Parcs Canada Parks Canada

SAINT-OURS CANAL HISTORIC SITE SUPERINTENDENT'S HOUSE REFURBISHING

V/REF. : OH 5P301-14-0002/003

Project : 131-21559-10

TECHNICAL SPECIFICATIONS

ISSUED FOR TENDER

March 31st 2016

Approuved by : 2016-03-31

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Director Structure

WSP

Travaux publics et Services gouvernementaux Canada
Public Works and Government Services Canada

Canada

Parks Canada Agency
Quebec Waterway Unit

Superintendent's house refurbishing
Saint-Ours canal national historic site

Architecture project no. : WSP-16-2630

ARCHITECTURE

SPECIFICATIONS

ISSUED FOR TENDER

MARCH, 31st 2016

RIOPEL+ASSOCIÉS ARCHITECTES

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PART 1 - GENERALITIES

1.1 Section content

.1 Work covered by the contract documents.
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.4 Examination of the site and documents.
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.6 Work schedule.
.7 Documents required on site.
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1.2 Work covered by the contract documents

.1 The work covered by this contract includes the refurbishing of the Superintendent's house's ground floor located at 2930, chemin des Patriotes at Saint-Ours National Historic Site, Saint-Ours Canal, as described in the accompanying documents (drawings and specifications) and as required by the contract documents.

.2 The work includes, generally, but not limited to:
  .1 Construction of women's and men's changing room including, among others, washrooms and showers with universal accessibility;
  .2 Refurbishing and refreshing the reception area and "exhibition venue";
  .3 Construction and installation of an outdoor monument to act as a washstand for the Otentik camping site;
  .4 And all elements as indicated in the drawings and specifications.

.3 Provide all cutting and patching jobs necessary and not specifically described but required in order to complete a full execution of the works, including those required by the mechanical, electrical, structural and civil work - see WSP's documents for the scope of this work.

1.3 Application of Divisions 0 and 1

.1 Unless indicated otherwise, the requirements of the various sections of Divisions 0 and 1 of the Specifications document apply to all sections of other Divisions.

1.4 Cooperation / coordination

.1 Coordinate work progress, calendars/schedules, documents to be submitted, site use, temporary public utilities, site planning, etc.

.2 Coordinate the work of this contract with other contractors on the work site, in order to not harm their operations and not to delay the work. Supply and install supports to ensure the structural integrity of adjacent structures; provide devices and methods to protect other elements of the project and the existing building against damage.

.3 The Contractor is responsible to define and assign to which subcontractor will be entrusted the supply and / or installation of the required materials and the different portions of work to be done.

.4 This manual has been divided into sections for different construction specialties to facilitate reading and subcontracting. In no way does this alter the responsibility of the Contractor and it places no limits to the scope of work to be done. Subcontractors are advised to carefully read this entire document in order to run and provide complete and finished work. The Contractor shall assume full responsibility for the work of its subcontractors.

.5 Take all measurements on site. Produce and direct the work depending on the size and site conditions. Provide templates, anchors, sleeves, inserts and accessories required for incorporation in the work, put in place or inform the subcontractors involved of their location and supervise the installation.

1.5 Examination of the site and documents

.1 The Contractor hereby confirms that before submitting his bid, he reviewed the work site and was informed of the extent and nature of conditions that may affect the achievement of the work, including the location of services to be protected, removed or relocated, the conditions of the surfaces, access, etc.

.2 The Contractor also confirms that he has carefully examined all the documents of the tender. It is assumed that the Contractor has a complete understanding of these documents.

.3 The drawings are intended to define the scope of work and indicate approximate locations, layout and size of the apparatus, equipment, ducts, pipes, ducts and plugs. Before starting the work, get accurate information

on the location, the layout and size of the elements, by studying and coordinating the drawings and shop drawings, including architecture, structure, mechanics and electricity; and by considering the site conditions. When these conditions require reasonable changes regarding the locations and arrangements indicated, perform these changes without cost to the Employer.

1.6 Codes and standards

.1 Install in accordance with the requirements of "the Quebec Construction Code - Chapter I, Building, and National Building Code - Canada 2010 (amended)" and other code or local law enforcement. In case of conflict between the requirements of the various codes and laws, the most stringent requirements apply.

.2 Meet or exceed the minimum requirements of the contract documents, standards, and codes cited documents and / or applicable.

1.7 Work schedule

.1 Provide, no later than 5 business days after the award of the contract, a timetable (represented by a Gantt diagram showing the critical path) illustrating the sequence of activities, interdependencies and estimated durations.

1.8 Documents required on site

.1 Keep a current copy of the following documents on site:
- .1 Contract Drawings;
- .2 Specifications document;
- .3 Addenda;
- .4 Reviewed shop drawings;
- .5 Change orders;
- .6 Other changes to the contract;
- .7 Site test reports;
- .8 A copy of the approved implementation schedule;
- .9 Manufacturers installation and application manuals;
- .10 Health and Safety Plans and other documents relating to security;
- .11 "As built" drawings.

1.9 Communications

.1 The Contractor will only take orders from the Ministerial representatives. Any other communication shall be considered null and void.

.2 The Ministerial representatives will only give instructions to the Contractor; orders to subcontractors will only be given in the presence of the Contractor.

.3 There will be no communication other than in writing, either by letter, email or meeting minutes.

1.10 Use of site by the Contractor

.1 The use of the site by the Contractor is restricted to areas necessary for the execution of works, storage and access, to allow the occupation by the Owner, and where applicable, use of the premises by the public.

.2 Coordinate the use of premises under the direction of the Owner.

.3 Assume full responsibility regarding the protection and custody of products necessary for the fulfillment of this contract.

1.11 Noisy and disturbing work

.1 Any work likely to disturb the activities of the Owner or tenant, or involving service interruptions, or may be due to noise or excessive vibration, is to be performed outside normal working hours, Monday to Friday between 18:00 and 8:00, at no additional cost to the Owner.

.2 Any work involving service interruptions is to be executed in close coordination with the operation of the park staff.

PART 2 - PRODUCTS

2.1 Not applicable.

PARTIE 3 - EXECUTION

3.1 Not applicable

End of section

PART 1 - GENERALITIES

1.1 Section content

.1 Shop drawings and data sheets;
.2 Samples of products and work;
.3 Certificates and minutes;
.4 Safety Data Sheets for hazardous material.

1.2 Sections connexes

.1 Section 01 45 00 – Quality control.
.2 Section 01 78 00 – Closeout submittals

1.3 Management considerations

.1 Within a reasonable time and in a predetermined order so as not to delay the execution of the work, submit documents and samples required for the approval of the Ministerial representatives. A delay in this regard cannot constitute a sufficient reason for an extension of the time limit for completion and no such request will be accepted.

.2 The work for which we require the filing of documents and samples should not be undertaken until the verification of all documents submitted is complete.

.3 The data shown on the shop drawings, data sheets and samples of products and works must be expressed in metric units.

.4 When the elements are not produced or manufactured in metric or that the features are not given in SI units, converted values can be accepted.

.5 Review all documents and samples before returning them to the Ministerial representatives. With this prior check, the Contractor confirms that the requirements applicable to works have been or will be determined and verified, and that each of the documents and submitted samples was examined and found to comply with the requirements of the work and contract documents. The documents and samples that will not be stamped, signed, dated and identified in connection with the particular project will be returned without being reviewed and will be considered rejected.

.6 Notify the Ministerial representatives in writing at the time of filing of documents and samples, of any differences that they have with the requirements of the contract documents, and state the reasons. It is the sole responsibility of the Contractor to demonstrate the equivalence between his proposal and the Contract Documents.

.7 Ensure the accuracy of the measures taken on site from adjacent structures affected by the work.

.8 The fact that the documents and samples submitted are reviewed by the Ministerial representatives does not release the Contractor from his responsibility to provide complete and accurate word and to comply with the requirements of the contract documents.

.9 Keep on the site a copy of each reviewed document submitted.

1.4 Technical specifications and shop drawings

.1 The term "shop drawings" means drawings, diagrams, illustrations, tables, graphics, leaflets and other documentation to be provided by the Contractor to show in detail part of the intended work.

.2 Shop drawings must indicate the materials used and construction methods, ties or anchors to use, and they must contain the assembly diagrams, details of connections, the relevant explanatory notes and any other required information for the execution of works. When structures or elements are connected to other structures or other elements shown in the drawings coordination is required, regardless of the section under which the works or adjacent elements will be provided and installed.

.3 Allow five (5) business days to Ministerial representatives to examine each batch of documents submitted.

.4 Changes to shop drawings by the Ministerial representatives are not intended to change the contract price. If this is the case, however, notify the Ministerial representatives in writing before starting work.

.5 Bring changes to the shop drawings if requested by the Ministerial representatives in accordance with the Contract Documents. When submitting drawings again, notify the Ministerial representatives in writing of changes that were made in addition to those required.

.6 The documents submitted must indicate the following:
  .1 The date of preparation and review dates;

.2 The name and project number;
.3 The names and addresses of: the contractor, supplier and manufacturer;
.4 The stamp of the Contractor, signed by the authorized representative, certifying that the documents submitted are approved, that the actions on site were checked and all comply with the requirements of the contract documents;
.5 Important details to the relevant portions of the work:
  .1 Materials and manufacturing details;
  .2 The layout or configuration, with dimensions, including those taken on site, as well as clearances;
  .3 Details of mounting or setting;
  .4 Performance characteristics;
  .5 Reference standards;
  .6 Connections with adjacent structures.

.7 The Contractor is responsible for issuing email copies and make the distribution of shop drawings and data sheets once the Ministerial representative has completed the verifications. In addition, the Contractor is responsible to keep copies required for assembly of the project's closeout manuals. Unless otherwise indicated, the review of technical specifications and shop drawings will be distributed by electronic copy.

.8 Submit by email shop drawings prescribed in the specification sections and all other requirements of the Ministerial representatives.

.9 If shop drawings are not required due to the use of a standard production product, submit by email datasheets or the manufacturers documentation prescribed in the specification sections and demanded by professionals.

.10 Remove the information that does not apply to the present works.

.11 In addition to the current information, provide any additional details that apply to the work.

.12 When the shop drawings were verified by the Ministerial representatives and no error or omission was detected or they contain only minor corrections, copies are returned by e-mail, and processing work and installation may then be undertaken. If shop drawings are rejected, or the annotated copies are returned and corrected, the shop drawings must be submitted again according to the above indications before the construction and installation work can be undertaken.

.13 When the requirements of the specification sections require that documents be checked and calculated by an engineer they must bear the seal and signature of an Engineer, who is a member in good standing of the order of Engineers of Quebec and able to validate this type of work.

.14 Maintain and update a calendar showing the processing of all shop drawings and technical data required by the contract.

.15 Submit all technical specifications and shop drawings required within two (2) weeks after contract award.

1.5 Sample products

.1 Submit at least two (2) product samples for verification, as specified by the specification sections. Label samples indicating their origin and intended destination.

.2 Ship prepaid samples to the Ministerial representatives' business office.

.3 Notify the Ministerial representatives in writing at the time of submission of product samples, indicate any differences they have with the requirements of the contract documents.

.4 When the colour, pattern or texture is the subject of a prescription, submit full range of samples required.

.5 Changes to the samples by the Ministerial representatives are not intended to change the contract price. If this is the case, however, notify the Ministerial representatives in writing before starting work.

.6 Indicated the changes requested by the Ministerial representatives while respecting the requirements of the contract documents.

.7 The samples examined and approved become the reference standard from which the quality of materials and finished works and installation will be evaluated.

1.6 Job sample

.1 Carry out work samples required in accordance with Section 01 45 00 – Quality control.

1.7 Certificates and Minutes

.1 Submit the relevant documents required by the Commission for Health and Safety at Work immediately after the contract is awarded.

1.8 Dangerous substances

.1 Submit updated MSDS sheets for each hazardous material required on site before it is brought there.

.2 Submit a Hazardous Materials Management Plan, indicating the name of all hazardous materials, use, location, personal protective equipment required and the arrangements that were made for their disposal.

PART 2 - PRODUCTS

2.1 Not applicable.

PARTIE 3 - EXECUTION

3.1 Not applicable

End of section

PART 1 - GENERALITIES

1.1 Section content

.1 Inspection and testing, administrative and operational requirements;
.2 Testing and dosage form;
.3 Work samples;
.4 Factory tests.

1.2 Related sections

.1 Section 01 33 00 – Submittal procedures;
.2 Section 01 78 00 – Closeout submittals

1.3 Inspection

.1 Ministerial representatives need access to the construction site. If parts of the work are performed outside of the site, access to this place must also be assured for the duration of the work.

.2 In case the works should be subject to inspections, approvals or special tests ordered by the Ministerial representatives or required under local regulations to the site, make that request within a reasonable time.

.3 If the Contractor has covered or allowed a job to be covered before it has been subjected to inspections, approvals or required special tests, he must uncover the work in question, to see the allow for the inspections or tests required to satisfy the competent authorities then put the work in its original state and pay for it.

.4 The Ministerial representatives may order the inspection of any part of the job when conformity with the contract documents is in doubt. If, after review, the job in question is found not to comply with the requirements of the contract documents, the Contractor shall take the necessary measures to make the work conform to specified requirements and undertake the inspection and repair costs. If the work in question is found to comply with the contract documents, the Owner shall bear the costs of inspection and rehabilitation so incurred.

1.4 Testing organizations and independent inspections

.1 Ministerial representatives will take care to retain the services of testing organizations and independent inspections. The cost of these services will be borne by the Employer.

.2 Provide the material required by the organization mandated for carrying out the tests and inspections.

. 3 The use of testing organization and inspection does not relieve the Contractor from its responsibility for the execution of works according to the requirements of the contract documents.

.4 If defects are detected during tests and / or inspections, the designated agency will require further inspection and / or additional tests to accurately define the nature and extent of these defects. The Contractor shall correct the defects and imperfections as directed by the Ministerial representatives, without additional cost to the Owner, and assume the cost of tests and inspections that should be performed after these corrections.

1.5 Access to site

.1 Enable testing organizations to have access to the site as well as to workshops that are located offsite.

.2 Collaborate with these organizations and take all reasonable measures so that they have the necessary means of access.

1.6 Procedure

.1 Notify in advance the appropriate agency and the Ministerial representatives when tests are to be performed so that all parties may be present.

.2 Submit samples and / or equipment and materials needed for the testing according to the requirements of the specifications, within a reasonable timeframe and in a predetermined order so as not to delay the execution of the work.

.3 Provide labour and facilities for collecting and handling samples and materials on site. Also provide the space required for storage and treatment samples.

1.7 Reports

.1 Provide three (3) copies of the test reports to the Ministerial representatives.

.2 Provide copies of these reports to subcontractors responsible for works that are to be inspected or tested.

1.8 Tests and dosage forms

.1 Provide three (3) copies of the test reports and the required dosage forms.

. 2 The cost of testing and dosing formulas that were not specifically required under the contractual documents or local regulations for the site will be subject to the approval of the Ministerial representatives and will later be reimbursed.

1.9 Work samples

.1 Prepare samples of works specifically required in the specifications document. The requirements of this section apply to all sections of the specifications under which it is asked to provide work samples.

. 2 Build the work samples at various locations approved by the Ministerial representatives and designated in the referred section.

. 3 Prepare work samples for approval by the Ministerial representatives within a reasonable time and in a predetermined order, so as not to delay the execution of the work.

.4 A delay in the preparation of work samples cannot constitute a sufficient reason for an extension of time for completion of the work and no such request will be accepted.

. 5 If necessary, the Ministerial representatives can assist the Contractor to establish a timetable for preparing the work samples.

. 6 It is specified in each section of the specification document when work samples are necessary, though they may or may not be part of the finished work and when they will be removed, if necessary.

1.10 Factory tests

.1 Submit factory test certificates that are required and prescribed in the various sections of this specifications document.

PART 2 - PRODUCTS

2.1 Not applicable.

PARTIE 3 - EXECUTION

3.1 Not applicable

End of section

PART 1 - GENERALITIES

1.1 Section content

.1 Temporary utility services.

1.2 Related sections

.1 Section 01 52 00 – Construction facilities.

1.3 Establishment and removal of equipment

.1 Provide the means necessary for the use of the temporary utility services to enable execution of the work in the shortest possible time.

. 2 Dismantle the equipment and evacuate it from the construction site when they are no longer needed.

1.4 Water alimentation

.1 The Owner will ensure the continuous supply of clean water for the execution of the work.

.2 Take the necessary steps to connect the water source to the concerned utility and bear all costs of installation, maintenance and disconnection.

.3 The Owner assumes the cost of this service at the current rate.

1.5 Heating and ventilation

.1 Provide temporary heating equipment required for the construction period, ensure the maintenance and provide the necessary fuel.

.2 Ensure adequate environmental control (heating and ventilation) in confined spaces for the following purposes:

- .1 faster work progress;
- .2 to protect the works and products against humidity and cold;
- .3 to prevent condensation on surfaces;
- .4 to ensure suitable temperatures and degrees of humidity for storage, installation, hardening or curing of materials;
- .5 to meet the requirements of regulations on safety measure in the work place.

.3 Keep the temperature at least 10 degrees Celsius where work is in progress.

.4 Ventilation :
- .1 prevent the accumulation of dust, vapors and gases as well as fogging in areas that remain occupied during construction;
- .2 provide a local exhaust system for combustion gases in order to prevent the accumulation of substances in the air that may be hazardous to the health of the occupants;
- .3 ensure that the combustion gases are evacuated in a safe way and at a place where they will not present any danger to the health of the workers and the occupants;
- .4 ensure the ventilation of the storage space of hazardous or volatile products;
- .5 operate the ventilation units and exhaust system after the completion of work in order to eliminate any volatile contaminants that could have been produced during the various constructions steps.

.5 Ensure at all times rigorously monitoring of the heating and ventilation devices, by ensuring that the following requirements are met:
- .1 comply with the current codes and standards;
- .2 apply safe methods;
- .3 prevent waste;
- .4 prevent any damage to the finishing coat;
- .5 evacuate outside the combustion gases from heating devices.

.6 Assume full responsibility for damages to structures due to improper heating or protection conditions maintained during the work.

1.6 Power supply and lighting

.1 The Owner shall assume the costs associated with the temporary electrical power supply for lighting and operation of the power tools during construction.

.2 Take the necessary steps to connect the power supply to that of the provided utility, and assume all costs of installation, maintenance and disconnection.

.3 Ensure the temporary lighting of the premises for the duration of the work and ensure the maintenance of the network. The devices must ensure a level of lighting of at least 162 lux on floors and stairs.

.4 The power supply and lighting systems installed under this contract can be used for construction only with the approval of a Ministerial representative and under condition that this does not contravene the conditions of guarantees. If necessary, repair any damage to the power supply and lighting systems.

1.7 Telecommunications

.1 The Contractor must provide temporary telecommunication facilities, including telephones, fax machines, data processing systems, including the necessary lines and equipment for its own use; it must ensure the connection of these installations to the network and shall assume the costs of all these services.

1.8 Fire protection

.1 Provide all fire protection equipment required by the relevant insurance companies and by regulations, and ensure the maintenance of the equipment.

.2 It is forbidden to burn waste material and construction waste on site.

PART 2 - PRODUCTS

2.1 Not applicable

PART 3 - EXECUTION

3.1 Not applicable

End of section

PART 1 - GENERALITIES

1.1 Section content

.1 Construction aides and accessories.
.2 Offices, materials and tools.
.3 Storage.

1.2 Related sections

.1 Section 01 51 00 – Temporary utilities.

1.3 Installation and equipment removal

.1 Provide, put in place or develop the construction of facilities necessary for the performance of the construction work in the shortest possible time.

. 2 Dismantle the equipment and remove it from the site when no longer needed.

1.4 Scaffolding

.1 Provide scaffolding, ramps, ladders, scaffolds, platforms and temporary stairs necessary for executing the work, and maintain them.

. 2 Design and build the scaffolding in accordance with CAN/CSA S269.2.

. 3 Design and construct construction work according to the CSA S269.1 standard.

1.5 On-site storage / eligible costs

.1 Ensure that work is carried out within the limits indicated in the contract documents. Do not clutter the site unreasonably with equipment and materials.

. 2 Do not overload or allow overloading any part of the work so as not to compromise its integrity.

1.6 Offices

.1 Provide a ventilated office, heated to a temperature of 22 degrees Celsius, with lighting ensuring a level of illumination of 750 lux, of sufficient size to allow for site meetings, and provide a table for spreading drawings.

. 2 Provide a complete first aid kit and clearly identify and store it in an easily accessible place.

. 3 If necessary, the subcontractors can develop their own office. Indicate them where they can settle.

.4 The Owner will provide access to the dining room on the second floor only for site meetings.

.5 Access to the door leading to the second floor must always be cleared so this floor can be used by the owner during the construction period.

.6 No septic installations and rest rooms, other than those in the construction areas, will be provided by the owner. Access to the second floor will not be permitted.

1.7 Equipment storage, materials and tools

.1 Provide lockable and weatherproof sheds, for storage of equipment, materials and tools, and keep them clean and in good order.

. 2 Equipment and materials that do not have to be kept out of the rain or snow can be left on site, but make sure they interfere as little as possible the flow of work.

PART 2 - PRODUCTS

2.1 Not applicable.

PART 3 - EXECUTION

3.1 Not applicable

End of section

PART 1 – GENERAL CONDITIONS

1.1 Section content

.1 Quality, ease of procurement, storage, handling, protection and product transportation.
.2 Manufacturer's instructions.
.3 Implementation, coordination and fasteners.
.4 Reference standards and codes.

1.2 Related sections

.1 Section 01 73 03 – Execution requirements

1.3 Reference standards and codes

.1 References to relevant standards can be made in each section of the specifications document. Comply with the standards listed, in whole or in part as prescribed by the specifications document.

. 2 In cases where there is doubt as to the compliance of certain products to relevant standards, the Ministerial representatives have the right to verify by testing.

