Unless indicated otherwise, install the conduits parallel or perpendicular to the building's layout lines.

3.3.2 Behind infrared or gas radiators, install conduits by leaving a space of 1.5m.

3.3.3 Make the conduits pass through the wings of the steel framework elements, if needed.

3.3.4 In locations where this is not possible, group the conduits into U-bend stirrups.

3.3.5 Unless otherwise specified, the conduits should not cross through framework elements.

3.3.6 In the case of conduits placed parallel to steam or hot water pipes, make provisions for a lateral space of at least 75mm; also make provisions for a space of at least 25mm in the case of crossings.

3.3.7 Install PVC expansion joints on conduit when installed in places where the temperature varies from 10 degrees and more. It must have an expansion joint for each length of 7.5m and 15m between each joint.

3.4 CONCEALED CONDUITS

3.4.1 Install conduits parallel or perpendicular to the building's layout lines.

3.4.2 It is forbidden to install horizontal conduits in masonry walls.

3.4.3 It is forbidden to embed the conduits into terrazzo works and concrete toppings.

3.4.4 No horizontal conduits will be accepted in drywall. Only vertical conduits will be tolerated.

3.5 CONDUITS IN CAST-IN-PLACE CONCRETE

3.5.1 Do not install conduits in concrete structures unless otherwise specified in the shop drawings and specifications.

3.5.2 Locate to suit reinforcing steel. Install in centre one third of slab.

3.5.3 Protect conduits at their exit points from a concrete work.

3.5.4 Install sleeves where conduits pass through slab or wall.

3.5.5 Before covering a concrete work with a water repellent membrane, install oversized joints in the locations where conduits have to pass through the latter. Apply a cold compound between the joints and conduits.

3.5.6 Conduits in slabs: minimum slab thickness 4 times conduit diameter.

3.5.7 Encase conduits completely in concrete with minimum 25 mm concrete cover.

3.5.8 Organize conduits in slab to minimize cross-overs.

3.5.9 Aluminum conduits shall not be concealed in concrete structures.

3.6 CONDUITS UNDERGROUND

3.6.1 Slope conduits to provide drainage.

3.6.2 Waterproof the joints using a thick layer of bituminous paint.

3.6.3 Install conduit at 1 m from the surface or as directed.

3.6.4 The underground conduits shall be of rigid PVC 41 mm minimum.

3.6.5 The underground conduits must be surrounded by a 150 mm layer of fine sand unless otherwise stated.

3.7 FIREWALL CROSSING CONDUITS

3.7.1 Caulk all gaps between the firewall and the conduit. Fire resistance shall be equal to surface crossing. The product manufacturer shall make an inspection of the work and issue a certificate stating that the facilities are inspected and comply with its recommendations and meet the requirements of ULC fire resistance characteristics.

END OF SECTION

1. GENERAL

1.1 RELATED REQUIREMENTS

1.1.1 Excavation, trenching, and backfilling.

2. PRODUCTS

2.1 CABLE PROTECTION

2.1.1 Prevention suitable marking tape with inscription “caution underground electrical line”.

3. EXECUTION

3.1 DIRECT BURIAL OF CABLES

3.1.1 After sand bed in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling, is in place, lay cables maintaining 75 mm clearance from each side of trench to nearest cable.

3.1.1.1 Do not pull cable into trench.

3.1.2 Include offsets for thermal action and minor earth movements.

3.1.2.1 Offset cables [150] mm minimum for each 60 m run, maintaining minimum cable separation and bending radius requirements.

3.1.3 Make termination and splice only as indicated leaving 0.6 m minimum of surplus cable in each direction.
Make splices and terminations in accordance with manufacturer's written recommendations using approved splicing kits.

3.1.4 Underground cable splices not acceptable.

3.1.5 Minimum permitted radius at cable bends for rubber, plastic or lead covered cables, [8] times diameter of cable or in accordance with manufacturer's written recommendations; for metallic armoured cables, [12] times diameter of cables or in accordance with manufacturer's instructions.

3.1.6 Cable separation:

3.1.6.1 Maintain 75 mm minimum separation between cables of different circuits.

3.1.6.2 Maintain 300 mm minimum horizontal separation between low and high voltage cables.

3.1.6.3 When low voltage cables cross high voltage cables maintain 300 mm vertical separation with low voltage cables in upper position.

3.1.6.4 At crossover, maintain 75 mm minimum vertical separation between low voltage cables and 150 mm between high voltage cables.

3.1.6.5 Maintain 300 mm minimum lateral and vertical separation for fire alarm and control cables when crossing other cables, with fire alarm and control cables in upper position.

3.1.6.6 Install treated planks on lower cables 0.6 m minimum in each direction at crossings.

3.1.7 After sand protective cover specified in Section 31 23 33.01 - Excavating, Trenching and Backfilling, is in place, install continuous row of overlapping 38 x 140 mm pressure treated planks, interlocking cable blocks as indicated to cover length of run.