. 3 If products or systems comply with the contract documents, the costs of these tests shall be borne by the owner, otherwise they shall be borne by the Contractor.

.4 If no date or specified edition is mentioned or if the specified date has passed, conform to the latest standards at the time of bid submission.

. 5 Perform the work in accordance with the Quebec Construction Code - Chapter 1, Building, and National Building Code of Canada 2010 building (modified) including amendments and any other state or local codes that apply with modifications, when filing your submission. In the event of any discrepancy or inconsistency, the more stringent requirements shall prevail.

1.4 Quality

.1 Products, materials, equipment, appliances and parts (called "products" in the specifications document) used for carrying out the work must be new,

in perfect condition and of the highest quality (according to the terms of the specifications document) to the purposes for which they are intended. If necessary, provide evidence establishing the nature, origin and quality of products supplied.

.2 Products found to be defective before the end of the work will not be accepted, whatever the findings of previous inspections. Inspections are not intended to relieve the Contractor of his responsibilities, but simply to reduce the risk of omission or error. The Contractor shall ensure the removal and replacement of defective products at his expense, and will be responsible for delays and resulting costs.

.3 In case of conflict as to the quality or suitability of the products, only the Ministerial representatives will decide upon the matter based on the requirements of the contract documents.

.4 Unless otherwise stated in the specifications, promote consistency by ensuring that the materials or elements are of the same type and from the same manufacturer.

.5 Labels, trademarks and permanent nameplates placed prominently on the products used are not acceptable unless they give an operating instruction.

1.5 Ease of obtaining products

.1 Immediately after signing the contract, consider the requirements for the delivery of products and provide for any delays. If delays in the delivery of products are predictable, notify the Ministerial representatives so that measures can be taken to replace them with alternative products or make the necessary corrections, and to do sufficiently in advance to avoid delays.

. 2 If the Ministerial representatives have not been notified of foreseeable delivery delays at the start of the work, and it seems likely that the performance of the work will be delayed, the Ministerial representative reserves the right to substitute products with comparable products that can be delivered quickly, and the price of the contract shall not be increased as a result.

1.6 Storage, handling and products protection

.1 Handle and store products to avoid any damage, do not alter them or dirty them, and follow the manufacturer's instructions, if any.

.2 Store the materials in the original packaging or products as grouped into lots; leave packaging intact, showing the manufacturer's label. Do not unpack or untie the products before they are incorporated into the work.

. 3 Products likely to be damaged by the weather must be kept in a secure storage area.

.4 Store the timber and sheathing materials on rigid supports so they do not rest directly on the floor. Give a slight slope to facilitate the flow of condensation.

.5 Store and mix paint products in a heated and well ventilated area. Every day, remove oily rags and other flammable waste from site. Take all necessary precautions to avoid the risk of spontaneous combustion.

. 6 Replace, at no additional charge, all damaged products to the satisfaction of the Ministerial representatives.

.7 Refinish, to the satisfaction of the Ministrial representatives, all surfaces that have been damaged. Use refinishing products identical to those used for the original finish. It is prohibited to apply a finish or to retouch nameplates and labels on doors and frames.

1.7 Transportation

.1 Pay the transportation costs of products required for the execution of the work.

1.8 Manufacturer's instructions

.1 Unless otherwise prescribed in the specifications, install or implement the products according to the manufacturer's instructions. Do not rely on the information on the labels and containers provided with the products. Obtain, directly from the manufacturer, a copy of their written instructions.

. 2 Notify in writing the Ministerial representatives of any discrepancies between the requirements of the specifications and the manufacturer's instructions, so that they can take appropriate action.

. 3 If the manufacturer's instructions have not been followed, the Ministerial representatives may require, without an increase to the contract price, removal and installation of the products that have been set up or installed incorrectly.

1.9 Quality of work

.1 The work must be of the highest possible quality and the work must be performed by skilled workers, and they must be skilled in their respective disciplines. Notify the Ministerial representatives if the work to be performed is such that they will likely not get the desired results.

.2 Do not hire unqualified workers or workers who don't have the abilities to carry out the work entrusted to them. The Ministerial representative has the right to refuse any worker found to be incompetent, negligent, insubordinate or whose presence will not be tolerated on the site.

.3 Only the Ministerial representative can resolve disputes concerning the quality of work and skills of the workforce, and their decision is to be final.

1.10 Coordination

.1 Ensure that workers cooperate among themselves to ensure the realization of the work.

1.11 Elements to cover

.1 Before covering elements, inform the Ministerial representative of abnormal situations. Perform the installation as directed by the Ministerial representative.

1.12 Repair

.1 Remediation work shall be required to repair or replace parts of elements found to be defective or unacceptable. Coordinate the work to be performed on the affected adjacent work as required.

.2 The restoration work must be done by specialists familiar with the materials and equipment used; the work must be done so that no part of the work is damaged or is likely to be.

1.13 Location of devices

.1 The location shown for devices, outputs and other electrical or mechanical equipment is approximate. The final location can be modified by the Ministerial representatives free of charge.

.2 Inform the Ministerial representatives of problems that may be caused by the choice of the location of a electromechanical device and install as directed.

1.14 Fasteners – General conditions

.1 Unless otherwise indicated, provide accessories and metal fittings with the same texture, color and finish as the element on which they are fixed.

.2 Avoid electrolytic action between metals or dissimilar materials.

.3 Unless stainless steel fasteners or other materials are prescribed in the relevant section of the specifications, use, for securing the outer works, fasteners and anchors that are corrosion proof and galvanized by hot immersion.

.4 It is important to determine the spacing of the anchors within the limits loads and shear strength to ensure a permanent anchor. Wooden pegs or other organic matters are not accepted.

.5 Minimize the use of exposed fasteners; space them out evenly and place them carefully.

.6 Attachments that could cause chipping or cracking of the element in which they are embedded will be rejected.

.7 For all appliances and equipments, provide nailing strips for all required locations: walls, floors and ceilings.

1.15 Mounting material

.1 Provide fasteners in shapes and standard commercial dimensions, suitable material having a finish surface suitable for the intended use.

.2 Unless otherwise indicated, use robust fasteners, semi-fine quality, with hex heads. Use stainless steel 304 or the appropriate grade in the case of outdoor installations.

.3 Stems of bolts must not exceed the top of the nuts by more than the length equivalent to their diameter.

.4 Use flat washers on equipment and sheet metal lock washers with flexible gaskets on places where there are vibrations. To secure material on stainless steel components, use stainless steel washers.

1.16 Protection of work in progress

.1 Do not overload any part of the building. Unless otherwise indicated, obtain written authorization from the Ministerial representatives before cutting or drilling a structural member or installing a sleeve.

1.17 Material Compatibility

.1 It is essential that the components of assemblies and contiguous materials are compatible. Provide the Ministerial representatives a written declaration that the materials and components assemblies are compatible.

.2 It is the responsibility of each subcontractor to ensure compatibility between their products and assemblies and assemblies products and other sections.

.3 Provide the Ministerial representatives a written notice of the incompatibility of some materials and systems so that they can dictate the required changes.

PART 2 - PRODUCTS

2.1 Not applicable.

PART 3 - EXECUTION

3.1 Not applicable.

End of section

PART 1 - GENERALITIES

1.1 Section content

.1 Requirements and restrictions for the execution of the work.

1.2 Related sections

.1 All other relevant specifications sections, especially when piercing, cutting or refinishing work is required. It is important to warn the Contractor and all other subcontractors in advance of this type of work.

1.3 Execution request for cutting and refinishing work

.1 Submit a written request prior to any cutting and refinishing work that may affect the following:
- .1 the structural integrity of any element of the work;
- .2 the integrity of the elements exposed to weather or water repellent items;
- .3 the efficiency, maintenance or safety of any functional element;
- .4 the aesthetic qualities of all apparent elements.

.2 The request must specify or include the following:
- .1 the designation of the project;
- .2 the location and description of the affected elements;
- .3 a statement explaining why it is necessary to perform the cutting and refinishing work;
- .4 a description of the suggested work and products that will be used;
- .5 alternatives to cutting and refinishing work;
- .6 the time and date of when the work will be executed.

1.4 Materials

.1 Materials required for the work, and to refinish the work identically to the existing adjacent materials.

.2 Any changes in materials must be subject to a request for substitution in accordance with the requirements of Section 01 33 00 - Submittal Procedures.

1.5 Preparatory works

.1 Inspect the construction site to examine the existing conditions and to identify any items that could be damaged or moved during the cutting and refinishing work.

.2 After taking out the discovered items, inspect them in order to determine any condition that may affect the execution of the work.

.3 The beginning of the cutting and refinishing work means acceptance of any existing conditions.

.4 Supply and install visible supports to ensure the structural integrity of the adjacent elements. Provide devices and consider methods to protect other elements that may be used in the work process against any damage.

.5 Provide protection for surfaces that might be exposed to the weather after uncovering the work.

1.6 Execution

.1 Execute the cutting jobs, repairing and refinishing work necessary for the realisation of the work.

.2 Adjust the different elements together so they fit well with the rest of the work.

.3 Uncover the work to allow the execution of steps which, for one reason or another, should have been made at a different time.

.4 Remove or replace the defective or non-compliant elements.

.5 Use methods that are not damaging to the other elements of the work and that will provide surfaces suitable to the work of repairing and refinishing.

.6 Cut rigid materials using a masonry saw or a core drill. Without prior authorization, it is forbidden to use pneumatic or percussion tools on masonry.

.7 Deliver the work with the level of finish, quality and products as specified in the requirements of the contract documents.

.8 Finish the surfaces to ensure consistency with the adjacent finishes. For continuous surfaces, finish all elements up the nearest intersection between two elements; in the case of an assembly of elements, completely refinish the surfaces.

PART 2 - PRODUCTS

2.1 Not applicable.

PART 3 - EXECUTION

3.1 Not applicable.

End of section

PART 1 – GENERAL CONDITIONS

1.1 Section content

.1 Cleaning during the execution of the work.
.2 Final cleaning.

1.2 Related section

.1 Section 01 77 00 – Closeout procedures.

1.3 Site cleanliness

.1 Keep the site clean and free from accumulation of debris and waste materials other than those generated by the Owner.

.2 Evacuate debris and waste materials from the site at predetermined intervals or eliminate as directed by the Ministerial representatives. Waste materials should not be burned on site.

.3 Clean work areas, public corridors, stairwells and other areas related to the work of this contract, after each shift. Perform a final cleaning on a daily basis in these areas.

.4 Make the necessary arrangements and obtain permits from the competent authorities for the removal of debris and scrap materials.

.5 Provide on-site containers for the disposal of debris and waste materials. Determine the location with the competent authorities

.6 Provide and use separate recycling containers that are clearly identified.

.7 Remove debris and waste materials from the site, and place in waste containers at the end of each work period.

.8 Put debris and waste materials in the designated areas which are to be located off site.

.9 Clean the inside surfaces before the finishing work and keep these areas free of dust and other impurities during the work in question.

.10 Store volatile waste in closed metal containers and evacuate off site at the end of each work period.

.11 Ensure good ventilation while using volatile or toxic substances. It is forbidden to use the building's ventilation system for this purpose.

.12 Use only cleaning products recommended by the manufacturer of the surface to be cleaned, and use them according to the product manufacturer's recommendations.

.13 Establish a cleaning schedule so that dust, debris and other raised dirt do not fall on freshly painted surfaces and do not contaminate the building systems.

1.4 Final cleaning

.1 At the substantial completion of the work, remove surplus materials, tools, equipment and construction materials that are no longer necessary for the execution of the remaining work

.2 Remove debris and waste materials and leave the place clean and ready to occupy.

.3 Before the final inspection, remove surplus materials, tools, equipment and construction materials.

.4 Remove all debris and waste materials other than those generated by the Owner.

.5 Discharge waste materials from the site at predetermined intervals or eliminate as directed by the Ministerial representative. Waste materials cannot be burned on site.

.6 Make the necessary arrangements and obtain permits from the competent authorities for the removal of debris and scrap materials.

.7 Clean and polish the windows, hardware parts, wall tiles, chrome and enameled surfaces, laminate surfaces, elements of stainless steel or porcelain-enamel as well as mechanical and electrical devices. Replace any broken windows, or that are scratched or damaged.

.8 Remove dust, stains, marks and scratches found on the decorative elements, mechanical and electrical appliances, furniture elements, walls and floors as well as on all equipment and devices.

.9 Clean the reflectors, diffusers and other lighting surfaces.

.10 Dust the interior surfaces of the building and vacuum behind the grids, louvers, shutters, registers and screens.

.11 Examine finishes, accessories and materials to ensure they meet the requirements prescribed for the operation and quality of execution.

.12 Sweep and clean paved areas according to manufacturer's recommendations.

.13 Clean the equipment and devices to make them hygienic, and clean or replace filters of any mechanical devices.

.14 When the work takes place in an active area that is occupied by tenants or by the Owner, perform the final cleaning on a daily basis in order to put these areas in their original clean condition before the arrival of the occupants in the morning:

.1 vacuum rugs and clean any other surfaces;

.2 clean and dust the furniture and equipment;

.3 replace, in their original position, all furniture and equipment that has been moved because of the work.

.15 Block off any empty areas and other concealed spaces that could accumulate debris or surplus materials.

PART 2 - PRODUCTS

2.1 Not applicable.

PART 3 - EXECUTION

3.1 Not applicable.

End of section

PART 1 – GENERAL CONDITIONS

1.1 Section content

.1 Administrative arrangements required prior to preliminary and final inspections of the work.

1.2 Related sections

.1 Section 01 78 00 – Closeout submittals

1.3 Inspection and declaration of substantial completion

.1 Inspection by the Contractor: The Contractor and subcontractors must inspect the work, identify faults and failures and make the necessary repairs so that everything is consistent with the requirements of the contract documents;
- .1 Send the Ministerial representatives a written notice once the contractor's inspection is completed and corrections are done.
- .2 Then present a request that the work be inspected by the Ministerial representatives.

.2 Inspection by the Ministerial representatives: the Ministerial representatives will conduct an inspection with the contractor of the work in order to identify shortcomings and obvious defects. The Contractor shall make the requested corrections.

.3 Completion: Submit written documents justifying the following;
- .1 Work is completed and has been inspected by the Contractor, and found to comply with the requirements of Contract Documents.
- .2 Malfunctions and defects found during inspections were corrected.
- .3 Devices and systems have been tested, adjusted and balanced, and they are fully operational.
- .4 Certificates required by the utilities companies have been submitted.
- .5 Owner 's staff received the training necessary for the operation of devices and systems.
- .6 The work is completed and ready for final inspection.

.4 Final inspection: Once all the aforementioned steps are completed, work is subject to final inspection, which will be conducted jointly by the owner, the Ministerial representatives and the Contractor. If the work is found to be incomplete by the owner and by the Ministerial representatives

complete the elements that have not been executed and demand a new inspection be undertaken at a later date.

.5 Statement of Substantial Completion: When the owner and the Ministerial representatives consider that the shortcomings and defects were corrected and that contract requirements seem largely satisfied, apply for the production of a certificate of substantial completion of the work.

.6 Start of the guarantee period and lien period: The date of acceptance by the Employer of the substantial completion of the submitted work will be the starting date of the builder's lien period and the warranty period, unless otherwise prescribed by the law at the place of the work.

.7 Final Payment: When the owner and the Ministerial representatives consider that the shortcomings and defects have been corrected and that contract requirements are fully met, make an application for final payment. If the work is found to be incomplete by the owner and by the Ministerial representatives, complete the elements that have not been properly executed and reapply for a final inspection.

.8 Holdback: After the issuance of the certificate of substantial completion of the work, submit a holdback payment request.

PART 2 - PRODUCTS

2.1 Not applicable.

PART 3 - EXECUTION

3.1 Not applicable.

End of section

PART 1 - GENERALITIES

1.1 Section content

.1 Project file, samples and specifications;
.2 Equipment and devices;
.3 Product data, materials, equipment and finishes, and related information;
.4 Sheets and operating and maintenance manuals;
.5 Replacement materials and equipment, special tools and spare parts;
.6 Warranties and guarantees.

1.2 Related sections

.1 Section 01 45 00 – Quality control.
.2 Section 01 77 00 – Closeout procedures.

1.3 Documents and materials to submit

.1 Maintenance instructions should be prepared by competent people who have the required knowledge about the operation and maintenance of the products described.

.2 Copies submitted will be returned after the final inspection of the work, together with the comments of the Ministerial representatives.

.3 If necessary, review the content of the documents before submitting again.

.4 Materials and replacement equipment, special tools and spare parts provided must be new, flawless and of the same build and quality as products used for the execution of works.

.5 On request, provide documents confirming the type, source of supply and the quality of products supplied.

.6 Defective products will be rejected, even if they have previously been inspected, and they will be replaced free of charge.

.7 Assume the cost of transportation of these products.

1.4 Presentation

.1 Present data in the form of an instruction manual.

.2 Use rigid binders: vinyl, three D-rings, flip 219 mm x 279 mm, with back and sleeves.

.3 When providing multiple binders, gather the data in a logical order. Indicate the content of the bindings on the back of each.

.4 On the cover of each binder, type the name of the document, the name of the project as well as the table of contents.

.5 Arrange the content according to the numbered sections of the specifications and the order in which they appear in the table of contents.

.6 Provide for each product and each system, a separator tab on which must be typed the product description and the list of major pieces of equipment.

.7 The text must consist of printed data provided by the manufacturer or typed data.

.8 Provide the drawings in a reinforced and perforated tab. Insert them in the binding and fold the large drawings in the format of the text pages.

1.5 Contents of each volume

.1 Contents: indicate the name of the project:

- .1 The date of submission of documents;
- .2 The name, address and telephone number of Ministerial representatives and the Contractor and the names of their representatives;
- .3 A list of products and systems, indexed to the content volume.

.2 For each product or system, indicate the following:

- .1 Name, address and telephone number of subcontractors and suppliers, as well as local distributors of spare parts.

.3 Product Data: mark each record to clearly identify the specific products and parts as well as the installation data. Remove all the irrelevant information.

.4 Drawings: drawings are used to complete the worksheets and to illustrate the relationship between the various elements of hardware and systems.

.5 Typed text: as required to complete the worksheets. Give instructions in a logical order for each procedure, incorporating the manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.6 Documents and samples to be included in the Project File

.1 In addition to the documents mentioned in the General Conditions, keep on site, for Ministerial representatives and the owner, a copy of the following documents:

- .1 Contract drawings;
- .2 Specifications;
- .3 Addenda;
- .4 Change orders and other contract amendments;
- .5 Shop drawings, revised data sheets and samples in their latest approved versions;
- .6 Records of tests performed on site;
- .7 Inspection certificates;
- .8 Certificates issued by the manufacturers;
- .9 Site instructions;
- .10 Test reports;
- .11 Approved updated work schedules;
- .12 Instructions for installation and implementation of the products and systems;
- .13 Additional issued drawings.

.2 Keep the documents and samples projects filed in the site office, separately from the documents used for work. Provide cabinets and shelves and a safe storage place.

.3 Label documents and classify them according to the list of section numbers in the table of contents of the project file. Register clearly "Project Folder" in block letters on the label of each document.

.4 Keep records of the project file dry and legible. Do not use them as documentation of works.

.5 The Ministerial representatives should have access to documents and samples in the project file for inspection.

1.7 Recording of work conditions

.1 Record information on an opaque set of drawings in a copy of the project file that will by handed over to the Ministerial representatives.

.2 Record information using felt tip markers by providing a different color for each major system.

.3 Record information as the work takes place. Do not conceal the works before the required information has been recorded.

.4 Contract Drawings and Shop Drawings: legibly indicate all data in order to show the works as they are, including the following:
- .1 Location of interior accessories, measured against visible and accessible building elements;
- .2 Changes about the size and structure of the details;
- .3 Changes due to change orders;
- .4 Details that are not included in the original contract documents;
- .5 References to shop drawings and related changes.

.5 Work: clearly describe the construction work as it is, including the following:
- .1 Manufacturer's name, brand name and catalog number of each product actually installed, including optional items and replacement parts;
- .2 Works resulting from which addendum or change order.

.6 Other Documents: keep manufacturer certificates, inspection certificates and records of tests performed on site in each of the prescribed specifications sections.

1.8 Equipment and systems

.1 For each piece of equipment and each system: provide a description of the device or system and its constituent parts; indicate its function, normal operating characteristics and constraints; give the characteristic curves with technical data and test results; also be listed as well as the commercial number of replaceable parts.

.2 Provide manufacturer's written instructions concerning the operation and maintenance of items.

.3 Provide the list of the original manufacturer parts and illustrations, drawings and assembly diagrams necessary for maintenance.

.4 Provide a list of spare parts OEM indicating the current prices and the amounts recommended to keep in stock.

.5 Additional requirements: in accordance with various specifications sections.

1.9 Materials and finishing products

.1 Construction materials, finishing products and other products apply: provide technical data and provide the catalog number, size, composition and the designations of colors and textures of products and materials. Provide the information necessary to order special products.

.2 Provide instructions for agents and cleaning methods and the recommended schedules for cleaning and maintenance, and the precautions to be taken against harmful practices and harmful products.

.3 Water repellents and products exposed to the weather products: provide manufacturer's recommendations relating to agents and cleaning methods and the recommended schedules for cleaning and maintenance, and the precautions to be taken against harmful methods and harmful products.

.4 Additional requirements: in accordance with various specifications sections.

1.10 Spare parts

.1 Provide spare parts in the quantities specified in individual specification sections.

.2 Parts supplied must be from the same manufacturer and be of the same quality as the elements incorporated in the work.

.3 Deliver and store spare parts at the specified location.

.4 Receive and catalog all the pieces, and then submit the inventory list to the Ministerial representatives. Insert the list approved in the maintenance manual.

.5 Obtain receipts of all delivered parts and submit before the final payment.

1.11 Replacement materials / equipment

.1 Provide equipment and replacement materials in the amounts indicated in different specification sections.

.2 Materials and replacement materials must be from the same manufacturer and be of the same quality as the equipment and materials incorporated into the work.

.3 Deliver and store materials / substitute materials where indicated.

.4 Receive and catalog materials and replacement materials and submit the inventory list to the Ministerial representatives. Insert the list approved in the maintenance manual.

.5 Obtain receipts of all delivered parts and submit before the final payment.

1.12 Special tools

.1 Provide special tools in the amounts specified in individual specification sections.

.2 Tools should be labeled with their function and the material which they are intended.

.3 Deliver and store special tools where indicated.

.4 Receive and catalog the special tools, and then submit the inventory list to the Ministerial representative. Insert the list approved in the maintenance manual.

1.13 Storage, handling and protection

.1 Store spare parts, materials and replacement materials and special tools to prevent damage or deterioration.

.2 Store spare parts, materials and replacement materials and special tools in their original packaging, kept in good condition and keep the seal intact and the manufacturer's label.

.3 Store items that may be damaged by severe weather.

.4 Store paints and products likely to freeze in a heated and ventilated room.

.5 Evacuate items that are damaged or deteriorated and replace them at no extra cost to the satisfaction of the Ministerial representatives.

1.14 Warranties and Guarantees

.1 Separate each guarantee or warranties with a separator tab marked according to the list given in the table of contents.

.2 Provide a list of contractors, suppliers and manufacturers, with the name, address and telephone number of the designated lead for each.

.3 Obtain warranties and bonds signed in duplicate by subcontractors, suppliers and manufacturers, within ten (10) days of completion of the work package concerned.

.4 Except for items commissioned with the approval of the Ministerial representative, do not change the effective date of the guarantee until the substantial completion date has been determined.

.5 Ensure that documents are in proper form, they contain all the necessary information and are notarized.

.6 Countersign documents to submit when needed.

.7 Retain warranties and bonds until the prescribed time for their recovery.

PART 2 - PRODUCTS

2.1 Not applicable.

PART 3 - EXECUTION

3.1 Not applicable.

End of section

PART 1 – GENERAL CONDITIONS

1.1 Section content

.1 The methods and procedures for the selective and partial demolition of structures that will enable the construction work.

1.2 Related sections

.1 Section 01 11 00 – Summary of works
.2 Section 01 33 00 – Submittal procedures
.3 Section 01 51 00 – Temporary utilities.

1.3 References

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

1.4 Samples and documents required

.1 Submit shop drawings in accordance with Section 01 33 00.

.2 When requested from the competent authorities, submit for the approval of the Ministerial representatives, drawings of shorings and bracings of structural walls prior to demolition. These drawings must be stamped and signed by a professional engineer recognized in the province of Quebec, and must illustrate the proposed working method.

.3 Shop drawings and design data must be stamped and signed by a professional engineer recognized in the province of Quebec.

1.5 Quality assurance

.1 Regulatory requirements: ensure that the work is carried out in accordance with provincial, territorial and municipal regulations.

1.6 Existing conditions

.1 Verify the record for any identified hazardous materials and take the necessary measures to preserve the environment.

.2 If a material resembling asbestos is applied using spray, trowel or if any other identified hazardous materials are discovered during the execution of work, stop work, take proper precautions and immediately inform the Ministerial representative. Do not resume work until you have received written instructions of a Ministerial representative.

.3 Warn Ministerial representatives and the Owner before hindering access to the building or cutting services.

1.7 Protection of the environment

.1 It is forbidden to burn waste and materials on the construction site.

.2 No waste or material waste should be burned on the construction site.

.3 Do not dump waste or volatile materials, such as mineral spirits, oils, petroleum based lubricants or toxic cleaning solutions into watercourses or sewers.

.4 Ensure the respect of the appropriate methods of disposal of such waste for the duration of the work.

.5 Do not pour water containing suspended particles in streams, storm or sanitary sewers or on adjacent land by pumping or other evacuation method.

.6 During the execution of the structure demolition work, erect temporary protective enclosures to prevent substances or foreign materials from contaminating the air outside the construction site.

.7 Cover the dry materials and waste or proceed with a wet procedure in order to prevent the lifting of dust and debris. Apply dust suppressants on all temporary access paths.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

3.1 Protection

.1 Take the necessary measures to prevent displacement, subsidence or other damages of the utilities conduits, structures and adjacent parts of the building that need to be preserved. Ensure shoring and bracing works if needed.

.2 Provide and install parts bracing and shoring, and perform required underpinning.

.1 If necessary, repair the damages during the structure demolition work as directed by the Ministerial Representative.

.3 Secure and brace all the affected structures. If the structure demolition work appears to be a danger to the rest of the structure and work, or to the adjacent structures and work, take the appropriate precautionary measures, stop work and notify the Ministerial Representative.

.4 If requested by the Ministerial Representative, submit for approval all drawings, diagrams or details indicating the steps of the demolition works or shoring or protective installations.

.5 All drawings of the support elements, structure, materials and load transfer procedures onto existing elements should bear the seal and signature of a professional engineer recognized in the province of Quebec.

.6 Minimize dust and noise produced by the demolition work and other inconveniences to the occupants.

.7 Protect the mechanical and electrical installations and equipment and all utilities pipes.

.8 Provide dust screens, tarps, support elements and other protective devices as required.

3.2 Preparatory work

.1 Inspect the construction site and validate the works that must be demolished or removed with the Ministerial Representative and the Owner. Also validate the works that must be recovered or resettled and those who must remain in place.

.2 Initiate the structure demolition in the state that they are on the date of the attribution of the contract.

.3 Inform the Ministerial Representative before dismantling any component or equipment that cannot be dismantled without damage.

.4 Coordinate downtime with the Owner.

.5 Inquire with the Owner of the fittest way to not disturb in any way the operation of the building and make all the necessary agreements, both in terms of work schedule and stopping services, power supply, or equipment and disturbance of existing equipment.

.6 Disconnect, with the approval of the Owner, power lines, telephone lines, mechanical or other mechanical or electrical devices stopping the execution of works according to the applicable laws and regulations.

3.3 Demolition, recovery and offsite disposal

.1 Carefully remove the elements that should be reused, store and protect them, and reinstall them according to the requirements of the relevant section of the specifications and as indicated in the plans.

.2 Demolish and remove the materials, equipment and parts of the building to allow the execution of the refurbishing work as stipulated in the contract and as indicated in the plans and specifications.

.3 All demolition work must be conform in all respects to the requirements of all provincial and municipal regulations, and to the applicable requirements of the National Building Code of Canada.

.4 Take all necessary measures to exclude places and protect occupants, employees and staff before the start of the demolition work. The Ministerial Representative may require that a construction fence be erected around the materials or the ground equipment.

.5 Protect all existing services against damage and take every care and precaution to avoid damaging any part of the building, low roof, parking areas, walkways, vegetation, etc.

.6 Install temporary guardrails wherever required. Every scaffold or platform that is necessary for this work must support the appropriate charge and meet the requirements of the National Building Code of Canada and the Security Code O.C.Q.

.7 All materials and waste resulting from this work will have to be removed from the premises and transported offsite daily. All recoverable materials to be reused must be stored in a place designated by the Owner and protected until reuse.

.8 All repairs of damaged surfaces, caused by demolition work, will be done properly and strictly according to best practices and according to the different indications on the plans and in the specifications. The Contractor will be required to repair all the damaged surfaces.

.9 Resize the shores of the partially demolished building components according to the specified tolerances by the Ministerial Representative to facilitate the introduction of new elements.

.10 Remove materials, equipments and other elements that hinder the rehabilitation or repair of existing structures and replace them during progress.

.11 At the end of each working day, ensure that no work can sag or collapse. Protect the parts of the building that need to be preserved and close the parts of the building that will not be demolished in order to protect the interior against weather at all times, regularly check the weather and be prepared at all times to protect the building, work and materials against weather damage.

.12 Perform demolitions in a way to limit the amount of dust raised and protect the materials that must be kept.

.13 Collect contaminated or dangerous materials and dispose them off the construction site by taking all necessary security measures.

.14 Get rid, on a daily basis, of all non-designated materials for recovery or reuse. Dispose of the waste outside of the construction site.

3.4 Refurbishment work

.1 Once the work completed, remove debris, put the surfaces back in theyre original condition and leave the site clean.

.2 Surfaces and structures that are outside the demolition zones must be restored to the condition they were in before the work begins.

End of section

PART 1 - GENERALITIES

1.1 Works included

.1 The work in this section includes the supply and installation of finish carpentry elements in washrooms, mainly including:
Furniture and solid laminate countertop vanities in the locker room;
- Installation of architectural hardware;
- Nailing strips in walls and bulkhead, and anchors for accessories and integrated furniture;
- Wooden frames for the granite monument washbasins;
- Other work as indicated and/or necessary for the full execution of the work.

1.2 Related items

.1 Blanket insulation. Section 07 92 00.
.2 Paint. Section 09 91 99.

1.3 Reference standards

.1 Unless otherwise indicated, perform carpentry work in accordance with applicable standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC) in 1984.

1.4 Samples

.1 Submit in duplicate samples of finishing materials in accordance with Section 01 33 00.
.2 Samples must show details of manufacture, seals, flanges, cutouts, finishes and core details.

1.5 Shop Drawings

.1 Submit millwork shop drawings according to the requirements of Section 01 33 00.
.2 Indicate the details of construction, assembly, profiles and other related details.
.3 Drawings must indicate all materials, finishes, thicknesses and hardware.

1.6 Delivery and Storage

.1 Protect elements of this section to prevent damage during transportation and storage on site.

.2 Damaged or scratched refinished and laminated surfaces should be replaced or repaired as directed by the Consultant.

.3 Store and install the materials in places where the relative humidity is between 25% and 60% and at a temperature of 22°C.

1.7 Protection

.1 After delivery to the site, store the panels and parts in a dry place protected against weather and extreme and sudden temperature changes. The panels will be stored horizontally supported every 600 mm and avoid contact with water or moisture.

1.8 Guarantee

.1 Provide a written and signed document, issued to the Client, certifying panels and solid laminate against warping, sagging, curling, fading, cracking and delamination of the veneer for a period three (3) years from the date of issue of the provisional acceptance.

.2 Provide a written and signed document, issued to the Client, certifying the wood framing members are free from defects for a period of one (1) year from the Issue Date of receipt provisional.

PART 2 - PRODUCTS

2.1 Timber (outside and inside)

.1 Lumber: (unless otherwise indicated) resinous wood, finished S4S (milled on 4 sides) with a moisture content not exceeding 19%, and conforming to the following standards and rules:

- .1 CAN / CSA-O141.
- .2 NLGA, Grading Rules for Canadian lumber.

.2 Furs, wedges, nailers, rough bucks:

- .1 boards: standard or superior categories.
- .2 Wood of dimension: light frame classification (clear), standard or superior.
- 3. Posts and timber (squares); standard or superior.

2.2 Plywood panels

.1 12.7 mm plywood exterior grade according to CSA 0151-F09 standards.

2.3 Fasteners

.1 Nails and staples: in accordance with ACNOR B111-1974 standard, galvanized or stainless steel 304, for outdoor work in very wet indoor environment and for treated wood. Ordinary finish for any other work.

.2 Wood screws: in accordance with ACNOR B35.4-1972 standards with standard finish.

2.4 Solid laminate panels

.1 COMPACT Series by Formica, color "black" 909 finished "mat" 52, 25.4mm or approved equivalent.

.2 Exposed mounting screws security type vandal resistant stainless steel type 410 BH with a special plug that can be removed with an appropriate tool.

.3 Unless otherwise indicated in the plans, counters need to be made in a single piece of solid laminate.

.4 Obtain the required dimensions on the site before shaping the elements which must be embedded with appliances, pieces of equipment and other materials, or that must be contiguous with these devices.

.5 Where openings are made, provide a radius of at least 3 mm at the corners to prevent the breakup of the laminate.

.6 Ensure consistency of colours and patterns of the plastic laminate pieces, they must be continuous over the entire surface.

2.5 Sealants

.1 Sealants comply with Section 07 92 00, the color will be chosen by the Ministerial representatives.

PART 3 - EXECUTION

3.1 Quality of works

.1 Draw and cut items to the appropriate contours to surfaces and adjacent walls so that they fit well in corners and around pipes, columns, sanitary

and electrical appliances, outlets or other protruding objects or intersecting parts or through.

.2 All joints will be located and hidden as much as possible, the colours and patterns will be continuous. Make joints to conceal the withdrawals. Run perfect butt joints, they must be tight and flush. Bevel the edges slightly.

.3 Fasteners, staples and nails will be concealed. All accessories or structures attached to the bulkhead shall be firmly secured to the nailing strip in the partition or structure.

.4 The works will be executed in order to prevent damage to the finished work of other trades; these will be protected so that no adjacent works are damaged.

3.2 Manufacturing

.1 All works will be executed in accordance with the measurements taken at the site. Build the cabinets, countertops and vanities according to the standards of the relevant AWMAC according to the type of manufactured items.

.2 Unless otherwise specified, the assembly will be done by tongue and groove, and/or mortise and tenon, or glued pins and blocks, in other cases, with glue to joinery, nails and screws concealed.

.3 Install in factory steel components, countertops and hardware.

.4 Carefully practice openings for plumbing fixtures, fittings, accessories, electrical outlet boxes and other devices.

.5 When assembling factory items to deliver to the site, take into account the difficulties in handling the work and the free space in the building openings.

.6 Glue the sheets of plastic laminate, according to the manufacturer's instructions and using the specified and recommended adhesives. Use sheets of maximum utility lengths to ensure that the profiles of the sheets to the core panels coincide well to get a sure grip on the surface. Bevel the edges to 20^{o}, perform perfect butt joints and cutouts needed for patches.

.7 Apply a compensatory sheet at the back of the core of laminated plastic material works.

.8 Install a strip of laminate or melamine on all exposed edges of panels covered with laminate; chamfering the laminate uniformly at about 20 degrees. Soften all edges of the panels.

3.3 Nailing strips

.1 Use nailing strips and steel reinforcements in all locations required to install furniture items, unless otherwise noted.

.2 Blocks and wooden nailing strips are not allowed in walls with a fire resistance and fire-resistant partitions, except as provided for by applicable building codes.

.3 If wooden blocks must be used, submit them for prior approval from the Ministerial representative.

3.4 Fixing works

.1 Install works and elements accurately, leveled and squared, attach or anchor them securely.

.2 Design, if necessary, or select suitable attachments to dimensions and nature of the constituent elements to be assembled. Use patented fastening devices according to the manufacturer's recommendations.

.3 Walnut head finishing nails to be resealed. If using screws to attach the elements, put the screws into countersunk holes, round and carefully drilled and seal the holes with wood plugs matching the fixed element and continuous surface.

.4 Replace elements whose surface has been damaged.

.5 In places where backsplashes and the edges of countertops join the wall cladding, apply a continuous sealing bead according to the requirements of Section 07 92 00.

3.5 Cleaning

.1 Once completed, make touch ups on damaged or scuffed woodwork; replace parts rejected by the Ministerial representative.

.2 Wipe surfaces to remove fingerprints and other marks; leave everything clean.

.3 Protect finished work against damage that could be caused by the work of other sections.

End of section

PART 1 – GENERAL CONDITIONS

1.1 Summary of works

.1 Section content :
- .1 Acoustic blanket insulation.

.2 Related sections :
- .1 Section 01 33 00 – Submittal procedures.
- .2 Section 09 21 16 – Gypsum board assemblies.
- .3 Section 09 22 16 – Non-structural metal framing.

1.2 Documents and samples required

.1 Specification sheets:
- .1 Submit specification sheets and the manufacturer's documentation for products in accordance with Section 01 33 00 – Submittal procedures.

.2 Manufacturer instructions:
- .1 Submit the instructions provided by the manufacturer.

1.3 Quality assurance

.1 Test Reports:
- .1 Submit test reports certifying that the products and materials comply with the specifications for physical characteristics and performance criteria.

.2 Certificates :
- .1 Submit certificates signed by manufacturer certifying that the products and materials comply with the specifications for physical characteristics and performance criteria.

PART 2 - PRODUCTS

2.1 Acoustic insulation

.1 Acoustic insulation made of mineral fiber batting, compliant with the criteria CAN/ULC S702 :
- .1 Type : 1.
- .2 Thickness: as indicated on the plans.

PART 3 - EXECUTION

3.1 Manufacturer's instructions

.1 Compliance: Comply with the manufacturer's written specifications requirements, including product installation and technical bulletins specified in the product catalogs and on the cardboard packaging instructions, as well as on the specification sheets.

3.2 Installation of the insulation

.1 Install the insulation between the studs to fit securely in place by friction. Install insulation in empty spaces securely to the elements to ensure continuous sound protection.

.2 Carefully adjust the insulation around electrical boxes, pipes and ducts, frames and other objects concealed under or through this insulation.

.3 Slide the insulation behind all electrical outlets to maintain the integrity of the sound-absorbing cushion.

.4 Fit cushions firmly together and fill any voids. Do not compress the insulation to fit the empty spaces.

.5 Do not cover the insulation until the installation has been inspected and approved by the Ministerial Representative.

.6 Make sure the installation is homogeneous.

3.3 Cleaning

.1 Once the installation work is completed, remove all surplus materials, scrap materials and tools.

End of section

PART 1 – GENERAL CONDITIONS

1.1 Work included

.1 All caulking required for the completion of the work, except the products mentioned in the related work sections.

.2 Caulking, and sealants for openings between the walls and ducts, pipes, drainage lines, ducts, etc.

.3 Caulking around fasteners, accessories and countertops in the bathrooms.

.4 Caulking around door frames, each side of the opening.

.5 Caulking in all joints between the materials.

.6 Any caulking, indicated or not, but necessary to complete the work.

1.2 Related work

.1 Section 06 20 00. - Finish carpentry
.2 Section 09 21 16.- Gypsum board assemblies

1.3 Reference standards

.1 CAN/CGSB-19.24-M90, Multi-component sealant with chemical polymerization.
.2 CAN/CGSB-19.22-M89, Sealant mildew resistant for tubs and tiles.
.3 CAN/CGSB-19.18-M87, Single silicone component sealant solvent polymerization.
.4 CAN/CGSB-19.13-M87, Single silicone component sealant, elastomer chemical curing.

1.4 Samples

.1 Submit two (2) samples of each type of materials and of the different chosen colours.

.2 Dry the samples under similar conditions to those provided during the implementation.

1.5 Samples of work

.1 If requested, build samples of the work. The samples include dimensions, profiles and depths of different applications and caulking materials. The accepted sample may be part of the finished work.

1.6 Terms of implementation

.1 The temperature at the time of the installation of the sealant and the backing material should be at 5oC minimum.

.2 In the obligation to proceed to the implementation at a temperature below 5°C, inquire with the manufacturer for their instructions and respect them.

.3 Follow and respect the manufacturer's recommendations regarding temperature, relative humidity and the moisture level content of the support for the application and drying process of the sealants, including special instructions for their use

1.7 Quality control

.1 The installation of the sealants will be done by a firm with a good reputation, approved by the product manufacturer, with at least five (5) years of experience in the field, and that has the necessary equipment and skilled workers to perform the work satisfactorily.

1.8 Guarantee

.1 The Contractor shall provide a guarantee of sealant works against sealant loss, cracking, spalling, loss of consistency, contraction, sagging, loss of grip and the tarnishing of adjacent surfaces in accordance with general conditions and for a period of five (5) years.

PART 2 - PRODUCTS

2.1 Sealants

.1 Primary: the type recommended by the manufacturer of the sealant.

.2 Joint backing :

.1 General requirements : compatible with the primary and other sealants, oversized of 30 to 50%.

.2 Polyethylene, urethane, neoprene or vinyl : cell extruded foam hardness 20 Shore A scale, tensile strength of 140 to 200 kPa.

.3 Anti-adhesion product: pressure applied plastic tape, which does not adhere to sealants.

.4 Sealants:
- .1 Joints in the washrooms around vanities, plumbing fixtures and accessories: moisture resistant silicone such as « Sanitary 1700 from General Electric » or « 786 from Dow Corning ».
- .2 Joints in fire resistant assemblies: « DymericTremco », with « Tundra Foam » and « Firebloc Tremco ».
- .3 Other joints : « Dymeric Tremco ».

.5 Sealant colour : as chosen by the Architect, will vary according to location.

.6 Sealant cleaning product: xylol, méthyléthylcétone or other non-corrosive product recommended by the manufacturer of the sealant, and compatible with the materials forming the joint.

PART 3 - EXECUTION

3.1 Surfaces preparation

.1 Remove dust, paint, non-adhesive mortar and other foreign bodies and dry joint surfaces.

.2 Using a wire brush, a wheel or a jet of sand, remove rust, scale and coatings covering the ferrous metal surfaces.

.3 Remove oil, grease stains and other coatings covering the non-ferrous metal surfaces.

.4 Prepare concrete surfaces, masonry and icy or glassy surfaces, according to the instructions of the manufacturer of the sealant.

.5 Check the dimensions of the joint and make the necessary corrections: the depth must equal half of its width, and it must have a minimum depth and width of 6 mm and a maximum width of 25 mm.

.6 Place the joint backing in order to obtain the required depth required for the sealing product.

.7 Before applying the primary and sealant, protect, if necessary, the adjacent surfaces to prevent tarnishing.

.8 Install the anti-adhesion tape according to manufacturer's instructions.

.9 Prior to the installation of the sealant, apply the primer on the side surfaces of the joint, according to the instructions of the manufacturer.

3.2 Installation

.1 Sealants
- .1 Install the sealant according to the manufacturer's instructions.
- .2 Apply the product to form a continuous sealing coat.
- .3 Apply the sealant using a gun with a nozzle of appropriate size.
- .4 Use a sufficiently high feed pressure to fill the voids and perfectly seal the joint surfaces.
- .5 Apply the sealant to the joints to form a continuous sealing strip, free of edges, folds, subsidence, air voids and coated dirt.
- .6 Shape the exposed surfaces to give them a slightly concave profile.
- .7 Apply sealant in the joints between windows and doors frames of any adjacent elements, in construction joints of the various elements, walls, doors and window frames, as well as all the places indicated on the plans and relevant sections of the specifications. Apply sealant around the perimeter of backsplashes and countertops edges joining wall coverings and frames.
- .8 Remove excess sealant gradually as the work progress and at the end of the work.