3.2 CABLE INSTALLATION IN DUCTS

3.2.1 Install cables as indicated in ducts.

3.2.2 Do not pull spliced cables inside ducts.

3.2.3 Install multiple cables in duct simultaneously.

3.2.4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.

3.2.5 To facilitate matching of colour coded multiconductor control cables reel off in same direction during installation.

3.2.6 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.

3.2.7 After installation of cables, seal duct ends with duct sealing compound.

3.3 MARKERS

3.3.1 Mark cable every 150 m along [cable] [duct] runs and changes in direction.

3.3.2 Mark underground splices.

3.3.3 Where markers are removed to permit installation of additional cables, reinstall existing markers.

3.3.4 Install concrete cable markers within [180] m from each side of runway centreline; 45 m from each side of taxi way centreline; 50 m from edge of taxi ramps or aprons.

3.3.5 Install cedar post type markers.

3.3.6 Lay concrete markers flat and centred over cable with top flush with finish grade.

3.4 FIELD QUALITY CONTROL

3.4.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

3.4.2 Perform tests using qualified personnel.

3.4.2.1 Include necessary instruments and equipment.

3.4.3 Check phase rotation and identify each phase conductor of each feeder.

3.4.4 . Check each feeder for continuity, short circuits and grounds.

3.4.4.1 Ensure resistance to ground of circuits is not less than 50 megohms.

3.4.5 Pre-acceptance tests:

3.4.5.1 After installing cable but before splicing and terminating, perform insulation resistance test with 1000 V megger on each phase conductor.

3.4.5.2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.

3.4.6 Acceptance Tests:

3.4.6.1 Ensure that terminations and accessory equipment are disconnected.

3.4.6.2 Ground shields, ground wires, metallic armour and conductors not under test.

3.4.6.3 High Potential (Hipot) Testing.

3.4.6.3.1 Conduct hipot testing of original factory test voltage in accordance with manufacturer's recommendations.

3.4.6.4 Leakage Current Testing:

3.4.6.4.1 Raise voltage in steps from zero to maximum values as specified by ICEA manufacturer for type of cable being tested.

3.4.6.4.2 Hold maximum voltage for specified time period by manufacturer.

3.4.6.4.3 Record leakage current at each step.

3.4.7 Provide Departmental Representative DCC Representative with list of test results showing location at which each test was made, circuit tested and result of each test.

3.4.8 Remove and replace entire length of cable if cable fails to meet any of test criteria.

3.5 CLEANING

3.5.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

3.5.1.1 Leave Work area clean at end of each day.

3.5.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.5.3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

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

3.6 COORDINATION OF PROTECTIVE DEVICES AND ARC FLASH

3.6.1 Repair damage to adjacent materials caused by cables installation.

END OF SECTION

1 GENERAL

1.1 REFERENCES

1.1.1 Seismic protection measures must meet the requirements of the National Building Code of Canada.

1.1.2 The design must comply with the following:

1.1.2.1 SMACNA, Seismic Restraint Manual Guidelines for Mechanical Systems.

1.1.2.2 ANSI/NFPA 13, Installation of Sprinkler Systems

1.1.2.3 National Building Code of Canada.

1.1.2.4 Seismic project area.

1.2 SCOPE OF WORK

1.2.1 Design, supply and install a complete system of seismic isolated fasteners against vibration or non-insulated as required for electrical equipment and related systems.

1.2.2 The design will be done by a professional engineer licensed member of the APEGNB and specialist in seismic system and shall bear the seal and signature of the engineer.

1.2.3 The seismic fastening system must be fully integrated and compatible with the requirements of reducing noise and vibration system of electrical equipment and related systems as specified on the drawings and elsewhere.

1.2.4 The seismic fastening system must be compatible with the electrical design and the design of the building structure. Calculations must be based on chapter 4.

1.2.5 During or after the earthquake, the fixed material must not necessarily remain working as in normal use. However, it is absolutely necessary that seismic fixation system prevents occupants injuries that could be caused by electrical systems and materials.

1.2.6 Provide and install the following equipment:

1.2.6.1 Anti-vibration devices with earthquake dampers.

1.2.6.2 Earthquake dampers.

1.2.6.3 Setting material relaxed cables.

1.2.6.4 Any other equipment necessary to meet the needs for a complete assembly

1.3 SHOP DRAWING

1.3.1 Present shop drawings in accordance with Section 26 05 00 - General Requirements.

1.3.2 Provide shop drawings and separate datasheets for each system and fixing devices for the seismic equipment.

1.3.3 The shop drawings shall clearly define the performance techniques and calculations showing the relevant forces in the anchor points. These documents must be sealed by a professional engineer and earthquake fasteners licensee member of the APEGNB.

1.4 CONSTRUCTION DRAWINGS

1.4.1 Once construction is completed, the contractor shall submit to the ministerial representative full set of original building materials, revised to reflect the requirements of the system as built.

1.4.2 Provide documentation detailing the installation methods of the seismic fastening systems.

2 – PRODUCT

2.1 GENERAL

2.1.1 The size and shape of the bases and the performance characteristics of vibration devices must comply with the manufacturer's recommendations and instructions.

2.1.2 Carry out the fabrication and installation of protective devices against earthquakes as recommended by the National Building Code of Canada.

2.1.3 Seismic protection systems must be able to oppose the forces in all directions.

2.1.4 Fasteners and anchors must be able to withstand the same loads as the seismic protection devices.

2.1.5 The seismic fasteners installed on duct systems, bars and shelves sheathed cables should be compatible with the requirements of anchoring and guiding these networks.

2.1.6 Mechanical expansion anchors of high resistance should be used for the seismic protection to concrete structures.

2.1.7 The use of anchors and fasteners installed to nailer gun or holes drilled for this purpose is prohibited.

2.1.7.1 Acceptable Products: Hilti HSL-type.

2.1.8 The use of materials made of cast iron or threaded pipe or other brittle materials is prohibited.

2.1.9 Seismic protection devices installed on ductwork, bus ducts, cable shelves and other related clips attached to equipment must be compatible with the vibration and seismic devices for component.

2.1.10 Seismic protection devices must not interfere with the operation of the firewall devices or compromise the integrity.

2.1.11 The whole system of seismic fasteners must be supplied by a single manufacturer and supplier.

2.1.12 Suppliers: Korfund Dynamics, Vibro-Acoustics, Noise Kinectics Conrol, Tecoustics, Vibra-Sonic controls.

2.2 SEISMIC MOUNTING FOR STATIC EQUIPMENT FIXATIONS (EQUIPMENT THAT DO NOT REQUIRE VIBRATION SUPPORT)

2.2.1 Equipment installed on the floor:

2.2.1.1 Attach the hardware to support, which must be attached to the frame, using the sizes of bolts shown on the shop drawings of these systems.

2.2.2 Suspended material, including networks of electrical conduit, bus ducts, cable shelves and similar related systems:

2.2.2.1 Use one or more of the following methods, depending on site conditions:

2.2.2.1.1 Attach the material securely to the frame.

2.2.2.1.2 Strengthen the material in all directions.

2.2.2.1.3 Strengthen the attachment points of the equipment to the structure.

2.2.2.1.4 Secure the material with relaxed cables.

2.2.2.2 The attachment of ductwork, bus ducts and cable shelves by relaxed cables prevents swaying motion in the horizontal level, the swing in the vertical level and the slip and buckling in the axial direction.

2.2.2.3 Care must be taken to ensure that the suspension rods can withstand the compressive load and none flammable.

2.2.2.4 Seismic protection system must exercise due to an elastomeric material or other means soft and smooth damping effect, to prevent high impact loads.

2.3 ATTACHMENTS FOR SEISMIC ISOLATED EQUIPMENT VIBRATION FIXATIONS

2.3.1 Equipment installed on the ground:

2.3.1.1 Apply one or more of the following methods, depending on site conditions:

2.3.1.1.1 Use anti-vibration devices with integrated dampers.

2.3.1.1.2 Use separate devices in addition to vibration dampers.

2.3.1.1.3 Use a cushioning system made from structural element compound and an elastomeric layer, with the approval of the ministerial representative.

2.3.2 Seismic protection devices should in no way interfere with the action of acoustic and vibration systems. Provide a clearance of 4 to 8 mm in normal operating conditions of the equipment and systems between the shocks of earthquake protection devices and equipment

2.3.3 Incorporate seismic vibration protection systems devices to prevent complete discharge of these.

2.3.4 The damping effect exercised due to an elastomeric material or other means should be soft and smooth to prevent high impact loads.

3 – EXECUTION

3.1 INSTALLATION

3.1.1 Attach the protection devices by the relaxed cable suspended ceiling material so that the axial projection of cables passes through the center of gravity of the material.

3.1.2 Install cables using wireway, assembly terminals and other hardware to ensure proper alignment of the protective devices and prevent bending cables to the mounting points.

3.1.3 Orient fastening cables attached to the ceiling suspended material so that they do an approximately 90 degrees between them (in the plane), then attach them to the ceiling where the slab so they do with the latter an angle not exceeding 45 degrees.

3.1.4 A minimum clearance of 25 mm shall be provided between the seismic protection devices and other equipment and service element.

3.1.5 Adjust the protection cables so as to enable the normal operation of the vibration system but without being visibly relaxed.

3.1.6 Bolted to the frame all other equipment that is not insulated against vibration.

3.1.6.1 Install vibration devices in accordance with manufacturers' instructions and specialized engineer and adjust the pads so that the devices are level.