.2 Drying
- .1 Ensure drying of the sealant as directed by the manufacturer of these products.
- .2 Do not cover sealants before they are completely dry.

.3 Cleaning
- .1 Immediately clean all adjacent surfaces and leave the work area clean and in a perfect condition.
- .2 Gradually, as the work progresses, remove excess sealant and burrs with the recommended cleaners.
- .3 Remove the masking tape at the end of the initial period of taking the joints.

.4 The fact that the drawings do not show all the places that need to be acoustically sealed or sealed, shall not remove the responsibility of the Contractor to seal all required places for obtaining a continuous acoustic seal. This section also applies to all other sections that refer to the supply and/or installation of the sealants.

En of section

PART 1 - GENERALITIES

1.1 Related items

.1 Flush wood doors. Section 08 14 16.

.2 Door hardware. Section 08 71 00.

.3 Non-structural metal framing. Section 09 22 16.

.4 Paint. Section 09 91 23.

1.2 Reference standards

.1 Canadian Steel Door & Frame Manufacturers' Association (CSDFMA) - for materials, thicknesses and shaping.

.2 Underwriters Laboratories of Canada (ULC) for listed assemblies for fire resistance.

.3 ULC List of Equipment and Materials, volumes 1 and 2 September 1984 (materials and equipment).

.4 National Fire Protection Association Inc. (NFPA) Standard for Fire Doors and Windows - NFPA 80-1983.

1.3 Shop drawings

.1 Submit shop drawings in accordance with the requirements of Section 01 33 00.

.2 Shop drawings must clearly identify each type of door and frame, the material used, the thickness of the core, the assemblies mortise, details of the reinforcement parts and the glazing, the location of parts hardware, exposed fasteners and openings, anchors, fire resistance rating and the type of finishing coat.

.3 Include a schedule that will identify each door and frame, and corresponding doors numbers to numbers listed on the drawings and door schedule.

1.4 Delivery and Storage

.1 Store steel doors and frames in appropriate packaging so that they are protected against damage and deterioration. Replace damaged parts with new parts.

.2 Place labels on the elements to identify each door and frame, benchmarks and numbers corresponding to those of doors and frames schedule.

.3 Store doors and frames vertically in a dry place, and so they do not rest directly on the floor. Take measurements to ensure required space between doors and frames.

1.5 Parts supplied by others

.1 Obtain templates and hardware components for architectural hardware manufacturers and security locks.

1.6 Guarantee

.1 Provide a two (2) year guarantee against defects in materials and/or workmanship for the works of this section. The following conditions, without limitation, are considered to be included:

a) any deformation resulting from loads and axial forces;
b) corrosion;
c) defects in the joints, resulting in connections and / or inadequate welds;
d) buckling, warping and other similar visible surfaces defects;
e) the releasing of connections and fasteners and the generation of noise of any kind;
f) loss of adhesion between laminated components;
g) malfunctioning frames.

Obtain templates and hardware components for architectural hardware manufacturers and security locks.

PART 2 - PRODUCTS

2.1 Materials

.1 Steel: cold-rolled commercial grade, conforming to ASTM A366-85 Class 1 finish conforming to ASTM 526M-85 with zinc coating applied by wiping ZF 075, finished commercial type.

.2 Galvanized sheet steel hot dip: conforming to ASTM A 653M, with zinc ZF75, minimum thickness of bare metal conforming to the standard of CSDMA Table 1 - Thickness for Component Parts.

.3 Reinforcement profiles: steel conforming to CSA G40.20 / G40.21, grade of 44W, with zinc ZF75 according to ASTM A 653M.

.4 Doors, unless otherwise indicated, 45 mm thick:
- .1 Base steel thickness of the walls of interior doors: 1.2 mm.
- .2 Base steel thickness of all hardware reinforcements 3.1 mm.

.5 Door core, unless otherwise stated;
- .1 Interior door core: made of continuous reinforced elements of steel 0.9 mm thick assembled to 150 mm c/c, welded to the steel door sheet to 150 mm c / c max. The spacing between the stiffeners will be filled with fiberglass, 24 Kg / m^3 minimum density 1A type, in accordance with CSA-A101-M1983.

.6 Welded steel frames of the doors:
- .1 Thickness of the base steel inner frames: 1.6 mm.

.7 Ground anchors and wedge stiffening frames: steel 1.5 mm thick at least.

.8 Anchor walls and partitions: steel 1.6 mm thick for masonry walls and 1.2 mm for drywall.

.9 T Anchor corrugated steel frames: the thickness of the steel and the model of the anchors must be approved by the ULC.

.10 Glazing beads: in nominal thickness of 0.9 mm steel, 15 mm x 15 mm, screwed and milled, commercial grade and vandal. The model of glazing beads must be approved by ULC in accordance with ASTM A526-80 designation ZF-075.

.11 Protection reinforcements of latches and hinges, mortar box or dust steel 0.9 mm thick.

.12 Steel reinforcement minimum thickness according to the following table:

Reinforcement for:	Minimum thickness (mm)
Hinge	3,4
Door latch	1,9
Surface hardware	2,7
Low and high doors	1,9
Vertical side doors	1,2
Flush bolts	1,9
Lintels	3,0

.13 Rubber door bumpers, three per (3) doors: Build in frames, black, L03011.

.14 Primer: primer paint, zinc chromate in accordance with CAN / CGSB 1.132-M90.

.15 General: all steel doors and frames must come from a single manufacturer.

.16 Absorbers for doors: single pin, neoprene rubber.

.17 Metal putty filling: according to manufacturer's specifications.

.18 Sealant: according to the requirements of Section 07 92 10 - Joint sealants.

2.2 Manufacturer – general requirements

.1 The frames must be manufactured according to the standards of the CSDMA.

.2 The frames must be manufactured to the highest frontal dimensions and profiles indicated.

.3 Interior Racks: 1.6 mm thick, welded.

.4 The frames must be cut, reinforced, drilled and tapped as needed to receive mortised hardware parts as necessary and, using templates provided by the supplier of finishing hardware. The frames must be strengthened if necessary to accommodate the hardware mounting parts.

.5 Mortises must be protected by steel mortise covers.

.6 Single frame doors must be equipped with three dampers, and with two shock absorbers installed on the top rail.

.7 Unless otherwise indicated, the fasteners should be concealed.

.8 The frames should be painted with primary paint where the zinc coating has been damaged during manufacture.

2.3 Anchor frames

.1 Suitable devices for fixing the frames to walls and floors must be supplied and installed.

.2 Wall anchoring devices must be positioned directly above or below each hinge reinforcement on the hinge side.

.3 If the height is equal to or less than 1520 mm, the door must be equipped with 2 anchors; additional anchorage must be provided for each segment or segment portion of 760 mm extra.

2.4 Welded frames

.1 The welds must be in accordance with CSA W59.

.2 Element frames must be assembled with precision, mechanically and be securely welded to each other, then solidly welded on the inner wall sections.

.3 Butt joints between elements of mullions, cross transoms, central and cross thresholds and supports must be assembled accurately.

.4 Welded joints and corners must be ground until they form a flat surface, lined with metal filling putty and sanded until smooth and have a uniform finish.

.5 Floor anchors shall be secured within each of the posts.

.6 Two temporary spacers are to be welded to each of the frames for maintaining right angles during transport.

2.5 Doors – general requirements

.1 The doors must be flat, swinging and should, as indicated, include an opening for the installation of a glazing.

.2 Longitudinal edges of the doors must be welded. The longitudinal joint must be invisible and grinded until it is a flat surface, then lined with metal filling putty and sanded until smooth and has a uniform finish.

.3 The doors are to be cut, reinforced and tapped as necessary to receive mortised hardware parts.

.4 Openings of equal or greater diameter to 12.7 mm must be drilled at the factory, except those intended to receive the mounting bolts and through bolts, which must be drilled on site at the time of installation of the parts hardware.

.5 Doors must be strengthened wherever the hardware parts are to be protruding. The doors must be provided, at their upper parts and their lower parts, with an inverted recessed section, spot-welded.

.6 Doors must be touched up with paint primer where the zinc coating has been damaged during manufacture or transport.

2.6 Hollow core doors

.1 Interior doors must be made of steel facing sheets of 1.2 mm thick.

.2 Doors must be fitted with vertical reinforcements firmly welded to each of the cover sheets, centered at 150 mm at most.

.3 Voids between the reinforcements inside doors should be filled with fiberglass.

2.4 Frames

.1 Cut tabs and seals and weld them by running a continuous bead on the inside of the profile.

.2 Smooth the seals and welded corners, the top with metal loaded paste filler, and sand until smooth and it has a uniform finish.

.3 Install the ties for anchoring the frames to the floor. Install mortar boxes to protect the locks and hinges.

.4 Weld two (2) stiffening profiles on each frame to keep it straight and aligned.

.5 Install frames measuring up to 2200 mm in height, a minimum of 3 anchors per jamb adapting to the type of build in which they are installed. Add an additional anchoring leg for each additional 600 mm in height.

.6 Reinforce the top rail whose width is greater than 1 200 mm with two steel brackets 30 mm x 30 mm x 3 mm. For every single door, install three black neoprene bumpers on the stile to receive the striker; in the case of double doors, install both on the lintel.

.7 For each single door, install three black neoprene bumpers on the stile to receive the striker; in the case of double doors, install both on the lintel.

.8 Refinish frames with the primer on areas where the finish has been damaged during assembly.

PART 3 – EXECUTION

3.1 Installation – general requirements

.1 Install doors and build according to the CSDMA guide.

3.2 Frame installation

.1 Install components that are square, leveled and at the appropriate height.

.2 Attach anchors to adjacent components.

.3 Firmly maintain the frames in position with the aid of bracing until they are installed. Install wooden temporary spacers horizontally to a third of the opening in order to maintain constant the width of the frames. Install a vertical strut in the top through the center of the bay when the width of the latter is greater than 1200 mm. Remove wooden spacers once the door is built up.

.4 Leave space as needed to prevent the loads to be transmitted to the frames.

.5 Caulk the perimeter of the frames between the latter and the adjacent elements.

3.3 Door installation

.1 Install doors and hardware parts using templates provided in accordance with the manufacturer's instructions and the requirements of Section 08 71 10- Door Hardware.

.2 Provide a uniform gap between the doors and the frame and between the doors and the finished floor as follows:
- .1 Hinged side: 1.0 mm.
- .2 Lock side and lintel: 1.5 mm.
- .3 Finished floor: 13 mm.

.3 Adjust moving parts in order for doors to operate smoothly.

3.4 Execution of patch up

.1 Patch up with a primer paint the surfaces that have been damaged during installation.

.2 Cover the apparent surface anchors frames and surfaces with putty metal filling, and grind until obtaining a smooth, even finish.

End of section

PART 1 – GENERAL CONDITIONS

1.1 Summary of work

.1 Section content :

.1 Solid core wood doors, ordinary and with fire resistance, installed in steel frames.

.2 Related sections :

.1 Section 08 71 10 – Door hardware.

.2 Section 08 80 50 – Mirrors.

.3 Section 09 91 23 – Paint.

1.2 References

.1 Architectural Woodwork Manufacturers Association of Canada (AWMAC).

.1 Quality Standards for Architectural Woodwork 1998.

.2 Association canadienne de normalisation (CSA International).

.1 Série CAN/CSA O132.2-F90(C1998), Portes planes en bois.

.2 CAN/CSA-O132.5-M1992(R1998), Stile and Rail Wood Doors.

.3 National Fire Protection Association (NFPA).

.1 NFPA 80-[1999], Standard for Fire Doors and Fire Windows.

.2 NFPA 252-[1999], Standard Method of Fire Tests of Door Assemblies.

.4 Laboratoire des assureurs du Canada (ULC).

.1 CAN4-S104M-[80(C1985)], Méthode normalisée des essais de comportement au feu des portes.

.2 CAN4-S105-[1985(C1992)], Spécification normalisée pour bâtis des portes coupe-feu satisfaisant aux exigences de rendement de la norme CAN4-S104.

1.3 Documents and samples required

.1 Technical specifications :

.1 Submit product data and specifications and the manufacturer's documentation for products in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit two (2) copies of the relevant MSDS WHMIS (Information System Hazardous Materials at work) in accordance with Section

01 33 00 - Submittal Procedures. Technical sheets must specify the emission rates of VOC of the products below.

.1 Caulking and sealing products used during implementation.

.2 Materials and adhesives used for the fabrication of the doors.

.2 Shop Drawings:

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

.2 The drawings must indicate the types of doors and openings required for any window, dimensions, core details.

.3 Samples :

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

.2 Submit as sample a corner of 300 mm side for each type of proposed wooden door.

.3 Samples must indicate the details of fabrication and the details of the core, of the glazing and facing of the door.

.4 Manufacturer instructions:

.1 Submit the installation instructions provided by the manufacturer.

.5 Test Reports:

.1 Submit tests reports that were performed in the laboratory, in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit test reports certifying that the products and materials comply with the specifications for physical characteristics and performance criteria.

.6 Certificates :

.1 Submit certificates signed by the manufacturer certifying that the products and materials comply with the specifications for physical characteristics and performance criteria.

1.4 Transport, storage and handling

.1 Transport, store and handle equipment and materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Store the finished doors and protect their finishes until installation.

.3 Protect the doors against moisture. Plan their delivery to the site after completion of work generating excessive moisture. Unless otherwise instructed by the manufacturer, deliver the doors to the site when the relative humidity of the site is between 25 and 55%.

.4 Submit a certificate to the Ministerial Representative attesting of the degree of internal moisture of the doors at delivery.

.5 Store the doors in a well-ventilated area and in a way that they do not rest directly on the ground and are not exposed to direct sunlight, according to the manufacturer's recommendations. Do not wrap the doors, according to the manufacturer's recommendations.

1.5 Guarantee

.1 Provide a written and signed document, issued on behalf of the Contracting authority, certifying that the doors are not warped and do not exceed 1.5 mm measured on each side in any sense whatsoever. This must guarantee against sagging, cracking, delamination or other defects in materials for a period of five (5) years from the date of issue of the certificate of substantial completion.

PART 2 - PRODUCTS

2.1 Flush wood doors

.1 Solid core doors :

.1 Meet the standard CAN/CSA-O132.2.1.

.2 Fabrication of flush wood doors of 45 mm thickness:

.1 Solid chipboard core, density of 28-32 lbs / ft3 and conforms to CSA-0188 and ANSI A208-1, with integrated wedge to lock.

.2 Upper and lower cross sections in low density solid wood, jointed or not, 30 mm wide and bonded to the core.

.3 Hardwood, 22 mm, longitudinally laminated by hot pressing using a structural adhesive type 1, all in accordance with ASTM D5456-93 "Structural Composite Lumber". The wings have a total width of 30 mm.

.4 Stiles in Canadian maple veneer Class A cut of false area, varnished. Colour as indicated on plans.

.5 Cold pressed assembly, polyvinyl acetate glue (PVA) Cross-Link type 1.6
Acceptable product: « 8600 series from Portes Baillargeon » or approved equivalent.

.3 Insulated exterior wood doors:

.1 Insulated wood doors and frames in Spanish cedar, with six (6) flowerbed panels with mouldings around the sides of panels: 2 ½ " x 36 " x 84 ".

.2 Provide the hardware for the completion of the door.

.3 Supply and install an insulated aluminum threshold for universal accessibility and all the weather-stripping required.

.4 As manufactured and installed by Carpenter the Eastern Townships or any approved equivalent.

.5 Choice of colour and finish by the architect.

PART 3 - EXECUTION

3.1 Manufacturer instructions

.1 Conformity: comply with the requirements, manufacturer's written recommendations or specifications, including the product technical bulletins, installation instructions specified in the product catalogs and on packaging, as well as the indications datasheets.

3.2 Installation

.1 Remove the doors from their packaging and protect them in accordance with CAN / CSA-O132.2 Appendix A.

.2 Install doors with a degree of fire resistance in accordance with NFPA 80 standard; these doors must bear the certification label of the competent body and the labels must be visible.

.2 Install doors and hardware in accordance with manufacturer's written instructions and requirements of CAN / CSA-O132.2 Appendix A.

.3 Adjust the hardware components so that the doors operate correctly.

3.3 Door adjustment

.1 Right before the completion of the works, readjust the new doors and hardware parts so they operate correctly.

3.4 Cleaning

.1 Once the installation is completed, clean the site to remove dirt and accumulated debris resulting from the construction work and the environment.

.2 Remove any paint and sealant stains. Clean all the doors and frames.

.3 Clean the glass surfaces with an approved non-abrasive cleaning product.

.4 Once the installation is completed, remove from the construction site any surplus materials, scrap materials, tools and safety barriers.

End of section

PART 1 – GENERAL CONDITIONS

1.1 Works included

.1 Supply and installation of all architectural hardware as described in this section, except where indicated otherwise.

1.2 Related Items

.1 Metal doors and frames. Section 08 11 14.
.2 Flush wood doors. Section 08 14 16.

1.3 Reference standards

.1 The standard position of the hardware must meet the requirements of the Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by the Canadian Steel Door and Frame Manufacturers' Association.

1.4 Regulatory requirements

Not applicable.

1.5 List of hardware

.1 Provide a list of door hardware in accordance with the requirements of Section 01 33 00.

.2 List the door hardware and submit for approval, indicating the brand, model, material, function and finish, as well as any other relevant information.

1.6 Sheets and maintenance equipment

.1 Provide maintenance records, parts lists and manufacturer’s instructions and incorporate the service manual.

1.7 Delivery and Storage

.1 Store finished hardware parts in a locked room, where it is clean and dry.

.2 Wrap each piece of hardware, including attachments, individually or by group of similar parts, and label each package according to the nature and location of the room.

.3 Develop an inventory from the list of hardware.

1.8 Guarantee

.1 Provide a joint guarantee, Supplier / Manufacturer, written, signed and issued to the owner, stating that the materials are guaranteed against defects in operation under conditions of normal use.

.2 The warranty period is five (5) years for door closers, two (2) years for other hardware.

.3 Products that prove defective in any way will be replaced or the damage due to these defects will be repaired at no additional cost to the Owner.

1.9 Quantities

.1 The Contractor shall verify the quantities in accordance with schedules, drawings and approved invoices; he shall, at his expense, furnish all the missing hardware.

1.10 Installation

.1 This hardware will be installed and adjusted by competent personnel. All the work will be executed carefully and thoroughly according to best practices. The fasteners provided by the supplier (s) for their respective hardware parts will be the only ones accepted.

PART 2 - PRODUCTS

2.1 General requirements

.1 Use hardware parts listed on the approved products list issued by ONGC, in the case of the absence of a relevant ONGC, the hardware part must perform its function and be recognized and approved by the Ministerial representatives.

.2 Use only products from a single manufacturer in the case of parts of the same nature.

2.2 Groups of hardware

GROUP 01
WC 002, 007 New steel frame/
Single door New steel door

QTY	DESCRIPTION	PRODUCT IDENTIFICATION	FINISH	MFR
3	RELEASE HINGE	5BB1SC 4.5 FNA	630	IVE
1	PRIVACY LOCK	ND40S ATH	626	SCH
1	PULL PLATE	8303 8" 3.5" X 15"	630	IVE
1	SURF. DOOR CLOSER	1461 DEL SCUSH FC	689	LCN
1	FOOT PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	630	IVE

GROUP 02
Shower 006 New steel frame/
Single door New steel door

QTY	DESCRIPTION	PRODUCT IDENTIFICATION	FINISH	MFR
3	RELEASE HINGE	5BB1SC 4.5 FNA	630	IVE
1	DEAD LOCK	L463P	626	SCH
1	PRIVACY LOCK	ND40S ATH	626	SCH
1	STOP ARM	SÉRIES 100S	630	GLY
1	SURF. DOOR CLOSER	1461 DEL HD FC X ST-3603	689	LCN
1	MOUNTING PLATE	1460-18FC	689	LCN
1	FOOT PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	630	IVE

GROUP 03
WC 004 New steel frame/
Single door New steel door

QTY	DESCRIPTION	PRODUCT IDENTIFICATION	FINISH	MFR
3	HINGE	5BB1 4.5 X 4 FNA	630	IVE
1	PRIVACY LOCK	ND40S ATH	626	SCH
1	FOOT PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	630	IVE
1	WALL STOPPER	WS406/407CCV	630	IVE

GROUP 04
Door 008 to basement New steel frame/
Single door New wood door

QTY	DESCRIPTION	PRODUCT IDENTIFICATION	FINISH	MFR
3	HINGE	5BB1HW 4.5 X 4.5 FNA	652	IVE

1	LOCK	ND80PD ATH	626	SCH
1	SURF. DOOR CLOSER	4040XP EDA	689	LCN
1	FOOT PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	WALL STOPPER	WS406/407CCV	630	IVE

GROUP 05

Changing room 001, 005 — New wood frame/
Single door — New exterior wood door

QTY	DESCRIPTION	PRODUCT IDENTIFICATION	FINISH	MFR
3	HINGE	5BB1HW 5 X 5 FNA	630	IVE
1	DEAD LOCK	L463P	626	SCH
1	MONI. STRIKE	LML-1	630	SEC
1	PULL HANDLE	PR 8371 18" P	626	IVE
1	STOP ARM	SÉRIES 90SE	630	GLY
1	AUTOM. DORR OPENER	4642 REG/LONG WMS X FLUSH CEILING MOUNT	689	LCN
2	ACTIVATION DEVICE	8310-856	630	LCN
2	PATCH	8310-874	689	LCN
1	FOOT PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	WEATHERSTRIPS	BY WOOD DOOR MFR.		
1	DOOR BRUSH	2100 X LARG. REQ.	628	UNI
1	THERMAL THRESHOLD	625A X LARG. REQ.	A	ZER
1	POWER SUPPLY 120V	BY OTHERSS		
1	DIAG. CONNECTION	AS OPERATION THÉORY		

GROUPE 06

Shower 003 — New steel frame/
Single door — New steel door

QTY	DESCRIPTION	PRODUCT IDENTIFICATION	FINISH	MFR
3	RELEASE HINGE	5BB1SC 4.5 FNA	630	IVE
1	DEAD LOCK	L463P	626	SCH
1	PRIVACY LOCK	ND40S ATH	626	SCH
1	SURF. DOOR CLOSER	1461 DEL HD FC X ST-3603	689	LCN
1	FOOT PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	630	IVE
1	WALL STOP	WS406/407CCV	630	IVE

2.3 Fasteners

.1 Provide screws, bolts, expandable pads and other fastening devices necessary for the proper functioning of the hardware.