3.1.6.2 Make sure the connection of electrical wiring to remote devices does not diminish the flexibility of the vibration isolation system and the pipes running through walls or floors do not transmit vibrations.

3.1.6.3 When the vibration devices are bolted to the floor, use vibration rubber washers.

3.1.6.4 It is forbidden to set the devices for protection against earthquakes with anchors or fasteners installed to nailer gun or holes drilled for this purpose.

3.1.6.5 Provide seismic ties to all ducts with a diameter of 63 mm or more and install more than 300 mm from the structural ceiling.

3.1.6.6 Install lateral attachments to a maximum of 12.2 m c / c.

3.1.6.7 Install longitudinal ties to a maximum of 24.4 m c / c.

3.1.6.8 Attach the hanging devices and integrated into a suspended ceiling devices using relaxed cables.

3.2 INSPECTION

3.2.1 At the completion of the work the specialist engineer will carry out an inspection of the seismic systems. He will issue a report or a signed letter certifying compliance of seismic installations as specified standards and various manufacturers' recommendations.

END OF SECTION

1 GENERAL

1.1 REFERENCES

1.1.1 Canadian Standards Association (CSA International)

1.1.1.1 CSA-C22.2 No. 5-02, Moulded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, current edition).

1.2 SHOP DRAWINGS AND PRODUCT DATA

1.2.1 Submit shop drawings and product data in accordance with Sections 26 05 00 – General Requirements, and 01 33 00 – Submittal Procedures.

1.2.2 Include the characteristic curves established according to the constant time-current for circuit breakers with a capacity of 100 A or more, or with a breaking capacity of 22 000 A symmetrical and over, to the line voltage.

1.2.3 Provide all available data regarding the values of the capacity of power failure and short circuit I2t maximum allowable values for all circuit breakers.

1.2.4 Provide the certificate of authenticity and fabrication of the circuit breaker.

1.3 AUTHENTIFICATION

1.3.1 Before proceeding with any installation of circuit breakers in a new or existing installation, the electrical contractor must submit three (3) copies of a certificate of authenticity from the manufacturer, in French, signed by the factory and the local representative of that manufacturer certifying that all circuit breakers are new and that they meet the standards and regulations. These certificates must be submitted to the ministerial representative for acceptance.

1.3.2 A delay in the production of the certificate of authentication will not justify an extension of the contract and no additional compensation.

1.3.3 Any work of manufacturing, assembly or installation should begin only after acceptance of the certificate of authentication by the ministerial representative. Failure to comply with this requirement, the ministerial representative and / or the client user has the right to mandate the manufacturer listed on the circuit breakers to authenticate all new circuit breakers under the contract, and that, at the expense of contractor electrician.

1.3.4 In general, the certificate of authentification must contain:

1.3.4.1 The name and address of the manufacturer and the person responsible for the authentication. The responsible person must sign and date the certificate;

1.3.4.2 The name and address of the licensed dealer and distributor of the person responsible for the count of the contractor.

1.3.4.3 The name and address of the contractor and the person in charge of the project.

1.3.4.4 The name and address of the building where the circuit breakers will be installed:

1.3.4.4.1 Project title (title of the specifications or plans);

1.3.4.4.2 Client’s reference number;

1.3.4.4.3 List of circuit breakers in tabular form when required.

2 – PRODUCT

2.1 GENERAL REQUIREMENTS

2.1.1 Moulded case circuit breakers, switches, and devices for protection against ground fault, circuit breakers, fuse and protective accessories against the high fault currents.

2.1.2 Moulded Case Circuit Breakers, bolted or plug to the bus bars, quick-closing type and snap-action, manually operated and automatic, with compensation for an ambient temperature of 40°C.

2.1.3 Common-trip circuit breakers, equipped with a single handle for multi-pole circuits.

2.1.4 Breakers equipped with magnetic snap-action trips, designed to act only when the current value reaches the setting value.

2.1.5 Circuit breakers equipped with interchangeable trips, as indicated.

2.2 THERMAL MAGNETIC BREAKERS (DESIGN A)

2.2.1 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.

2.3 OPTIONAL FEATURES

2.3.1 Include:

2.3.1.1 Shunt trip.

2.3.1.2 Auxiliary switch.

2.3.1.3 Motor-operated mechanism.

2.3.1.4 Under-voltage release.

2.3.1.5 On-off locking devices.

2.3.1.6 Handle mechanism.

2.4 MANUFACTURERS

2.4.1 Accepted products: Cutler-Hammer, Siemens, Scheider Electric, GE.

3 – EXECUTION

3.1 INSTALLATION

3.1.1 Install circuit breakers as indicated.

3.1.3 The order in which circuit breakers should be installed in the panels must meet the one shown in the plans.

END OF SECTION

1 GENERAL

1.1 REFERENCES

1.1.1 Canadian Standards Association (CSA International).

1.1.1.1 CAN/CSA C22.2 No. 4, Enclosed Switches.

1.1.1.2 CSA C22.2 No. 39, Fuseholder Assemblies.

1.2 SHOP DRAWINGS AND PRODUCT DATA

1.2.1 Submit shop drawings and product data in accordance with Sections 26 05 00 – General Requirements and 01 33 00 – Submittal Procedures.