.2 Exposed fasteners must match the finish of the hardware.

.3 Use fasteners made of material compatible with that they pierce.

.4 Use only attachments supplied or recommended by the manufacturers of the products.

2.4 Keys

.1 Provide with each lock, an interchangeable "BEST" cylinder.

.2 Cylinders and permanent keys will be provided by the Contractor and coordinated with the owner.

PART 3 – EXECUTION

3.1 Verification

.1 Check the plans, details and hardware list as to the items to be provided and the installation details. Include all hardware finishes and related items such as fittings, screws, bolts, etc., that are necessary to complete the work of this section.

.2 The hardware schedule is given as a guide to determine the type, function, quality, minimum weight of items required but should not be interpreted as a quantity list.

3.2 Installation

.1 Provide manufacturers of doors and frames, installation templates and complete instructions that will enable them to prepare their products to receive the hardware specified in this section.

.2 Provide installation instructions prepared by the manufacturer with each item of hardware.

.3 Standards and the list of materials cover as much detail as possible. However, the contractor must check everything and is responsible for quantities to be supplied for all the work.

.4 The hardware will be installed with fasteners (screws, bolts, etc.) provided by the manufacturer.

.5 Installation with auto-shooting or self-tapping screws is not permitted. Replacing these ties, if necessary, will be the responsibility of the subcontractor who performs these installation.

.6 Install the hardware parts to standard positions consistent with the requirements of the Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by the Canadian Steel Door and Frame Manufacturer's Association.

3.3 General Notes about the hardware groups

.1 Door closers: The position and strength of door closers will be determined during the production, provide the details and schedule for approval.

.2 Except where indicated otherwise, install the closer inside the room.

.3 Bumpers: bumpers will be installed on the walls wherever possible.

End of section

PART 1 – GENERAL CONDITIONS

1.1 Included work

.1 Supply and install all gypsum boards and related work as indicated on drawings and specified in these specifications.

1.2 Related work

.1 Blanket insulation. Section 07 21 16

.2 Door hardware. Division 8.

.3 Non-structural metal framing. Section 09 22 16.

.4 Painting. Section 09 91 23.

1.3 Referenced standards

.1 Unless indicated otherwise, perform the work in accordance with CSA Standard A82.31 M91 and CGC technical brochures, latest editions.

.2 Fire resistant rated assemblies: materials and components must comply with ULC requirements. Submit ULC assemblies for approval by the Ministerial Representative.

1.4 Samples

.1 If requested by the Ministerial Representative, submit samples in accordance with the requirements of the Section 01 33 00.

.2 If requested, submit two (2) samples measuring 300 x 300 mm of gypsum board, angle reinforcements and flush trim moldings and insulating strips.

1.5 Transportation and storage

.1 The materials in bags must be delivered to the site and stored in their original packaging.

.2 Protect materials against moisture.

1.6 Terms of installation

.1 Plaster work must be performed at a temperatures above 13oC and in the manner dictated by CSA A82.30-M1980.

PART 2 - PRODUCTS

2.1 Gypsum board

.1 Water and ultra-resistant gypsum board: in accordance with CSA Standard A82.27-M91, standard type, 12.7 mm thickness, 1200 mm in width and a maximum working length.

.2 Backer boards for ceramic tiles: lightweight cement panels resistant to mold, humidity and physical damage, "Durock Next Gen CGC" 12.7 mm thickness, 1220 mm width x length required.

2.2 Metal furring and fasteners

.1 Metal furring, « U » shaped, suspension rods, fixing wires, patches and anchors: compliant to ACNOR A82.30-M1980, galvanized.

.2 Furring profiles for drywall, in galvanized steel, 0.5 mm thick core, permitting gypsum boards to be screwed to it. Use the appropriate gauge for the type, height and weight of the wall to be constructed.

2.3 Fasteners and adhesives

.1 Nails, screws and staples: in accordance with ACNOR A 82.31-M91. Wall screws, type S, use appropriate lengths, trumpet head, like those by Phillips.

.2 Screw "Durock MC" type SF for steel framing.

.3 Adhesives for metallic studs: in accordance with ONGC 71-GP-25M.

.4 Adhesives for laminate: in accordance with ACNOR A 82.31-M91, not containing any asbestos.

2.4 Accessories

.1 Mouldings, type 200A or 200B (CGC exclusively), corner reinforcements, joints expansions: sheet of commercial quality steel, 0.5 mm thick, zinc Z275 to comply with ASTM A525M-86, perforated wings, one piece.

.2 Acoustic sealant: that conforms to CAN / CGSB-19.21-M87.
.1 Acceptable sealants for these works must be on the list of approved products issued by the CGSB joints registration committee.

.3 Insulating bands: rubber, waterproof, cell neoprene, 3 mm thick, 12 mm wide, one side of which is coated with a permanent pressure-sensitive adhesive, in suitable lengths for the products that are to be installed.

.4 Accessory products for sealants: conforming to CSA Standard A82.31 M91, not containing asbestos.

PART 3 - EXECUTION

3.1 Gypsum bulkheads

Not applicable.

3.2 Wall furrings and build outs

.1 Unless otherwise indicated, install wall furrings behind gypsum panels, according to CSA Standard A82.31-M91.

.2 Furrings and build outs around openings and recessed hardware, cabinets, access panels, etc. View the requirements for embedded hardware for required clearances.

.3 In finished areas, and where indicated, install the furrings and create build outs around the sleeves-ducts, beams, braces, columns, and piping or other apparent work.

3.3 Gypsum board installation

.1 Do not install drywall before the subframes, anchors, insulation, wedges and electrical and mechanical installations are approved.

.2 Check that all nailing strips and backer boards are installed, as required to attach devices, accessories, furniture, etc. to the walls; notify the Contractor if any are missing.

.3 Place screws at 300 mm c/c at most. Install drywall to hide the beams, bracing, columns, piping or mechanical ducts located in finished areas, unless otherwise indicated in the plans.

.4 Water resistant gypsum board in the washrooms. Apply sealant on the edges, the ends and holes in the drywall, so as to protect the core; also apply to the head of all fasteners.

.5 Install cement backer boards on all wall surfaces that are to receive ceramic tiles. Install panels and finish joints in accordance with the manufacturer's recommendations. Ensure that all the reinforcements, the locations for supporting fixtures, toilet partitions, accessories, etc. are in place before installing the panels.

.6 Build the walls with the appropriate framing or fireproof boxes, as indicated in the plans. Cut panels to be 25 mm less than the required height, and then install them vertically between the "J " wall plates. Stagger the joints of the top and bottom of a panel so they do not line up, and reinforce them with a horizontal stud.

.7 All openings will be properly created to maintain fire resistance as required and allow all structural properties. The final layer of 25 mm gypsum board will be placed vertically, fixed with Type S screws, 32 mm long, spaced at 200 mm c/c along the perimeter and at 300 mm c/c in the centers.

.8 Attach gypsum panels in accordance with CSA A82.31-M91, according to the manufacturer's recommendations and directions. Install boards that are all well abutted, adjust and cut carefully.

.9 Do not attach drywall to the upper plates to allow for movement.

.10 Apply a continuous bead of 12 mm acoustic sealant on the periphery of each gypsum panel, along the junction of the panels and the frame and on the ceiling where the walls join other elements. Perfectly seal all openings around electrical boxes, telephone boxes, conduits and elements passing through the partition.

3.4 Accessories

.1 Mount all accessories square, plumb and level and securely fasten. Use full length pieces where possible. Make well-fitting joints, aligned and securely attached. Cut the corners squarely and adjust perfectly, leaving no rough edges. Fix the elements at 150 mm c/c max.

.2 Install edge mouldings on the edges of suspended ceilings, unless otherwise stated in plans.

.3 Install edge mouldings at the junctions between drywall and surfaces that do not have a joint cover, as well as at all indicated locations. Seal the joints with a sealant.

3.5 Access doors

.1 Install access doors in the walls and ceilings used in electrical and mechanical devices prescribed in the appropriate sections. Access doors are supplied by the Divisions 21, 22, 23 and 26.

.2 Tightly fasten frames to studs, furring or framing.

.3 Coordinate the number and location of access doors as required by the quantity and type of electrical and mechanical equipment. See mechanical and electrical engineer.

3.6 Tape and joint compounds

.1 Finish joints between the panels and the inside corners using the following products: joint compound and joint tape and tape coating. Apply these products as recommended by the manufacturer and smooth all over the surface of the panels to completely finish these.

.2 Cover the corner moldings, gaskets and, if necessary, trims, with two thin layers of joint compound and a layer of tape coating. Smooth thin layers on the surface of the panels to ensure an even finish.

.3 Fill the hollow screw heads with the joint compound and the coating until a uniform surface is obtained and it is flush with the adjacent surfaces of the gypsum board, these hollow must be invisible once the topcoat is applied.

.4 Lightly sand the sharp edges and other imperfections. Avoid sanding adjacent surfaces that do not need to be sanded.

.5 Once the installation is complete, the work must be smooth, level and plumb, free from waves and other defects and ready to be coated with a finish coat.

End of section

PART 1 – GENERAL CONDITIONS

1.1 Related Items

.1 Blanket insulation. Section 07 21 16
.2 Doors and frame installation. Division 8.
.3 Gypsum board assemblies. Section 09 21 16.

1.2 Shop Drawings

.1 If requested by the Ministerial representatives, submit shop drawings for steel studs, in accordance with the general requirements.

.2 Shop drawings shall clearly identify the materials, dimensions, thicknesses, fittings, assemblies, the number and types of anchors, the braces and the details around openings.

1.3 Samples

.1 If requested by the Ministerial representatives, submit the samples in accordance with the general requirements.

.2 Submit a sample of all the parts of the framework, including fasteners. Sample lengths will be 300 mm.

PART 2 - PRODUCTS

2.1 Materials

.1 Non-supporting structures composed of metal studs: comply with CAN / CGSB 7.1 M86 and ASTM A525M; rolled steel sheet, electro-galvanized with zinc coating Z180 for internal partitions. Studs must be designed so that the drywall can be screwed to them, and include knockouts for pipes, semi-perforated and installed at 460 mm c/c, the distance between the centerline of last unreinforced hole punched and the end of the studs should not be less than 300 mm.
  .1 "U" shaped studs for interior walls: 0.53mm thick, width of 63.5 mm, 92.1 mm or 152.4 mm, as indicated on the plans.

.2 Upper and lower plates: must conform to CAN / CGSB 7.1 M86 and ASTM A525M, sheet rolled steel, electro galvanized with zinc coating Z180 for interior partitions, of appropriate width according to the size of the studs.

.1 "U" shaped plates for interior walls, with a 38 mm plate at the bottom of the walls and a 50 mm one on the top of the walls, 0.53 mm thick.

.3 "U" shaped metal stiffener: 38 X 1.52 mm, cold rolled steel, coated with anti-rust paint.

.4 Acoustic Products: to CAN / CGSB 19.21 M87 standard.

.5 Insulating tape: foam rubber strip, water repellent, self-adhesive on one side, 3 mm thick, 12 mm wide and of length as required.

.6 Metal screws will be treated with anti-corrosive zinc coating or cadmium with a minimum thickness of 0.008 mm, type and dimensions as recommended by the manufacturer, with an appropriate resistance coefficient as prescribed by CAN3 S136 M89. The penetrations beyond the assembled materials shall not be less than 3 exposed threads and screws hidden by siding will have a low profile head.

.7 Accessories: eclipses, fasteners, wire ties in addition to framing members according to manufacturer's recommendations.

PARTIE 3 - EXECUTION

3.1 Mounting

.1 Install wall plates on the floors and the ceilings aligning accurately and fix them mechanically at 600 mm c/c at most for interior partitions. Supports shall be located no more than 150 mm from the end of the plates, using anchoring devices according to manufacturer's recommendations.

.2 Unless otherwise specified in the drawings, or differently recommended by the manufacturer of the timber, install the “U” profile studs vertically at 405 mm c/c and at maximum 50 mm from the intersection of walls and beside each opening and angle. Securely fasten posts to the top and bottom wall plates. Brace the studs to ensure the rigidity of the frame according to the manufacturer's instructions.

.3 During assembly, the maximum allowable deviation is 1: 1000.

.4 The gaps must not exceed 3 mm more than the required spacing. Cumulative errors in spacing distances must not exceed the requirements for finish materials.

.5 Coordinate the installation of studs with the installation of pipes, conduits and various services. Install the studs so that the openings are aligned.

.6 Coordinate the installation of studs with the door frames and windows, and other supports or anchoring devices for works prescribed in other sections.

.7 Pair studs, for the full height of the wall, on each side of openings whose width is greater than the prescribed spacing of the studs.

.8 Install wall plates above windows and doors, and below window sills and sidelights so as to be able to install intermediate studs. Secure the plates at each end of the studs according to the manufacturer's instructions. Install the studs that are above and below the windows spacing them according to the allowances for studs forming the wall framing and use the same method of attachment.

.9 Install studs or furring channels between the main uprights to allow the attachment of devices hanging from the metal partitions, such as sinks, washrooms accessories and other fixtures including grab bars. Strengthen the walls where cupboards and other equipment will be attached.

.10 Install studs or steel furring channels between the main uprights, so as to allow for the installation of electrical boxes or other installations.

.11 Unless otherwise indicated in the plans, build full height partitions.

12 Leave space under the beams, steel deck or other supporting elements, so that the structural loads are not transmitted to the studs. Unless otherwise indicated, leave a space of 20 mm between the top of the posts and the top plate.

.13 Build ducts and build outs to cover beams, columns, braces, plumbing or mechanical ducts located in finished spaces.

.14 Install two continuous beads of acoustic insulation tape at the bottom of posts and plates at the perimeter of soundproof partitions.

End of section

PART 1 – GENERAL CONDITIONS

1.1 Scope of work

.1 Leveling and preparing of existing floors, in the changing rooms, to receive the new ceramic flooring.

.2 Preparing of existing and new walls, in the showers in the changing rooms, to receive the new ceramic wall tiles.

.3 Supplying and installing ceramic wall and floor tiles in washrooms and showers in changing rooms.

.4 Other works as indicated in the drawings and / or as required.

1.2 Related work

.1 Gypsum board assemblies. Section 09 21 16.

.2 Toilet and bath accessories. Section 10 28 10.

1.3 Reference standards

.1 Unless otherwise indicated, install the tiles according to the "Installation Manual 200-1979, Ceramic Tile," published by the Canadian Association of terrazzo, tile and marble (TTMAC).

1.4 Responsibility and coordination

.1 Before starting work, the contractor will review the conditions and locations and notify, in writing, the Ministerial representatives and the contractor of any necessary corrections. Starting work means that the Contractor accepts the conditions and locations and cannot claim any fees for making corrections afterwards.

.2 The contractor will provide the tools and manpower necessary for the duration of the work to ensure that levels and alignments will conform to the required tolerances.

.3 The Contractor shall coordinate with other trades to obtain the information necessary for the installation of anchors and other equipment, including electrical or mechanical.

.4 The Contractor shall provide other trades with such information as they may need to perform their work on time and according to the schedule.

1.5 Skills

.1 The contractor carrying out the work must possess recognized competence in ceramic tile installation.

.2 The contractor and his employees assigned to the work must meet the requirements put forth by the Canadian Association of Terrazzo, Tile and Marble.

.3 All work in this section will be executed by skilled workers with a minimum of ten (10) years of valuable experience in ceramics installation work.

.4 The Contractor must be accredited by the ceramic tile manufacturer, in order to provide the required guarantee on materials and labor for all work

1.6 Samples

.1 On request, submit a sample of each type of tile, baseboard, grout and accessories for each color, texture, size and pattern of tiles in accordance with Section 01 33 00. The samples will be glued to plywood panels that are maximum 400 mm X 400 mm.

1.7 Spare tiles

.1 Provide an amount of spare tiles representing at least 2% of the total number of tiles of every type and color of tiles and baseboards required for the work. Store the tiles at the location indicated, the tiles must be from the same production batch as those that are installed.

1.8 Installation conditions

.1 Examine the locations where the work of this section is required. Install tiles only on acceptable or properly prepared surfaces.

.2 Maintain the temperature of the air and the surfaces intended to receive the tiles above 12^{o}C during installation and for a period of 48 hours before and after installation.

1.9 Guarantee

.1 Provide a written document issued and signed on behalf of the owner stating that the tiles are warranted against delamination from their support and that they will stay adhered for a period of five (5) years from the date the Provisional acceptance certificate is signed.

PART 2 – PRODUCTS

2.1 Washroom tiling

- Refer to drawings.

2.2 Shower wall tiling.

- Refer to drawings.

2.3 Granite panels

.1 Washbasins Monument: 19mm thick panels, model "Cambrian Black" finish "polished", as distributed by Granites Rochelle (Espace granite 3G) or approved equivalent.

.2 Profile: Square profile with slightly rounded corners.

.3 Sealant: Seal the joints between the panels with an appropriate sealant as required by Granites Larochelle (Espace granite 3G).

.4 Mounting: Glue the granite panels on plywood with glue as required by Granites Larochelle (Espace granite 3G).

.5 Cleaning and maintenance: as prescribed by Granites Larochelle (Espace granite 3G).

2.4 Adhesives and mortar

.1 Unless otherwise indicated, use an adhesive for floors and walls like Keralastic from MAPEI or approved equivalent, it must be made of synthetic polymer resins and a Portland cement powder (Kerabond), the dosage must be according to the manufacturer's written instructions. Complies with CGSB 71 GP 30M, Type 2, ANSI A118.1 76 ANSI A118.4 76.

.2 Additives and jointing materials are to come from the same manufacturer that supplied the adhesives according to the recommendations of the latter.

.3 Latex additive: dosed for the composition of Portland cement mortar.

.4 Mortar (measured by weight):
- .1 Two parts Portland cement compliant CAN3 M83-A5-type 10.
- .2 Six parts dry sand conforms to the CSA standard M1976-A82.56.
- .3 One part of Planicrete 50 - latex additive.

.5 Sand: conforming to CSA A82.56 M1976.

.6 Water: potable and free of harmful mineral mortar.

.7 Bonding layer of the mortar bed, 40 mm or less: Monobond by Macnaughton-Brooks (2-component epoxy).

.8 Latex additive:
- .1 Type 50 Planicrete bonding layer of the mortar bed (over 40 mm); as latex additive in the mortar bed.
- .2 Plastijoints for cementious grouting grout.

.9 Leveling layer: to level variations of 6 mm and under: Planicrete 20. And for greater than 6 mm, Planicrete 50.

2.5 Grout (floors and walls)

.1 Unless otherwise specified, use a quick setting polymer modified grout like "Ultra-Color Mapei." for floors. Use a polymer-modified grout "Ker 800 Mapei" or approved equivalent, for wall. Colour choices by Ministerial representatives.

.2 Preparation of the slurry: follow the manufacturer's instructions.

2.6 Adhesion primer

.1 For laying new tile on the ceramic tile / existing mosaic, use an adhesion primer like «Eco Prim Grip, from Mapei" or approved equivalent.

.2 Preparation and installation of the adhesive: according to manufacturer's instructions.

2.7 Repair mortar

.1 For the repair and resurfacing of horizontal concrete screeds from 9mm to 101mm thick. Binder for quick setting repair mortar and concrete, "Mapecem from Mapei" or approved equivalent.

.2 Preparation and installation of mortar: according to manufacturer's instructions.

.3 For the first 40mm, on the surface of the slab, including slopes, the repair mortar must be installed by the ceramic subcontractor.

2.8 Accessories

.1 Polysulfide sealant for control joints, of similar colour to the grout, as recommended by ACTTM and grout manufacturer.

.2 Sealant and protective coating for flooring as recommended by the manufacturer of the tiles and grout.

.3 Anodized aluminum mouldings, to finish the ceramic edges, from "Schluter" x tile thickness, polished chrome finish.

PART 3 - EXECUTION

3.1 Execution – general requirements

.1 The Contractor will examine all surfaces where these works are to be performed and will see that they are well prepared to receive finishes. He will level the surface with mortar and submit a report of any defect that could affect the execution of his work.

.2 Install tiles or coatings on properly prepared and clean surfaces.

.3 Adjust the tiles at the corners, around the accessories, appliances and other embedded objects. Make uniform joints. Trim the edges to form smooth and equal edges.

.4 The maximum permissible flatness deviation is 1: 800.

.5 Make uniform joints with an approximate width of 1.5 mm so that the tiles are plumb, square, aligned and all at the same level. Ensure that it is

impossible to distinguish between different tile plates in the finished work. Align the patterns.

.6 Peripheral tiles must be at least half their full size.

.7 After installation, tap the tiles and replace those that ring hollow to get a perfect grip.

.8 Make internal angles with exposed edges.

.9 Use wall protection mouldings to finish outside corners, at the top of the baseboards and wall tiles, except where the tiles meet a surface that is projecting.

.10 Install marble thresholds at the junction of the floor tiles with different materials.

.11 Wait at least 24 hours after laying the tiles to apply the grout.

.12 Once the work is hard and the grout is well taken, clean tiled surfaces and marble surfaces.

3.2 Wall and floor mounted ceramic tiles

.1 Level and prepare the existing floor surface to make it ready for installation of the new ceramic. Refer to the manufacturer's instructions to execute leveling and sanding of an existing ceramic floor.

.2 Brush and sand thoroughly all the inequalities of the floor and the existing walls, including the grout joints.

.3 Roughen the existing ceramic tile floor by sanding or grit blasting it to increase adhesion.

.4 Clean the existing ceramic surfaces floor with trisodium phosphate (PTS) according to manufacturer's recommendations so that the surfaces are free from defects, clean and free of dust, wax, grease, sealer, soap residues and other substances that can prevent or reduce adhesion.

.5 Obtain approval from the mounting surface by the manufacturer of tiles and grout before proceeding with the installation of other products.

.6 Install the adhesion primer specified according to the manufacturer's recommendations.

.7 Spread mortar with a trowel, use a scraping movement to get good contact with surfaces covered. Teeth of 6 mm x 6 mm (1/4 "X 1/4") and of 6 mm x 9 mm (1/4 "X 3/8") for quarry tiles and for tiles bigger than 150 mm x 150 mm (6 "X 6").

.8 Do not lay more mortar than the quantity of material that is possible to be layed out in 20-30 minutes.

.9 Spread a little mortar on the back of each tile when laying out large tiles.

.10 Spread and tap with a small block to ensure good adhesion.

.11 Install tiles at level and ensure uniform joints.

3.3 Ceramic joint finishes

.1 Completely fill the joints so as to not have any voids.

.2 Pass a rounded, smooth tool to obtain uniformly concave joints.

.3 Clean surfaces and remove any excess mortar with water during the work and before any of it hardens.

.4 Clean any veil or mortar film with "Laticrete TC-500" or approved equivalent, according to the manufacturer's recommendations.

3.4 Cleaning

.1 At the end of the work, when the mortar is hard enough to withstand cleaning, wash with water and with a soft fiber brush and soap without cleaner. Do not use cleaner with acid on coloured grout joints.

3.5 Protection

.1 Protect completed work against any damage caused by the execution of other work sections, or subsequent contracts.

End of section

PARTIE 1 – GENERAL CONDITIONS

1.1 Related work

.1 Section 06 20 00 - Finish carpentry.

1.2 Samples

.1 Submit samples in accordance with the requirements of Section 01 33 00.

.2 Submit two samples of 300 mm lengths of the different floorboards.

1.3 Records

.1 Provide instructions for finishing and maintenance of wooden floors, and incorporate them into the manual specified in Section 01 78 00.

1.4 Transportation and storage

.1 Store materials in a room where they will be placed for at least 72 hours before work begins.

1.5 Installation conditions

.1 Maintain the temperature inside the room between 20°C and 23°C at all times and a relative humidity of 40 to 50%.

1.6 Guarantee

.1 Provide a written document issued and signed on behalf of the owner, stating that the solid wood floor is guaranteed for a period of three (3) years against any wear from the date of signing of the Certificate of provisional acceptance of the work.

PART 2 - PRODUCTS

2.1 Materials

.1 Planks of massif oak, "Old Red Oak Seashell", Cashmere finish, "Imagine" collection (brushed) from Mirage or approved equivalent. Thickness of

19mm X 108mm wide and random lengths (250mm to 1930mm).

.2 Fixing to floor: nailed every 400mm on new or existing plywood.

.3 Maintenance: follow the manufacturer's recommendations.

PART 3 - EXECUTION

3.1 Under the parquet

.1 Repair, clean and prepare the existing surface for the installation of new solid wood boards. Check the anchoring of the existing surface and screw the plywood panels where necessary. Replace damaged panels, decayed panel or panels showing signs of aging.

3.2 Parquet

.1 Install the first oak plank parallel to the longest wall and leave a 6mm gap between the boards and walls to allow for floor expansion.

3.3 Cleaning

.1 Follow the manufacturer's recommendations.

3.4 Protection

.1 Protect work completed against any damage caused by the execution of other work sections, or subsequent contracts.

End of section

PART 1 – GENERAL CONDITIONS

1.1 Works included

.1 Provide all materials, labor, supervision, tools, scaffolding, equipment, public protection and all services necessary for the execution of all the work outlined in the plans and specifications.

.2 Included in this scope of work, all accessories and works, even if they are not all shown on the drawings or described in the tender specifications as they are needed to complete the work or to comply with the intentions of the contract, to be executed as if they were listed or described. The execution of these works will be fully compliant with quality standards referenced and / or recognized in the industry and follow best practice standards.

.3 The work specified in this section includes the supply of paint and its application to all exposed surfaces, including but not necessarily limited to, the following:

- .1 Patching all surfaces in contact with the work of this mandate.
- .2 Existing and new drywall areas affected by the work of this mandate.
- .3 Paint new wooden doors
- .4 Painting new steel frames
- .5 Any other item identified on the plans and in the specifications.
- .6 Any other unfinished and visible material.

1.2 Related sections

.1 Section 01 11 00 – Summary of work
.2 Section 06 20 00 – Carpentry and Joinery
.3 Section 08 11 14 – Doors and metal frames
.4 Section 08 14 16 – Flush doors in wood
.5 Architectural plans

1.3 References

.1 Repainting Maintenance Manual 2004 (Guide for the refurbishment of paint coatings) Master Painters Institute (MPI), covering component identification, evaluation of substrates, paint systems, preparatory work and the list of approved products.

.2 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).

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

.4 Canadian Standards Association (CSA)
- .1 CSA-A23.1-00, Concrete - components and workmanship.

1.4 Quality assurance

.1 Qualifications
- .1 Contractor must have at least five (5) years experience in performing similar work, and provide references. In this regard, he must provide a list of three (3) recent comparable projects in which he participated, specifying the name and location of the project, the responsible authority and the name of the project manager.
- .2 Paint work must be performed by skilled workers under the active local regulations.
- .3 Apprentices can also be hired on condition that they work under the direct supervision of a skilled worker in accordance with the regulations governing this trade.

.2 Comply with the latest requirements of the MPI with respect to interior work and the refurbishing of paint coatings, including those for cleaning and surface preparation and application of primers or paint.

.3 Products used, either primers, paints, coatings, varnishes, stains, lacquers, fillers, diluents, solvents and others, must be on the latest version of the list of products approved by MPI and all products forming the chosen paint system must be from the same manufacturer.

.4 Paint products such as linseed oil, shellac, thinners and turpentine should be of high quality and, as appropriate, be compatible with other coating products used. They must come from an approved manufacturer listed in the MPI Maintenance Repainting Manual.

.5 Keep purchase receipts, invoices and other documentation to establish, at the request of the Ministerial representative, that the work conforms to specified requirements formulated by the MPI.

.6 Quality Standards: the examined surfaces must, under the planned final lighting, meet the following requirements.
- .1 Walls: no visible defects less than 1000 mm, with an angle of 90

degrees relative to the surface being examined.

.2 Ceilings: no defects visible to an observer on the ground at an angle of 45 degrees to the projection surface.

.3 The color and gloss of the topcoat must be uniform over the entire surface examined.

.7 Samples of the work: build mock ups and work samples as required in accordance with Section 01 45 00 - Quality Control.

.1 Submit samples of the work required to Ministerial representatives in accordance with Section 01 45 00 - Quality Control.

.2 Prepare substrates, parts or interior elements designated as samples of the work for the refurbishment of their top coating according to the requirements of this section, then apply the paint, the product or the coating prescribed according to color, gloss or sheen, texture and quality of execution specified in the MPI Maintenance Repainting Manual, and submit them for review and approval.

.3 When accepted, substrates, parts or interior features painted as samples of the work will be the standard to be met.

.4 Surfaces executed as samples will be accepted as parts of the finished work.

1.5 Performance requirements

.1 Requirements for environmental performance

.1 Paint products used must comply with the requirements for obtaining the "Environmental Choice" MPI E2 awarded on the basis of the content of volatile organic compounds (VOCs) determined according to the number 24 method "Environmental protection Agency "(EPA).

.2 If the quality of indoor air (presence of smell) is a problem, only prescribe products on the MPI list who obtained at least an E2 mention.

1.6 Samples and documents required

.1 Submit product data and manufacturer's instructions regarding the implementation or application of each painting system in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit samples required in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit a sample representative of each type of prescribed color

finishing systems.

.2 For painting products and coatings used, submit MSDS sheets.

1.7 Transport, storage and handling

.1 Transport, store and handle paint products according to the requirements below.

.1 The materials must be pre-mixed in factory.

.2 Deliver and store paint products in their original containers, sealed and provide with labels intact.

.3 The labels must indicate:

.1 Name and address of the manufacturer;

.2 The type of paint or coating;

.3 Compliance with standards or the relevant requirements;

.4 Color number, according to the list of specified colors.

.4 Remove from the site degraded products, opened or refused.

.5 Handle and store products according to manufacturer's recommendations.

.6 Store products in a safe, dry, well ventilated site where the temperature is between 7 and 30 degrees Celsius. Store products away from heat sources and keep temperature sensitive products at a temperature above the minimum recommended temperature by the manufacturer.

.7 Keep the site clean and tidy to the satisfaction of the Ministerial representative. Once the work is completed, restore these areas to their original state of cleanliness, to the satisfaction of the owner.

.8 Remove from the storage area only the quantities of products which will be installed on the same day.

.9 Meet WHMIS requirements for the use, storage, handling and disposal of hazardous materials.

.10 Requirements for fire safety

.1 Provide (1) dry chemical fire extinguisher, 9 kg, and place it near the storage area.

.2 Place in a ULC sealed container: oily rags, waste, empty containers and materials liable to spontaneous combustion and remove the containers from the site daily.

.3 Handle, store, use and dispose of flammable and combustible products and materials in accordance with the requirements of Canada's National Fire Prevention Code.

.2 Management and disposal of waste

.1 Separate waste materials for reuse / re-use and recycling.

.2 Paints, dyes, wood preservatives and other related products

(thinners and solvents) must be treated as hazardous materials, whose disposal is subject to various regulations. Information regarding the relevant legislation can be obtained from provincial ministries responsible for the environment and government agencies in the region.

.3 Products that cannot be reused must be treated as hazardous waste and disposed of properly.

.4 Place's products and designated hazardous or toxic materials, including tubes and adhesive used containers and sealant, in areas designated containers for receiving hazardous waste.

.5 To reduce contamination of the soil or waterways and sanitary sewers and storm, strictly observe the following guidelines.

.1 Keep paint wash water and other products based on water so as to allow for the collection by filtration of the various deposited materials. The materials used must in no case be cleaned without recuperating the washing water.

.2 Keep cleaning products, thinners, solvents and excess paint in containers designated for this purpose, and dispose of properly.

.3 Keep rags that were soaked with oil and solvent and eliminate or clean them as appropriate.

.4 Arrange for the removal of contaminants in accordance with regulations for hazardous waste.

.5 Let paint containers dry empty prior to disposal or recycling (in areas with appropriate facilities).

.6 Close and seal the partially used paint product containers, including containers of adhesives and sealants, and store them at a moderate temperature in a well-ventilated area and protected from fire.

.6 Where there is a paint recycling service, collect the excess paint, classify it by type of product and provide transport to a facility for collection or recycling.

1.8 Terms of implementation

.1 Heating, ventilation and lighting

.1 Before starting the repainting work, check whether a continued adequate ventilation can be ensured and if proper heating can bring the temperature to minimum 10 degrees Celsius 24 hours before work begins and maintain these temperatures for the duration of the work and after completion, until the paint is sufficiently cured.

.2 If necessary, provide ventilation for seven (7) days after completion.

.3 Coordinate the use of the existing ventilation system with the owner and, if necessary, make appropriate arrangements for its operation

during and after the execution of works.

.4 Supply and install temporary heating and ventilating equipment necessary if permanent systems cannot be used; if building permanent systems fails to meet the minimum requirements, supply and install the additional equipment required to meet them. It is prohibited to use gas appliances for this purpose.

.5 Before starting painting, check the level of illumination of surfaces for painting, is must be at least 323 lux.

.6 Keep toxic or volatile products in closed containers when not in use. Strictly follow the requirements of manufacturers for handling diluents and volatile solvents.

.2 Ambient temperature, relative humidity and moisture content of the substrate

.1 Unless specific authorization is given previously by the Representatives of the ministry and the manufacturer of the product applied, not to proceed with re-painting work under the following conditions:

.1 The temperature of the ambient air and that of the substrate are less than 10 degrees Celsius;

.2 The surface temperature is above 32 degrees Celsius, unless the paint is applied specifically formulated for implementation at high temperature;

.3 Relative humidity in the work area is greater than 85%.

.2 No paint should be applied when the relative humidity of substrates, measured hygrometer is greater than:

.1 2% for gypsum board, concrete, and the concrete blocks;

.2 5% for wood.

.3 Surface conditions and conditions of installation

.1 Perform painting work in areas where the air is free of airborne dust generated by construction or particles blown by the ventilation system and, therefore, likely to affect the finished surfaces.

.2 Apply paint on surfaces properly prepared and where the moisture content is within the range specified in this section.

.3 Apply paint when the previous coat is dry or cured sufficiently, unless there are other indications previously approved by the manufacturer of the paint or coating.

.4 Do not apply paint in places where work is carried out that give off dust.

.5 Protect against stains and splashes all devices, equipment, furniture, plumbing fixtures and piping with a permanent finish: glazed surface, cast iron, polished bronze, nickel, copper,

aluminum or stainless steel. Removed during the painting, plates of switches and sockets and hardware applied to the surface.

.6 Interrupt painting in places where work is carried out that give off dust.

1.9 Maintenance

.1 Materials / equipment replacement

.1 Submit one (1) container of four (4) liters of each type and each color of primer, paint or finishing product. Identify the color and type of product according to the color list and the specified paint system.

1.10 Guarantee

.1 The Contractor shall provide a warranty of articles of this section, against defective materials and their application, spalling, loss of grip and finished fading, for a period of five (5) years (except for the paint of restored and new windows which will be guaranteed for a period of ten (10) years); from the date of provisional acceptance.

PART 2 - PRODUCTS

2.1 Materials

.1 Approved materials: unless otherwise indicated, for the execution of these works, only use paint materials from the list of approved products issued by ONGC.

.2 Unless otherwise specified, use paint materials that meet standards of ONGC mentioned in the list of paint finishing systems.

.3 Unless otherwise specified, the materials of each paint system must come from a single manufacturer recognized, the selection and approval of the Ministerial representative.

.4 Unless otherwise indicated, colors and finishes will be the choice of the representatives of the Ministry and / or as specified in the plans. Each color and finish will be approved by the Ministerial representative before starting work. Each color and finish will be chosen to match the existing.

.5 All the works in this section should be performed by a skilled laborer amd according to best practices.

2.2 Colors

.1 Conform to the color chart of the color range SICO 6000 or equivalent approved by the architect.

.2 Colors will be applied as indicated by the Ministerial representative, and as indicated in the plans.

2.3 Mixing and color

.1 Color layout coating materials prior to transport to the site, according to the manufacturer's written instructions. This color setting must be previously approved in writing by the owner's representative.

.2 Some diluent may, if necessary, be added to the paint according to the manufacturer's recommendations. Kerosene or similar organic solvent should not be used to dilute the water based paints.

.3 Thin the paint to be applied to the gun according to manufacturer's instructions.

.4 Before and during application, mix thoroughly the paint in the container to break up clumped materials, to ensure complete dispersion of pigments deposited, and to preserve the uniformity of color and gloss of the paint applied.

2.4 Gloss / Sheen

.1 For gloss paint means the degree of gloss paint implementation, according to the values presented in the following table:

	Gloss to 60 degrees	Gloss to 85 degrees
1 - matte finish	more than 5	to 10
2 - velvet finish	to 10	10 à 35
3 – eggshell finish	10 to 25	10 à 35
4 - satin / melamine finish	20 to 35	at least 35
5 – semi-gloss finish	35 to 70	
6 – gloss finish	70 to 85	
7 – ultra gloss finish	More than 85	

.2 brightness levels surfaces coated with paint must comply with the directions and the nomenclature of finishes.

2.5 Paint Systems

.1 **System 1**
Applications: Metal, wood painting
Finish: matt
.1 Prepare surface in accordance with manufacturer recommendations
.2 Apply one coat sanded multi-surface Griptec Sierra
.3 Apply a minimum of 2 enamel topcoat layers of acrylic urethane Metalmax Sierra, color choice of the Ministerial representative.

.2 **System 2**
Applications: Gypsum existing and new
Finish: melamine
.1 Prepare surface in accordance with manufacturer recommendations
.2 Apply primer sealer 850-130
.3 Apply a minimum of 2 coats of finish 855-6XX latex color choice of the Ministerial representative.

.3 The systems described above are not exhaustive. It is up to the Contractor to submit a proposal whenever a painting surface not described above is met, and execute the preparation and application of work based on systems approved by the representatives of the ministry, and as recommended by the manufacturer of accepted materials.

PART 3 - EXECUTION

3.1 General requirements

.1 No paint work will be undertaken when the surface temperature is below 10° C or if there is risk that it falls below that until completely dry.

.2 All adjacent surfaces must be protected during painting operations; take all necessary means to protect everything that should not be painted like: devices, accessories, or surfaces whose finish is final, the Contractor shall repair at his own expense any damage to adjacent surfaces caused by him or his staff.

.3 Prior to commencing work, the Contractor will check all surfaces to be painted and will report any fault which could affect the final result. No work will be undertaken before these defects have been corrected. Check that all nails and screws are driven, well-sanded surfaces, etc. The beginning of work of this section means that the Contractor considers fully

satisfactory surfaces for a perfect finish on all points.

.4 The specified number of layers of paint should normally allow perfect finishes. However, if additional layers are required to achieve an acceptable finished by the Ministerial representative, the Contractor shall provide them free of charge.

.5 All the painting surfaces will be perfectly prepared scrubbed, dusted, cleaned and purged bright dust or any foreign material.

.6 All materials are compatible and will be used as recommended by the manufacturer. The application will be made under adequate lighting perfectly uniform and continuous. Each layer must be dry before applying the next layer. Re-polish with fine sandpaper and make all the fillings; holes, studs and slots of all finished surfaces to painting, after applying the first layer.

.7 All thinners used will by those recommended by the manufacturer for each type of paint used.

.8 Application on large areas can be done by brush, roller or spray gun, provided the work is the product quality and consistency required and that precautions are taken to protect the surrounding parts.

.9 End products should be applied in full coats, with no brush marks, splashed or run offs; if required they must be carefully sanded between each layer. Do not apply additional layer of paint before the first layer has been inspected.

.10 Inspect the work before its completion and ensure that all painted surfaces are properly finished to the satisfaction of the Ministerial Representative.

.11 Make alterations or repairs as are needed to the damaged parts, whether the damage has been caused by the teams of painters or not.

3.2 Manufacturer's instructions

.1 Compliance: Comply with manufacturer's written data, including product technical bulletins, instructions for handling, storage and implementation of products and indications datasheets.

3.3 Examination

.1 Interior surfaces to be painted must be inspected by the painting contractor that will notify the Ministerial representative in writing of any defect or problem before the beginning of the work or after surface preparation if a deterioration of the substrate is exposed at this stage of the work.

.2 If the damage to the substrate is measured at a level between DSD 1 and DSD 3 before the preparing of surfaces, and the work requires a DSD-4 level after the preparatory work, the surfaces where the defects were discovered must, by mutual agreement, be repaired or replaced before the start of repair work and / or patching.

.3 In areas where the paint or plaster coatings (coating elastomers) are to be done or in places where the products are not approved by the MPI systems should be used, the manufacturer must, as part of the work, ensure the certification of surfaces and conditions to be met for the application of paint or coating and the supervision, inspection and approval of, if necessary, paints or coatings applied, at no additional cost.

3.4 Preparatory work

.1 Prepare wood surfaces according to ONGC 85 GP1M standard.
- .1 Cover and seal the knots and resinous surfaces in accordance with CAN / CGSB-1.126-M91.
- .2 Fill cracks and holes with a colored wood filler paste matched to the type of wood.

.2 Unless otherwise stated, prepare the surfaces and paint in accordance with the requirements of the MPI "Maintenance Repainting Manual."

.3 Apply paint products according to the manufacturer's written instructions.

.4 Sand and dust between applying each coat of paint to correct defects visible from a distance of 1.5 m.

.5 Finished surfaces are to be perfectly polished and free of lumps, brush strokes, dirt, excess paint or other defects.

.6 Clean and prepare the interior surfaces, they must be refinished and / or repaired in accordance with the requirements of the MPI "Maintenance Repainting Manual." Refer to this document regarding specific requirements in addition to the instructions below.
- .1 Remove dust, dirt and foreign matter by wiping surfaces with clean dry rags [or by scanning them with a jet of compressed air.

.2 Wash surfaces with detergent and clean warm water, using a stiff bristle brush to rid surfaces of dirt, oil and other contaminants.

.3 Rinse well brushed surfaces with clean water until no more foreign material.

.4 Allow surfaces to drain completely and dry thoroughly. Provide sufficient drying time and check the moisture content of surfaces using an electronic moisture meter before starting work.

.5 Use water-based cleaning products instead of organic solvents in the case of discounts to new surfaces with water paints.

.6 Once dry, many water-based paints cannot be removed with water. It should nevertheless minimize the use of kerosene or other organic solvents similar to the removal of these paintings.

.7 Clean metal substrates including paint coating should be refurbished by removing the rust, dirt, oil, grease and foreign materials as required by the MPI. Eliminate contaminants on surfaces that need to be refurbished and in the corners and recesses of these surfaces using clean brushes, a clean, dry compressed air or by performing a brushing followed a cleaning with a vacuum cleaner.

.8 Before applying primer or paint, and before applying each subsequent layer, make sure the cleaned surfaces are not contaminated with salts, acids, alkalis, corrosive chemicals, grease , oil and solvents. Perform retouching and spot applications of primary or paint, then apply primer or the paint product, painting or any prior treatment product as soon as possible after cleaning, before the surface deteriorates.

.9 Do not apply paint until prepared surfaces are accepted by the Ministerial representative.