1.3 HEALTH AND SAFETY

1.3.1 Do construction occupational health and safety in accordance with Section 01 70 12 – Health and Safety Requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

1.4.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.4.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

1.4.3 Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

1.4.4 Separate for reuse and recycling and place in designated containers steel, metal, and plastic waste in accordance with Waste Management Plan.

1.4.5 Fold up metal banding, flatten and place in designated area for recycling.

1.5 ELECTRICAL EQUIPEMENT PROTECTED BY SPRINKLERS

1.5.1 Provide and install materials in accordance with Section 26 05 00 – General Requirements.

2 – PRODUCT

2.1 DISCONNECT SWITCHES

2.1.1 Fused and non-fused switches, in CSA enclosure:

2.1.1.1 Type 1 for indoor use in ordinary locations.

2.1.1.2 Type 2 for outdoor use, where the envelope is exposed to fluid leaking.

2.1.1.3 Type 3R for outdoor use.

2.1.1.4 Type 4 for use where the envelope is exposed to direct water.

2.1.1.5 Type 5 for indoor use in locations where dust, lint, or particles are not dangerous, or are likely to be deposited or suspended in the atmosphere.

2.1.2 Possibility to lock in “closed” or “open” positions, with three locks.

2.1.3 Mechanical door with interlock, prohibiting the opening when the lever is in "closed" position.

2.1.4 Bypass mechanism allowing to open the enclosure when the switch is "ON".

2.1.5 Closing and abrupt cut-off mechanism.

2.1.6 “Open” and “Closed” indication on the enclosure lid.

2.1.7 Fuses: rating in accordance with Section 26 28 13.01.

2.1.8 Fuse holders: movable and suitable, without an adapter, to the type and fuse rating indicated.

2.1.9 A set of auxiliary contacts CSA certified is required when used for elevators, escalators, hoists, engine stairwell pressurization of a fire alarm or via a variable frequency drive. All auxiliary contacts shall be of type "open advanced”.

2.1.10 At 120/240 V, single phase, three cords; to 120/208 V, three phase, four cords; and 347/600 V, three phase, four cords, the switches will be equipped with a solid neutral.

2.1.11 All switches must be provided by the same manufacturer.

2.2 EQUIPEMENT IDENTIFICATION

2.2.1 Nameplates provided and installed in accordance with Section 26 05 00 – General Requirements.

2.2.2 Indicate name of load controlled on size 4 nameplates.

2.3 MANUFACTURER

2.3.1 Accepted products: Cutler-Hammer, Siemens, Square D, and GE.

2.3.2 The switches manufacturer must be the same as the electrical distribution panels unless stated otherwise.

3 – EXECUTION

3.1 INSTALLATION

3.1.1 Install disconnect switches complete with fuses if applicable, as indicated.

3.1.2 Install contacts sets required by 2.1.9 and the necessary wiring (although not shown in plans) between the switches and the variable frequency drive upstream (connection in series with the termination of the variable frequency drive).

END OF SECTION

1. GENERAL

1.1 REFERENCES

1.1.1 American Society for Testing and Materials (ASTM)

1.1.1.1 ASTM D 4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

2. PRODUCTS

2.1 MATERIALS

2.1.1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.

2.1.2 Flat and elongated particles of coarse aggregate: to ASTM D 4791.

2.1.2.1 Greatest dimension to exceed [5] times least dimension.

2.1.3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following :

2.1.3.1 Natural sand.

2.1.3.2 Artificial sand.

2.1.3.3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.

2.1.4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following :

2.1.4.1 Crushed rock.

2.1.4.2 Gravel and crushed gravel composed of naturally formed particles of stone.

2.1.4.3 Light weight aggregate, including slag and expanded shale.

2.2 SOURCE QUALITY CONTROL

.1 Inform Engineer of proposed source of aggregates and provide access for sampling 2 weeks minimum before starting production.

.2 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source.

.3 Advise Engineer 2 weeks minimum in advance of proposed change of material source.

.4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

3. EXECUTION

3.1.1 Non applicable.

END OF SECTION

1. GENERAL

1.1 RELATED REQUIREMENTS

1.1.1 Section 31 05 16 – Aggregates materials.

1.2 REFERENCES

1.2.1 American Society for Testing and Materials International (ASTM)

1.2.1.1 ASTM D 1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ü) (2,700 kN-m/m ü).

1.2.2 Canadian General Standards Board (CGSB)

1.2.2.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

1.2.2.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.2.3 Canadian Standards Association (CSA International)

1.2.3.1 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.2.3.1.1 CSA-A3001-03, Cementitious Materials for Use in Concrete.