.10 Sand and dust between coats as needed to ensure good adhesion of the next layer and to remove any new defect visible within 1,000 mm.

3.5 Existing conditions

.1 Before starting work, examine the conditions observed on site and the existing interior substrates, and report in writing to the Ministerial representative if any damages, unsatisfactory or unfavorable defects or conditions of the substrates that could affect the execution of work are found.

.2 Perform tests to check the moisture content of surfaces using a properly calibrated electronic moisture detector; the moisture content of the concrete floors, however, must be evaluated by a simple "control

coverage." then report the results to the Ministry Representative. The maximum moisture content must not exceed the specified limits.

.3 Do not commence work before the unsatisfactory state or defects have been corrected, and the substrates are deemed acceptable by the contractor responsible for the work and by the painting inspection agency.

.4 The degree of deterioration of the surface should be assessed according to the criteria and using the MPI identifiers defined in the MPI "Maintenance Repainting Manual."

3.6 Protection

.1 Protect interior and exterior surfaces of the building that may be affected by the work as well as appliances and furniture that neighbors should not be painted against the speckles, marks and other damage by using covers or non-messy items caches. If the surfaces in question are damaged, clean and refurbish them as directed by the Ministerial representative.

.2 Protect fixtures, fire door labels and frames.

.3 Protect materials and finished products.

.4 Ensure the protection of the general public and building occupants located in or near the building.

.5 Before the painting, remove the cover plates from electrical equipments, lighting fixtures, the visible elements of door hardware, bathroom accessories and all other accessories, fasteners and surface-installed hardware. Store these items and reinstall them once the painting is completed.

.6 If necessary, cover or move items of furniture and transportable equipment to facilitate repainting work. Put these elements and materials back in place as the work progresses.

.7 As the work progresses, place posters "PEINTURE FRAICHE" / "FRESH PAINT" in the occupied areas.

3.7 Application

.1 Apply paint using the method that best suits the state of the coated substrate to refurbish, either by brush, roller, air pistol and / or high-

pressure airless spray gun. Unless otherwise stated, apply the product according to the manufacturer's instructions. The chosen application method must be approved by the Ministerial representative before the work begins

.2 Sand and dust between applying each coat of paint to correct defects visible from a distance of 1.5 m.

.3 Finished surfaces are perfectly polished and free of lumps, brush strokes, dirt, excess paint or other defects.

.4 Finish the edges protruding above and below the line of vision, according to the requirements specified for surrounding surfaces.

.5 Already existing surfaces to be smoothed are painted in the same plane (wall, ceiling, etc.) will be repainted to the nearest intersections, unless otherwise stated plans.

3.8 Interior and exterior finishing

.1 See paint systems in section 2.5

3.9 Cleaning

.1 Perform cleaning in accordance with Section 01 74 11 - Cleaning and following instructions.

- .1 Remove drips, smudges, splatters, drips of paint, as well as the surplus paint as the work progresses, using materials and methods that will not damage the finish of target surfaces.
- .2 Taking care of quickly clearing the work area of surplus materials and debris, as well as tools, materials and equipment that are no longer needed.
- .3 Quickly clear the work area of surplus materials and debris, as well as tools, materials and equipment that are no longer needed.
- .4 Clean materials and equipment used then remove the wash water, solvents used for cleaning in the case of oil products as well as hardware and cleaning and protective materials (rags, cloths, ribbons, caches and others), paint, solvents, cleaners, as required by the competent authorities securely and following the instructions set out in this section.
- .5 Clean materials and painting equipment in watertight containers for the deposition and later collecting particulates. The waste collected at the end of the cleanup should be recycled or disposed of in a

manner acceptable to the competent authorities.

.6 Recycle paint and coatings products not used during the refurbishment works of paint coatings according to the information provided.

3.10 Final clean up

.1 Clean and reinstall the hardware that was removed.

.2 Remove protections and warning signs as soon as possible after completion.

.3 Remove splashes on exposed surfaces. Remove speckles using a compatible solvent.

.4 Protect freshly painted surfaces against dust and drips to the satisfaction of the Ministerial representative and avoid scratching the new coatings.

.5 Clean areas used for storage, mixing and handling of paint, and cleaning tools and equipment, so that they are in their initial state of cleanliness.

End of section

PART 1 – GENERAL CONDITIONS

1.1 Works included

.1 Supply and installation of accessories in existing and new washrooms on the second floor.

1.5 Shop Drawings

.1 Submit shop drawings or catalog illustrations in accordance with Section 01 33 00.

.2 The shop drawings shall clearly identify the nature and dimensions of the elements, base materials, the finished interior and exterior surfaces, fittings and locks, fasteners, description and dimensions of installation details.

PART 2 - PRODUCTS

2.1 Accessories

.1 Unless otherwise indicated, the accessories will be equivalent to those by "Bobrick".

.2 Supply and install in each washroom:

- .1 In each toilet compartment, one (1) toilet paper dispenser, model B-2892 to supply and install.
- .2 In each women's toilet compartment, one (1) sanitary napkins B receptacle 254 to provide and install.
- .3 In each washroom, one (1) paper towel dispenser with waste receptacle, model B-38032 to provide and install.
- .4 Only for 002 and 007, supply and install one (1) horizontal support bar 36 " (915 mm) in length and one (1) horizontal support bar 18 " (458 mm) long (verify the measure directly on the site and adjust as needed), model B 5806.99, stainless steel, satin finish, non-slip grip hammered with hidden fasteners.
- .5 For each toilet compartment, one (1) clothes hook B-6707 to supply and install.

.6 In each shower room, three (3) model clothes hook B-6707 to supply and install.
.7 In each locker room, one (1) hand soap dispenser model B-2111 to supply and install.
.8 In each locker room, two (2) B-1658 model mirrors tempered glass, dimensions of 460mm x 915mm, to supply and install.

2.2 Manufacturing

.1 Bend and smooth at the wheel joints shaped elements. Use mechanical fasteners only at approved locations.

.2 Smooth surfaces without distorting them. Keep surfaces flat, avoid scratches or dents.

.3 Paint anything that comes in contact with other finishes to prevent electrolysis.

.4 Hot galvanized anchors and fasteners concealed ferrous metal in accordance with CSA Standard G164-M1981.

.5 Fit workshop items and package them with anchors and fittings.

.6 Deliver the site patches and rough-ins in time for their implementation. Provide templates and details and instructions for setting up anchors and inserts.

.7 Provide anchors and steel components needed to install accessories on the wall studs on the frame plates.

PART 3 - EXECUTION

3.1 Installation – general requirements

.1 Install and secure the new accessories as follows:
.1 Wall to the studs: fix the steel support plate to the frame pole before applying the finishing plaster or drywall. Providing the plate sockets or threaded rods.
.2 Hollow masonry units or plaster walls / existing drywall: use toggle bolts secured in the holes in the cell wall or cavity wall.
.3 Walls masonry, marble, stone or concrete: fix a bolt with expansion sleeve lead in the drilled hole.

.4 Toilet compartments: using bolts passing through male / female.

.2 Install and secure the accessories plumb, level, square and lined up with secure screws / bolts.

.3 Fasten the support bars with embedded anchors supplied by the manufacturer of the bars.

.4 Finish cleaning all ceramic surfaces before removing, if necessary, the protective films.

.5 Installation heights: as indicated and in accordance with "BARRIER FREE DESIGN STANDARD - D-10" Public Works Canada, last edition.

.6 Fill distributors with the necessary supply just before the final acceptance of the building.

3.2 Location and quantity

.1 Unless otherwise indicated, install the accessories where indicated and according to the plans and to manufacturer's recommendations. The Ministerial representative will specify the exact locations.

3.3 Cleaning

.1 Clean the installed equipment, and remove all brands on finished surfaces.

End of section

Technical specifications
(Issued for Tender)

FOLDER : 131-21559-10

DATE : MARCH 31, 2016

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Part 1 General

1.1 DESCRIPTION

.1 The present section prescribes the requirements regarding the supply, the erection, the use and the dismantling thereafter of all formwork and falsework required for cast in place concrete works included in the contract.

1.2 RELATED WORK

.1	Concrete Reinforcement	Section 03 20 00
.2	Cast in place Concrete	Section 03 30 00

1.3 REFERENCE STANDARDS

.1 Unless otherwise specified, all concrete formwork shall be done in accordance with CSA-A23.1-09 Standards.

.2 In this section, references are made to standards and publications as listed below; these form integral part of this section and their requirements shall apply, but without any limitations to the requirements of the present section:

.1 Canadian Standard Association (CSA): S269.1-1975: "Falsework for Construction Purpose."

.2 CAN/CSA-S269.3 M92 "Formwork"

.3 Éditeur officiel du Québec: S-2.1,r.6: "Code de sécurité pour les travaux de construction."

1.4 CONTRACTOR RESPONSIBILITY

.1 Assume responsibility for works concerning formwork and falsework. The Ministerial representative's approval of formwork and falsework shop drawings does not release the contractor from his responsibility to supply works complying entirely with plans and specifications.

.2 Assure to know all laws and by-laws governing the design and construction of formwork and falsework and make sure to respect those laws and by-laws. Respect Quebec Code S.2.2, r.6, relative to concrete form supports.

.3 Before the use of formwork and falsework, provide the Ministerial representative with a declaration, stipulating that the formwork and falsework conform with stamped and signed shop drawings, and that they can be used to perform their intended functions.

1.5 FORMWORK AND FALSEWORK DRAWINGS

.1 Execute formwork and falsework shop drawings describing all the elements required to complete the work in accordance with plans and specifications.

.2 Each drawing submitted shall include the signature and the stamp of the Ministerial representative.

.3 Before execution of the formwork or falsework work, shop drawings shall be submitted to the Ministerial representative for review and commentaries.

.4 Clearly indicate on shop drawings the construction method and work schedule, materials, joint arrangements, ties, scaffoldings, interior sidings, and positions of temporary embedded parts. Conform to article 3 of CSA S269.1-1975 Standard relatively to the design of falsework shop drawings.

.5 In addition to details specified in article 1.5.4, for each location where falsework is fixed to or applies a force on an existing structure or on the structure being executed, shop drawings shall specify the size and direction of the maximum forces transmitted to the structure considering all field construction loads.

1.6 FORMWORK AND FALSEWORK DESIGN

.1 Design falsework according to the state of the art rules by paying attention not to transmit to the structure being executed, loads exceeding those for which these structures were designed.

.2 Take into consideration the construction sequences while designing false work. Describe on shop drawings, or in a complementary note, the order and utilisation mode of formworks, the position of planned construction joints, and the reutilization principle for formwork and falsework. That complementary note or related shop drawings shall be approved by the Ministerial representative.

Part 2 Products

2.1 MATERIALS

.1 All formwork material in direct contact with fresh concrete shall be approved by the Ministerial representative.

.2 Building Timber :

- .1 In contact with the concrete:
  - .1 Formwork plywood.
- .2 Other:
  - .1 Straight sawed, non warped framing timber
  - .2 Framing Steel

.3 In case of exposed concrete surfaces, use only new formwork materials. Exposed surfaces are the surfaces which are visible on the mechanical process and architectural plans.

.4 Falsework materials : complying with CSA S269.1-1975 Standard, Table 1. Materials shall bear grade marks or be accompanied by certificates, test reports or other proof of conformity.

.5 Form release agent : chemically active release agents containing compounds that react with free lime present in concrete, to provide water insoluble soaps, preventing the adhesion of concrete to the formworks.

.6 Form ties shall be:

- .1 Form ties equipped with a moulded water barriers on both ends for all the works. These form ties must be equipped at both ends of plastic cones which have a minimum diameter of 25 mm and assuring that after their removal with a minimum set back of 25 mm.

.7 Sleeves, ties, anchors or other concrete embedded parts shall be as required in plans or in specifications and shall comply with section 8 of CSA-A23.1-09 Standard.

.8 Filling mortar of the form ties holes: mortar with Portland cement polymer modified.

Part 3 Execution

3.1 FORMWORK AND FALSEWORK CONSTRUCTION

.1 Unless otherwise specified, forms shall be executed and used in accordance with CSA-A23.1-09 Standard.

.2 Before use, treat the formwork surfaces with form release agents according to section 11.3.3 of CSA-A23.1-09 Standard

.3 Before using the formwork and falsework, alignments, levels and column centres must be verified and exact duplication of dimensions with plans and specifications must be assured.

.4 Forms must be constructed to produce finished concrete conformed to shapes, dimensions, levels, and locations indicated in the plans and specifications. Appropriately brace forms and fix them together in such a way so as to keep their shapes and positions throughout the placing of concrete and maintain them such until the final setting of the concrete.

.5 Tolerances for localisation and geometrical configuration of concrete elements after removal of forms, in relation with indications in plans and specifications, should respect the tolerances prescribed by the section 10 of the CSA-A23.1-09 Standard.

.6 Construct falsework in accordance with CSA S269.1-1975 Standard.

.7 Obtain the Ministerial representative's written permission before framing openings not indicated in a concrete structural element, if such an opening is required for construction purposes.

.8 Form joints shall be aligned and made watertight to prevent any lost of mortar. The number of joints shall be kept to a minimum.

.9 All concrete surfaces that will be apparent after removal of formwork shall be formed using symmetrical arrangement of joints and symmetrical positions for form ties, submitted to the approval of the Ministerial representative.

.10 Grooves, dovetails, mouldings, slots, mortises opening, drips and recesses, as well as expansion and construction joints shall be constructed as indicated on plans and specifications.

.11 Form, braces and supports shall be installed in such a way as to allow for their removal without shock and damage to the concrete.

.12 Except in the cases where new formwork materials are required, they can be reused after a sufficient cleaning and assurance that surfaces are not chipped or rough; in this latter case, cut and patch the formworks to the satisfaction of the Ministerial representative.

.13 Forms shall be provided with openings or other devices to allow for inspection and cleaning of formwork, as well as placing and consolidation of concrete.

.14 Advise the Ministerial representative before the closing of forms to allow for the required inspection. Placing of concrete in the formwork is forbidden as long as Contractor has not received approbation of the Ministerial representative.

.15 Use 25 mm bevelled bands 20 mm for salient angles of the beams, joints and columns, unless otherwise specified.

3.2 ANCHORS, SLEEVES AND EMBEDDED PIECES

.1 Provide and install in the formwork the anchors, ties anchoring plates and other embedded pieces required on the plans and specification, according to section 13 of the CSA-A23.1-09 standard.

.2 Provide and install in the formwork the anchoring bolts for machinery ties required on the plans and specification, according to section 13 of the CSA-A23.1-09 standard.

.3 In all cases, respect the laying allowances specified in article of CSA A23.1-09 standard

.4 In the slabs, place the ducts between the superior reinforcement row and the inferior reinforcement row.

.5 Install the sleeves, ducts or pipes respecting the following requirements:
- .1 The interior diameter of the sleeve, duct or pipe shall not be superior to the third or the thickness of the beam, the slab of or of the wall in which they are embedded;
- .2 The interaxial distance between to adjacent elements must be superior or equal to three (3) diameters;
- .3 These pieces must not be situated such as to reduce the resistance of the structure;
- .4 These pieces must not be embedded in floor slab subjected to bad weather conditions.

.6 If the requirements of article 3.2.6 cannot be respected advise the Ministerial representative and wait for his instructions on how to proceed.

.7 Ensure that aluminium sleeves, ducts or pipes embedded in concrete be covered or adequately coated such as to avoid reactions causing rusting of aluminium.

3.3 FORMWORK AND FALSEWORK REMOVAL

.1 Authorization of the Ministerial representative is required before the formwork and falsework removal.

.2 The stripping of forms and removal of falsework for slabs is not permitted before a minimum period of 7 days following the end of the placing of concrete.

.3 Taking into account atmospheric conditions, concreting method and curing conditions, the Engineer may impose a minimum period of time to be respected before the stripping of different casting.

3.4 FILLING OF FORMWORK TIE HOLES

.1 Fill in all the conical cavities left in after the removal of the plastic cones on the extremities of the formwork ties with a polymer modified mortar. Moisten previously as requested by the manufacturer. Carefully smooth after the application of the mortar on the surface such that they melt in onto the adjacent concrete surfaces. Insure curing.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 The present section prescribes the requirements relatively to the supply and the installation of concrete reinforcement used for concrete and masonry works.

1.2 RELATED WORK

.1	Formwork and Falsework	Section 03 10 00
.2	Cast in place Concrete	Section 03 30 00

1.3 REFERENCE STANDARDS

.1 Execute concrete reinforcement works in accordance with the requirements of CSA-A23.1-09 Standard and its supplements and in accordance with the National Building Code of Canada 2010 and its supplement, unless otherwise stipulated.

.2 The other standards or publications are mentioned in this section of the specifications; these form integral part of it and their requirements shall apply not limiting the application the other requirements of the present section :

.1 Canadian Standard Association (CSA):

.1 CAN/CSA-G30.18-M92: ''Billet Steel Bars for Concrete Reinforcement ''

.2 G30.3-M1983 (R1991): ''Cold Drawn Steel Wire for Concrete Reinforcement''

.3 G30.5-M1983 (R1991): ''Welded Steel Wire Fabric for Concrete Reinforcement''

.4 W186-M90: ''Welding of Reinforcing Bars in Reinforced Concrete Construction''

.5 CAN3-A23.3-94: Design of Concrete Structures for Buildings

.2 Reinforcing Steel Institute of Canada:

.1 Manual of Recommended Standards, lastest edition.

1.4 SAMPLING TESTING AND INSPECTION

.1 Allow and facilitate free access for Ministerial representative to plant and field at any time, to allow him to verify, investigate and supervise quality of materials and to select, if required, samples for testing, proofs or analyses.

.2 Concrete placing is not authorized as long as Ministerial representative has not inspected and approved the placement of the concrete reinforcing bars.

1.5 SHOP DRAWINGS

.1 Submit shop drawings for review and approval by the Ministerial representative any concrete reinforcement required for the works.

.2 The shop drawings shall clearly indicate the dimension of the bars, the spacing and location detail for each type of reinforcing bar and the location of bar supports, spacers, chairs, couplers, additional bars and all other accessories necessary to support and fix the reinforcement.

.3 Unless otherwise stipulated, use the details for concrete reinforcement in accordance with the requirements of the "Manual of Recommended Standards" published by the "Reinforcing Steel Institute of Quebec", last edition.

.4 Wait for the final approval of the shop drawings before proceeding with the cutting and fabrication of the reinforcing bars.

.5 Submit steel report with shop drawings.

.6 Take into account the pouring sequences at the construction joints and bring the necessary changes to them.

Part 2 Products

2.1 MATERIALS

.1 Reinforcing steel: steel crenelated bars, billet steel of Canadian fabrication in accordance with the CAN/CSA G30.18-M92 Standard. Required grade is 400 MPa and required category is regular (R). Provide one piece bars with required lengths and bents.

.2 Wire ties: smooth, cold drawn annealed steel wire equal or superior in diameter to 16 Ga. (U.S. Steel Wire gauge).

.3 Supports: in accordance with the CSA-A23.1-09 Standard, rust proof in plastic, galvanised steel or approved equivalent.

2.2 SUBSTITUTES

.1 The Ministerial representative's written authorization shall be required for any substitution of specified reinforcement size and modifications to spacing, overlapping or bending as shown on drawings.

2.3 FABRICATION

.1 Bars should be fabricated in shop in accordance with the requirements of CSA-A23.1-09 Standard.

.2 Fabrication tolerances shall be those shown in chapter 6 of « Manual of Recommended Standards » published by the « Reinforcing Steel Institute of Québec». Reinforcing bars that do not comply with these tolerances shall be rejected.

2.4 MARKING

.1 Clearly identify the bundles of reinforcing steel bars in accordance with the bar lists and the shop drawings, before shipping to the site.

.2 Use reinforcing steel bars that are marked during fabrication. The mark identifies the size, the quality and the manufacturer. Any unmarked bar will be rejected.

Part 3 Execution

3.1 SITE BENDING

.1 Unless otherwise indicated or expressly authorised by Ministerial representative, do not bend reinforcing steel bar on site.

3.2 PLACING

.1 Accurately assemble and carefully place reinforcing steel bars and fix them using plain cold drawn annealed steel wire. Use an arrangement and a number of supports in accordance with the Section 12.7 of CSA-A23.1-09 Standard.

.2 Place reinforcing steel bars and maintain them in position during placing of concrete using tolerances provided in Section 12.8 of CSA A23-1-00 Standard.

.3 Unless otherwise shown on drawings, the minimal net thickness of concrete coating on reinforcing bars shall be as provided in the following table:

.1 Concrete cast on the ground: 75 mm

.2 Concrete in direct contact with water or the ground after the removal of formwork and concrete exposed to bad weather conditions: 50 mm

.3 At other locations: 50 mm

3.3 WELDING

.1 Unless written authorization from the Ministerial representative, welding of reinforcing steel bars is not permitted.

.2 When authorized by Ministerial representative, execute reinforcing steel welding works in accordance with Section 12.10 of CSA-A23.1-09 Standard and with requirements of CSA W186 Standard. When a weld is executed, the use of bars of weldable category (W) is mandatory.

3.4 SHIPPING AND STORAGE

.1 Deliver the reinforcing steel bars and the wire mesh sheets to site in clearly identified bundles.

.2 Handle the reinforcing steel bars and the wire mesh sheets with care in order to avoid deformation.

.3 Immediately upon arrival on site, pile suitably reinforcing steel bars and wire mesh sheets on wood timbers to avoid rust and contact with soil.

.4 Cover reinforcing steel with woven canvas to protect from bad weather and snow.

3.5 CLEANING

.1 Before the placing of concrete, reinforcing steel surfaces shall be in accordance with Section 7.5 of CSA-A23.1-09 Standard.

.2 If required, the contractor shall clean the concrete reinforcing bar immediately before the placing of concrete.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 The present section prescribes the requirements regarding the supply, the installation, the finishing, the protection and the curing of cast in place concrete.