1.2.3.1.2 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.2.4 Ministère des Transports du Québec

1.2.4.1 CCDG 2019, Cahier des charges et devis généraux.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

1.3.1 Preconstruction Submittals:

1.3.1.1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.

1.3.1.2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field.

1.3.2 Samples:

1.3.2.1 Inform Engineer at least 2 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.

1.3.2.2 Submit samples of each type of fill specified including representative samples of excavated material.

1.4 WASTE MANAGEMENT AND DISPOSAL

1.4.1 Separate waste materials for reuse and recycling or disposal.

1.4.2 Divert excess aggregate materials from landfill to local recycling facility for reuse as directed by Engineer.

1.5 EXISTING CONDITIONS

1.5.1 Buried services:

1.5.1.1 Before commencing work verify location of buried services on and adjacent to site.

1.5.1.2 Remove obsolete buried services within 2 m of foundations: cap cut-offs.

1.5.1.3 Prior to beginning excavation Work, notify to Engineer the establish location and state of use of buried utilities and structures. Make sure to clearly mark such locations to prevent disturbance during Work.

1.5.1.4 Confirm locations of buried utilities by careful test excavations.

1.5.2 Existing buildings and surface features:

1.5.2.1 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Engineer.

2. PRODUCTS

2.1 MATERIALS

2.1.1 Crushed granular materials specified in the plans and the sand material must comply with CCDG 2019.

3. EXECUTION

3.1 SITE PREPARATION

3.1.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

3.1.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.1.3 Dispose waste to an authorized site: concrete, pavement.

3.2 PREPARATION/ PROTECTION

3.2.1 Protect existing features in accordance and applicable local regulations.

3.2.2 Keep excavations clean, free of standing water, and loose soil.

3.2.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to [Departmental Representative] [DCC Representative] [Consultant] approval.

3.2.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

3.2.5 Protect buried services that are required to remain undisturbed.

3.3 EXCAVATION

3.3.1 Excavate to lines, grades, elevations and dimensions as directed by Engineer.

3.3.2 Remove concrete, masonry, paving, walks, demolished foundations and rubble and other obstructions encountered during excavation.

3.3.3 Excavation must not interfere with bearing capacity of adjacent foundations.

3.3.4 For trench excavation, unless otherwise authorized by Engineer in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.

3.3.5 Restrict vehicle operations directly adjacent to open trenches.

3.3.6 Dispose of surplus and unsuitable excavated material in approved location off site.

3.3.7 Do not obstruct flow of surface drainage or natural watercourses.

3.3.8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

3.3.9 Notify Engineer when bottom of excavation is reached.

3.3.10 Obtain Engineer approval of completed excavation.

3.3.11 Remove unsuitable material from trench bottom includin those that extend below required elevations to extent and depth as directed by Engineer.

3.4 FILL TYPES AND COMPACTION

3.4.1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D 698 and ASTM D 1557.

3.5 BACKFILLING

3.5.1 Do not proceed with backfilling operations until completion of following:

3.5.1.1 Engineer has inspected and approved installations.

3.5.1.2 Engineer has inspected and approved of construction below finish grade.

3.5.1.3 Inspection, testing, approval, and recording location of underground utilities.

3.5.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

3.5.3 Do not use backfill material which is frozen or contains ice, snow or debris.

3.5.4 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

3.5.5 Backfilling around installations:

3.5.5.1 Place bedding and surround material as specified elsewhere.

3.5.5.2 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 0,6 m.

3.6 RESTORATION

3.6.1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Engineer.

3.6.2 Replace topsoil as directed by Engineer.

3.6.3 Reinstate lawns to elevation which existed before excavation.

3.6.4 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.

3.6.5 Clean and reinstate areas affected by Work as directed by Engineer.

3.6.6 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

1. GENERAL

1.1 REFERENCES

1.1.1 .1 American National Standards Institute/American Water Works Association (ANSI/AWWA)

1.1.1.1 ANSI/AWWA B300-10, Standard for Hypochlorites.

1.1.1.2 ANSI/AWWA B301-10, Standard for Liquid Chlorine.

1.1.1.3 ANSI/AWWA B303-10, Standard for Sodium Chlorite.

1.1.1.4 ANSI/AWWA C104/A21.4-08, Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.

1.1.1.5 ANSI/AWWA C105/A21.5-10, Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.

1.1.1.6 ANSI/AWWA C111/A21.11-07, American National Standard for Rubber-Gasket Joints for Ductile-Iron and Fittings.

1.1.1.7 ANSI/AWWA C110/A21.10-08, American National Standard for Ductile-Iron and Gray Iron Fittings for Water.

1.1.1.8 ANSI/AWWA C150/A21.50-08, Standard for Thickness Design of Ductile-Iron Pipe.

1.1.1.9 ANSI/AWWA C151/A21.51-09, Standard for Ductile-Iron Pipe, Centrifugally Cast.

1.1.1.10 ANSI/AWWA C153/A21.53-11, Standard for Ductile-Iron Compact Fittings.

1.1.1.11 ANSI/AWWA C200-05, Standard for Steel Water Pipe - 6 Inch (150 mm) and Larger.

1.1.1.12 ANSI/AWWA C203-08, Standard for Coal Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot Applied.

1.1.1.13 ANSI/AWWA C205-07, Standard for Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 Inch (100 mm) and Larger - Shop Applied.

1.1.1.14 ANSI/AWWA C206-11, Standard for Field Welding of Steel Water Pipe.

1.1.1.15 ANSI/AWWA C207-07, Standard for Steel Pipe Flanges for Waterworks Service, 4 Inch through 144 Inch (100 mm through 3,600 mm).

1.1.1.16 ANSI/AWWA C208-07, Standard for Dimensions for Fabricated Steel Water Pipe Fittings.

1.1.1.17 ANSI/AWWA C300-11, Standard for Reinforced Concrete Pressure Pipe, Steel-Cylinder Type.

1.1.1.18 ANSI/AWWA C301-07, Standard for Prestressed Concrete Pressure Pipe, Steel-Cylinder Type.

1.1.1.19 ANSI/AWWA C303-08, Standard for Concrete Pressure Pipe, Bar-Wrapped, Steel-Cylinder Type.

1.1.1.20 ANSI/AWWA C500-09, Standard for Metal-Seated Gate Valves for Water Supply Service.

1.1.1.21 ANSI/AWWA C504-10, Standard for Rubber-Seated Butterfly Valves.

1.1.1.22 ANSI/AWWA C600-10, Standard for Installation of Ductile-Iron Water Mains, and Their Appurtenances.

1.1.1.23 ANSI/AWWA C602-11, Standard for Cement-Mortar Lining of Water Pipelines - 4 Inch (100 mm) and Larger.

1.1.1.24 ANSI/AWWA C651-05, Standard for Disinfecting Water Mains.

1.1.1.25 ANSI/AWWA C800-05, Standard for Underground Service Line Valves and Fittings.

1.1.1.26 ANSI/AWWA C900-07, Standard for Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 Inch through 12 Inch (100 mm - 300 mm), for Water Transmission and Distribution.

1.1.2 ASTM International

1.1.2.1 ASTM A 53/A 53M-10, Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.

1.1.2.2 ASTM A 123/A 123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

1.1.2.3 ASTM A 307-10, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.

1.1.2.4 ASTM B 88M-05(2011), Standard Specification for Seamless Copper Water Tube [Metric]

1.1.2.5 ASTM C 117-04, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.

1.1.2.6 ASTM C 136-06, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.

1.1.2.7 ASTM C 478M-11, Standard Specification for Precast Reinforced Concrete Manhole Sections Metric.

1.1.2.8 ASTM D 698-07e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ftü (600 kN-m/mü)).

1.1.2.9 ASTM D 2310-06, Standard Classification for Machine-Made "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe.

1.1.2.10 ASTM D 2657-07, Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings.

1.1.2.11 ASTM D 2992-06, Standard Practice for Obtaining Hydrostatic or Pressure Design Basis for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe and Fitting.

1.1.2.12 ASTM D 2996-01(2007)e1, Standard Specification for Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe.

1.1.2.13 ASTM F 714-10, Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

1.1.2.14 ASTM C 618-08a, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

1.1.3 American Water Works Association (AWWA)/Manual of Practice

1.1.3.1 AWWA M9-2008, Concrete Pressure Pipe.

1.1.3.2 AWWA M11-2004, Steel Pipe - A Guide for Design and Installation.

1.1.3.3 AWWA M17-2006, Installation, Field Testing, and Maintenance of Fire Hydrants.

1.1.4 CSA International

1.1.4.1 CAN/CSA-A257 Series-09, Standards for Concrete Pipe (Consists of A257.0, A257.1, A257.2, A257.3 and A257.4).

1.1.4.2 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.1.4.3 CAN/CSA-B137 Series-09, Thermoplastic Pressure Piping Compendium. (Consists of B137.0, B137.1, B137.2, B137.3, B137.4, B137.4.1, B137.5, B137.6, B137.8, B137.9, B137.10, B137.11 and B137.12).

1.1.4.3.1 CAN/CSA-B137.1-09, Polyethylene Pipe, Tubing, and Fittings for Cold-Water Pressure Services.

1.1.4.3.2 CAN/CSA-B137.3-09, Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications.

1.1.4.4 CSA G30.18-09, Carbon and Steel Bars for Concrete Reinforcement.

1.2 SCHEDULING OF WORK

1.2.1 Schedule Work to minimize interruptions to existing services.

1.2.2 Submit schedule of expected interruptions for approval and adhere to interruption schedule as approved by Engineer.

1.2.3 Notify Departmental Representative building minimum of 24 hours in advance of interruption in service.

2. PRODUCTS

2.1 SERVICE CONNECTIONS

2.1.1 Copper tubing: to ASTM B 88M type K, annealed.

2.1.2 Copper tubing joints: compression type suitable for 1 MPa working pressure.

2.2 PIPE BEDDING AND SURROUND MATERIAL

2.2.1 Granular material to: Section 31 05 16 - Aggregate Materials and following requirements:

2.2.1.1 Crushed or screened stone, gravel or sand.

2.3 BACKFILL MATERIAL

2.3.1 As indicated Type 3, in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

2.4 PIPE DISINFECTION

2.4.1 Disinfect water mains in accordance with ANSI/AWWA C651.

3. EXECUTION

3.1 TRENCHING

3.1.1 Do trenching work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.1.2 Trench alignment and depth require Engineer’s approval prior to placing bedding material and pipe.

3.2 GRANULAR BEDDING

3.2.1 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness.

3.2.2 Do not place material in frozen condition.

3.2.3 Shape bed true to grade to provide continuous uniform bearing surface for pipe.

3.2.4 Shape transverse depressions in bedding as required to suit joints.

3.2.5 Compact each layer full width of bed to 90% maximum density to ASTM D 698.

3.2.6 Fill authorized excavation below design elevation of bottom of specified bedding in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.3 PIPE INSTALLATION

3.3.1 Install coupling necessary for connection to building plumbing.

3.3.2 If plumbing is already installed, make connection; otherwise cap or seal end of pipe and place temporary marker to locate pipe end.

3.3.3 Lay pipes to ANSI/AWWA C600 ANSI/AWWA M-9, M-11 and manufacturer's standard instructions and specifications.

3.3.3.1 Do not use blocks except as specified.

3.3.4 Join pipes in accordance manufacturer's recommendations.

3.3.5 Bevel or taper ends of PVC pipe to match fittings.

3.3.6 Lay pipes on prepared bed, true to line and grade.

3.3.6.1 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.

3.3.6.2 Take up and replace defective pipe.

3.3.6.3 Correct pipe which is not in true alignment or grade or pipe which shows differential settlement after installation.

3.3.7 Do not exceed permissible deflection at joints as recommended by pipe manufacturer.

3.3.8 Keep jointing materials and installed pipe free of dirt and water and other foreign materials.

3.3.8.1 Whenever work is stopped, install a removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.

3.3.9 Cut pipes in approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.

3.3.10 Align pipes before jointing.

3.3.11 Complete each joint before laying next length of pipe.

3.3.12 Minimize deflection after joint has been made.

3.3.13 Apply sufficient pressure in making joints to ensure that joint is completed to manufacturer's recommendations.

3.3.14 Ensure completed joints are restrained by compacting bedding material alongside and over installed pipes.

3.3.15 When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.

3.3.16 Do not lay pipe on frozen bedding.

3.3.17 Backfill remainder of trench.

3.4 HYDROSTATIC AND LEAKAGE TESTING

3.4.1 Do tests in accordance with ANSI/AWWA C600.

3.4.2 Provide labour, equipment and materials required to perform hydrostatic and leakage tests hereinafter described.

3.4.3 Notify Engineer at least 24 hours in advance of proposed tests.

3.4.3.1 Perform tests in presence of Departmental Representative.

3.4.4 Open valves.

3.4.5 Expel air from main by slowly filling main with potable water.

3.4.5.1 Install corporation stops at high points in main where no air-vacuum release valves are installed.

3.4.5.2 Remove stops after satisfactory completion of test and seal holes with plugs.

3.4.6 Thoroughly examine exposed parts and correct for leakage as necessary.

3.4.7 Examine exposed pipe, joints, fittings and appurtenances while system is under pressure.

3.4.8 Remove joints, fittings and appurtenances found defective and replace with new sound material and make watertight.

3.4.9 Repeat hydrostatic test until defects have been corrected.

3.5 PIPE SURROUND

3.5.1 Upon completion of pipe laying and after Departmental Representative has inspected Work in place, surround and cover pipes as indicated.

3.5.2 Do not place material in frozen condition.

3.6 BACKFILL

3.6.1 Place backfill material, above pipe surround, in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.

3.6.2 Do not place backfill in frozen condition.

3.7 SURFACE RESTORATION

3.7.1 After installing and backfilling over water mains, restore surface to original condition as directed by Departmental Representative.

END OF SECTION