1.2 RELATED WORK

.1	Formwork and falsework	Section 03 10 00
.2	Concrete reinforcement	Section 03 20 00

1.3 REFERENCE STANDARDS

.1 The following standards and publications are mentioned in this section of the specifications; they form an integral part of it and their prescriptions shall apply, but without limiting the other prescriptions of the present section :

.1 Canadian Standard Association (CSA)

- CSA-A23.1-09: "Concrete, Materials and Methods of Concrete Construction"
- CSA-A23.2-09: "Methods of Tests for Concrete"
- CSA-A23.3-94: "Design Rules, Concrete Structures for Buildings"
- CAN/CSA-A23.5-98 (R1992): '' Supplementary Cementing Materials''
- CSA-A5/A362-98: "Portland Cements, Blended Hydraulic Cements"
- CAN3-A266.1-M78: "Air Entraining Admixtures for Concrete"
- CAN3-A266.2-M78: "Chemical Admixtures for Concrete"
- CAN3-A266.6-M85: "Superplasticizing Admixtures for Concrete"

.2 National Research Council of Canada :

- National Building Code of Canada 2010 and its supplement

.3 Quebec Publication

- "Cahier des charges et des devis généraux, latest edition''.

Part 2 Products

2.1 MATERIALS

.1 Cement: type GUSF Portland cement complying to the CSA/A23.5-98 Standard or with the CSA-A5/A8/A362-98 Standard. Only one brand of accredited cement should be used for the entire job.

.2 Fine aggregates: of normal volumetric mass, meeting the requirements of articles 5.1, 5.2 and 5.3 of CSA-A23.1-09 Standard. It can be either a natural sand or a manufactured sand with at least 20 percent of natural sand.

.3 Coarse aggregates: of normal volumetric mass, meeting the requirements of articles 5.4, 5.5 and 5.6 of CSA-A23.1-09 Standard. Particles shall be clean, durable, without dust and deleterious substances and they shall contain less than 10% of flat or elongated particles. The loss shall be less than 12% when submitted to 5 cycles of the magnesium sulphate durability test. The loss shall be less then 50% when submitted to the Los Angeles abrasive test. The aggregates cannot be made of fine grain limestone or of crystalline limestone. Dolomite is acceptable. The grading shall be the one corresponding to a maximum size of aggregate of 20 mm, unless otherwise stipulated. With the approval of the Ministerial representative, a maximum size of aggregates of 13 mm, in some location where casting is difficult can be used.

.4 Mixing water: in accordance with section 4 of the CSA-A23.1-09 Standard.

.5 Air carrier agent: in accordance with the CAN3-A266-1-M78 Standard.

.6 Superplasticizing agents (when required): in accordance with the CAN3-A266.6-M85 Standard.

2.2 DESIGN OF CONCRETE MIXES

.1 Contractor is responsible for the batching of each required concrete type, based on requirements described in section 2.1 and on the following criteria, in accordance with alternative no. 1, table 13 of CSA-A23.1-00 (article 17.1):

.1 Mix no 1: Structural concrete for general use

Concrete for footing, for walls, for structural slabs (on the ground or not), for columns, beams, bottom slabs, and all the work on the new construction:

.1 Cement type: 10SF

.2 Minimal compressive strength, confirmed by tests at 28 days: 35 MPa

.3 Condition of exposure (table no.1, CSA-A23.1-00): C-1

.4 Air content : 5 to 8 %

.5 Maximum water/ bonding agent (cement + cementing additive) ratio (by mass) : 0,40

.6 Required slump at point of discharge: 80 mm ± 20 mm

.7 Concrete of normal density

.2 Mix no 2: Structural concrete for general use with large aggregates of 13 mm with or without superplasticizers.

For usage identical to mix no.1 and no.2, but for concreting in hard to reach places, with the approbation of the Ministerial representative:

.1 Mix identical to mix no.1 except for the following requirements

.1 The maximum size of the large aggregate is 13 mm

.2 The desired slum at point of discharge can be of 140 ± 40 mm with the use of superplasticizers

.2 For all parts of the structure, the design of the concrete mix is homogeneous and, when hardened, the concrete has the strength, the degradation resistance, the durability, the appearance and other proprieties required by the current specifications.

.3 Provide a sample of the used admixtures each time the Ministerial representative requires it.

.4 If admixtures are used, follow manufacturer's recommendations.

.5 The Contractor is responsible for making sure that the admixtures and materials used together in the mix are compatible amongst themselves and with the materials used for the mix.

.6 Write down type and quantity of admixture(s) used on concrete delivery slip.

.7 Use of admixture shall not affect concrete durability and its resistance to freezing and thawing.

2.3 APPROVAL OF CONCRETE MIXES BATCHING

.1 Provide a document stating that the mixing plant, the equipment and the materials used to fabricate concrete comply with the requirements of the CSA-A23.1-09 Standard.

.2 Submit the mix formulation(s) for approval to the Ministerial representative as well as a document stating that the chosen batching will produce a concrete of adequate quality, having required performance and strength, in accordance with article CSA-A23.1-09 Standard.

.3 The Ministerial representative approval of the mix formulation(s) does not relieve Contractor responsibility to provide a concrete with properties meeting the requirements of the present specification, either before or after the set of the concrete.

2.4 CONCRETE QUALITY CONTROL

.1 The Contractor is the only one responsible of all concrete works required to complete jobs, as shown on drawings or required in specifications. Any defective works under this specification, for any reason, (quality of materials, mixing, placing of concrete, resistance, imperviousness, etc...) shall be modified in accordance to the Ministerial representative's instructions or shall be totally or partially demolished and rebuilt to comply with drawings and specifications, at Contractor's expenses.

Part 3 Execution

3.1 GENERAL

.1 Prior to the beginning of works, obtain the Ministerial representative approval for methods of placing concrete that should be in accordance with section 19 of CSA-A23.1-09 Standard.

.2 Obtain the Ministerial representative authorization prior to placing concrete and notify him minimum 24 hours in advance. To this effect the contractor will submit to the Ministerial representative an authorization demand for placing the concrete, where all the concerned sub-contractors will attests to the completion of the required works. This demand will include all information relevant to the pouring.

.3 Ensure that reinforcement and inserts are not free to move during concrete placement.

.4 Prior to concreting, obtain the Ministerial representative's authorization for the proposed method of concrete protection during placing and subsequent curing.

.5 Keep a record of concrete placing showing date and location of each pour, concrete characteristics, trucks numbers, exterior temperature, taking of samples and other relevant information. A copy of this record will be given to the Ministerial representative at the end of the works.

.6 Clean carefully and remove all rubbish and debris of any nature in space where concrete will be placed immediately before pouring concrete.

3.2 CONCRETE FABRICATION AND DELIVERY

.1 Supply a ready mixed type concrete, plant fabricated, delivered and discharged on site according to section 18 of the CSA A23.1-09 Standard, or supply field batched concrete conforming to all requirements of this same section. If the second alternative is chosen, submit the entire fabrication process for approval by the Ministerial representative.

2. Request a delivery slip from the concrete supplier for each concrete load and submit one copy of this slip to the Ministerial representative. The following information shall be recorded on slip: Corporate name and address of the supplier, truck number, contractor's name, project designation and location, type of concrete, cumulative quantity, time at beginning of unloading, time at end of unloading, maximum size of aggregates, required slump and air content, types and quantities of admixtures used, type and quantity of cement and quantity of water.

.3 No water shall be added after the initial mixing unless it is made in strict accordance with article 18.4.3.2 of CSA-A23.1-09 Standard. Submit all additions to the approval and control of the Ministerial representative. Record on the delivery slip the quantity of all water additions at the unloading point.

.4 Do not remix concrete or mortar which have started to set.

.5 Concrete temperature at point of unloading shall be within the limits of table 16 of the CSA A23.1-09 standard and shall be verified in accordance with article 18.4.4 of same Standard. Use all the required protection methods to that effect.

.6 The use of aluminium in any material used in mixing, delivery or placing of concrete is forbidden.

3.3 PLACING OF CONCRETE

.1 The placing of concrete shall be in accordance with the CSA-A23.1-09 Standard.

.2 Consolidate concrete with mechanical vibrators which models and size are approved by the Ministerial representative.

.3 Choose a type and an adequate number of vibrators and use in accordance with section 19.5 of CSA-A23.1-09 Standard.

.4 Connect the new concrete with rock or hardened concrete in accordance with section 19.2 of CSA-A23.1-09 Standard.

.5 Saturate with water hardened concrete surfaces immediately prior to placing new concrete on these surfaces.

.6 Comply with indications of section 20 of CSA-A23.1-09 Standard regarding construction joints. Execute shear keys on the entire length of any construction joint. Those keys shall have a depth equal to a sixth of that thickness, with a maximum of 100 mm. Slightly bevel sides of shear keys. In all cases, the construction joints will have a waterstop.

3.4 CONCRETE CURING

.1 Concrete curing is realized in accordance with the CSA-A23.1-09 standard, chapter 21.

.2 The use of curing compounds if forbidden.

.3 Concrete curing is insured by the use of a jute kept constantly moist.

.4 Slabs and other unformed concrete surfaces are kept moist for a period of at least 7 days.

.5 When the outside weather exceed 20°C for mass concrete or 27°C otherwise, keep the formwork moist prior to pouring the concrete and during the entire where they are kept in place.

.6 By cold weather, wet concrete curing ends 12 hours before the end of the protection.

3.5 CONCRETE PROTECTION

.1 By hot weather, the concrete is protected according to article 21.2.2 of the CSA A23.1-09 standard.

.2 Concrete elements containing silica fumes are protected against drying according to article 21.2.2.3.2.

.3 The protection of other elements against drying is established according to annexe D of the CSA A23.1-09 standard.

.4 By cold weather, the concrete is protected according to article 21.2.3 of the CSA A23.1-09.

.5 The concrete protection methods for cold weather are the ones detailed in '' Cahier des charges et devis généraux'', latest edition, Chapter 30.7.18.

3.6 FINISHING

.1 Unless otherwise stipulated, finish the floor surfaces and the unformed concrete surfaces in accordance with section 22 of the CSA-A23.1-09 Standard.

.2 Unless otherwise stipulated, the top surfaces of unformed concrete slabs shall be finished with a manual spreading of the surface, following with a wood trowel levelling.

.3 For the top surfaces of concrete slabs, the tolerance class for the finish, measured in accordance with article 22.1.2 of CSA A23.1-09 Standard, (straight ruler method) is as follows

.1 Class A: Conventional (smooth) 8 mm in 3 m.

3.7 FINISHING OF FORMED SURFACES

.1 Finish surfaces according to section 24 of the CSA A23.1-09 Standard. A smooth formwork finish according to article 24.3.6 of the CSA-A23.1-09 standard is required for the interior surface of the basins and undercuts and on the surfaces exposed to vu in finished buildings. A rough formwork finish according to article 24.3.5 of CSA-A23.1-09 standard is required on all other formed surfaces.

.2 In all cased, fill the holes left by the tie-rods with a polymer modified mortar for which the smoothed surface will have to melt-in with the concrete. Fill only the hole, without staining the adjacent surface.

END OF SECTION

PART 1 - GENERAL

1.1 DEFINITIONS

1. « C » means by the CONTROL trade
2. « G » means by the GENERAL contractor
3. « P » means by the PLUMBING trade

1.2 SCOPE OF WORK

1. Trades shall comply, **without limitation to**, with the following sections :

Section	***Title***	***Specialty***
21 05 01	COMMON WORK RESULTS FOR MECHANICAL	All
22 11 16	DOMESTIC WATER PIPING	P
22 13 18	DRAINAGE WASTE AND VENT PIPING – PVC DWC	P
22 30 05	DOMESTIC WATER HEATERS	P
22 42 01	PLUMBING SPECIALTIES AND ACCESSORIES	P
23 05 05	INSTALLATION OF PIPEWORK	P
23 05 48	VIBRATION AND SEISMIS CONTROLS FOR HVAC PIPING AND EQUIPMENT	All
23 05 53.01	MECHANICAL IDENTIFICATION	All
23 05 93	TESTING, ADJUSTING AND BALANCING FOR HVAC	V
23 07 13	DUCT INSULATION	V
23 07 15	THERMAL INSULATION FOR PIPING	P
23 31 13.01	METAL DUCTS – LOW PRESSURE TO 500 PA	V
23 33 00	AIR DUCT ACCESSORIES	V
23 33 15	DAMPERS - OPERATING	V
23 37 20	LOUVRES, INTAKES AND VENTS	V

PART 2 - PRODUCTS

2.1 Not used

PART 3 - EXECUTION

3.1 Not used

END OF SECTION

PART 1 - GENERAL

1.1 SUBMITTALS

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

.2 Shop drawings and product data accompanied by:
- .1 Acoustical sound power data, where applicable.
- .2 Points of operation on performance curves.
- .3 Manufacturer to certify current model production.
- .4 Certification of compliance to applicable codes.

.3 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

.4 Closeout Submittals:
- .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative and Consultant before final inspection.
- .3 Approvals:
  - .1 Submit 2 copies of draft Operation and Maintenance Manual to Consultant for approval. Submission of individual data will not be accepted unless directed by Consultant.
  - .2 Make changes as required and re-submit as directed by Consultant.
- .4 Site records:
  - .1 Consultant will provide (1) set of reproducible mechanical drawings. Provide sets of prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
  - .2 Transfer information to reproducibles, revising reproducibles to show work as actually installed.
  - .3 Use different colour waterproof ink for each service.
  - .4 Make available for reference purposes and inspection.

.5 As-built drawings:
- .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
- .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
- .3 Submit to Consultant for approval and make corrections as directed.
- .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.

.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
.6 Submit copies of as-built drawings for inclusion in final TAB report.

1.2 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

1.3 DELIVERY, STORAGE, AND HANDLING

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling.

1.6 ACCEPTABLE PRODUCTS OR MATERIALS

.1 When materials or products are specified via a trademark, refer to the "Instructions to the bidders" for the procedure to follow in order to submit an equivalent product for approval.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Materials and products in accordance with good sustainable constructions practices.

PART 3 - EXECUTION

3.1 PAINTING REPAIRS AND RESTORATION

.1 Do painting in accordance with Section 09 91 23 - Interior Painting.

.2 Prime and touch up marred finished paintwork to match original.

.3 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

.1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.
.2 In accordance with Section 01 74 11 – Cleaning.

3.3 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME)
- .1 ANSI/ASME B16.15, Cast Bronze Threaded Fittings, Classes 125 and 250.
- .2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
- .3 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- .4 ANSI/ASME B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.

.2 ASTM International Inc.
- .1 ASTM A 307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 ASTM A 536, Standard Specification for ductile Iron Castings.
- .3 ASTM B 88M, Standard Specification for Seamless Copper Water Tube (Metric).

.3 American National Standards Institute/American Water Works Association (ANSI)/(AWWA)
- .1 ANSI/AWWA C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

.4 Canadian Standards Association (CSA International)
- .1 CSA B242, Groove and Shoulder Type Mechanical Pipe Couplings.

.5 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
- .1 MSS-SP-67, Butterfly Valves.
- .2 MSS-SP-70, Gray Iron Gate Valves, Flanged and Threaded Ends.
- .3 MSS-SP-71, Gray Iron Swing Check Valves, Flanged and Threaded Ends.
- .4 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.

.6 National Research Council (NRC)/Institute for Research in Construction
- .1 NRCC 38728, National Plumbing Code of Canada (NPC) - [1995].

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

- .1 Provide manufacturer's printed product literature and datasheets for insulation and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

PART 2 - PRODUCTS

2.1 PIPING

.1 Domestic hot, cold and recirculation systems, within building.
- .1 Above ground: copper tube, hard drawn, type K: to ASTM B 88M.
- .2 Buried or embedded: copper tube, soft annealed, type K: to ASTM B 88M, in long lengths and with no buried joints.

2.2 FITTINGS

.1 Bronze pipe flanges and flanged fittings, Class 150: to ANSI/ASME B16.24.

.2 Cast bronze threaded fittings, Class 125: to ANSI/ASME B16.15.

.3 Cast copper, solder type: to ANSI/ASME B16.18.

.4 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.

.5 NPS 1-1/2 or smaller: forged copper to ANSI/ASME B16.22 and ANSI/ASME B16.18, with stainless steel 301 internal parts and EPDM gasket, suitable for 1380 kPa continuous service pressure.

2.3 JOINTS

.1 Rubber gaskets, latex-free 1.6 mm thick: to AWWA C111.

.2 Bolts, nuts, hex head and washers: to ASTM A 307, heavy series.

.3 Solder: 95/5.

.4 Teflon tape: for threaded joints.

.5 Grooved couplings: designed with angle bolt pads to provide rigid joint, complete with EPDM flush seal gasket.

.6 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

2.4 GLOBE VALVES

.1 NPS2 and under, soldered:
- .1 To MSS-SP-80, Class 125, 860 kPa, bronze body, renewable composition disc, screwed over bonnet as specified Section 23 05 23.01 - Valves - Bronze.

.2 NPS 2 and under, screwed:
.1 To MSS-SP-80, Class 150, 1 MPa, bronze body, screwed over bonnet, renewable composition disc as specified Section 23 05 23.01 - Valves - Bronze.

2.5 BALL VALVES

.1 NPS 2 and under, screwed:
.1 Class 150.
.2 Bronze body, chrome plated brass or stainless steel ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle as specified Section 23 05 23.01 - Valves - Bronze.

PART 3 - EXECUTION

3.1 APPLICATION

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

3.2 INSTALLATION

.1 Install in accordance with NPC and local authority having jurisdiction.

.2 Install pipe work in accordance with Section 23 05 05 - Installation of Pipework, supplemented as specified herein.

.3 Assemble piping using fittings manufactured to ANSI standards.

.4 Install CWS piping below and away from HWS and HWC and other hot piping so as to maintain temperature of cold water as low as possible.

.5 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.

.6 Buried tubing:
.1 Lay in well compacted washed sand in accordance with AWWA Class B bedding.
.2 Bend tubing without crimping or constriction. Minimize use of fittings.

3.4 VALVES

.1 Isolate equipment, fixtures and branches with ball valves.

3.5 PRESSURE TESTS

.1 Conform to requirements of Section 21 05 01 - Common Work Results for Mechanical.

.2 Test pressure: greater of 1 times maximum system operating pressure or 860 kPa.

3.6 FLUSHING AND CLEANING

.1 Flush entire system for 8 h. Ensure outlets flushed for 2 h. Let stand for 24 h, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean copper and CPVC to Provincial potable water guidelines. Let system flush for additional 2 h, then draw off another sample for testing.

3.7 PRE-START-UP INSPECTIONS

.1 Systems to be complete, prior to flushing, testing and start-up.

.2 Verify that system can be completely drained.

.3 Ensure that air chambers, expansion compensators are installed properly.

3.8 DISINFECTION

.1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction.

.2 Upon completion, provide laboratory test reports on water quality for approval.

3.9 START-UP

.1 Timing: Start up after:
- .1 Pressure tests have been completed.
- .2 Disinfection procedures have been completed.
- .3 Certificate of static completion has been issued.

.2 Provide continuous supervision during start-up.

.3 Start-up procedures:
- .1 Establish circulation and ensure that air is eliminated.
- .2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.

.3 Bring HWS storage tank up to design temperature slowly.
.4 Monitor piping HWS and HWC piping systems for freedom of movement, pipe expansion as designed.
.5 Check control, limit, safety devices for normal and safe operation.

.4 Rectify start-up deficiencies.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 National Plumbing Code

PART 2 - PRODUCTS

2.1 PIPING

.1 Underground and above ground drainage and vent piping :

.1 DN 4 and smaller: PVC DWV piping shall be certified to CSA B181.2. It shall be tested and listed in accordance with CSA/ULC S102.2 and clearly marked with the certification logo indicating a Flame Spread Rating not more than 25 and Smoke Developed Classification not exceeding 50.

.2 Approved product: System 15 from Ipex, or equivalent.

2.2 FITTINGS

.1 Underground fittings.

.1 PVC DWV male and female sockets provided by the same manufacturer as the installed piping, listed in accordance with norm NQ3624-130 and 135. Fittings shall be approved by piping manufacturer and shall be certified to CSA B181.2.

.2 Approved product: System 15 from Ipex, or equivalent.

.2 Above ground fittings.

.1 PVC DWV male and female sockets provided by the same manufacturer as the installed piping, listed in accordance with norm NQ3624-130 and 135. Fittings shall be approved by piping manufacturer and shall be certified to CSA B181.2.

.2 Approved product: System 15 from Ipex, or equivalent.

2.3 JOINTS

.1 Joints for PVC DWV piping: welded joints using adhesive solvent (system 15 from IPEX or equivalent) certified to CSA and complying with ASTM D2564 requirements. Use appropriate bonding method based on manufacturer's recommandations.

2.4 FIRE-RATED PARTS

.1 Fire-rated parts installed on PVC DWV piping shall be certified to CAN4-S115 and tested to a 50 Pa pressure differential. Fire-rated parts are mandatory when crossing a vertical or horizontal partition.

.2 Approved product: FirePro from IPEX, or equivalent, and complying with piping manufacturer's recommendations.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install in accordance with NPC and local authority having jurisdiction.

.2 Install pipe work in accordance with Section 23 05 05 - Installation of Pipework, supplemented as specified herein.

.3 Install underground piping as shown, on a clean compact sand bed free of clay, snow, ice and rocks. The bed shall be 150mm (6'') thick shaped, for socketed piping, so to perfectly follow the females end fittings. Backfill with clean sand.

.4 Install piping at indicated levels, parallel and close to walls and ceilings in order to clear up as much as possible the installation area.

.5 When slope is not specified, piping shall be sloped to comply with plumbing code.

.6 Plug piping and fittings with caps to protect the installation from debris generated during construction.

.7 No drainage piping shall be hidden without the client or building inspector's authorization.

3.2 TESTING AND INSPECTION

.1 All drainage and vent systems shall be inspected and approved by the plumbing inspection service from the Régie du bâtiment.

.2 Test in accordance with the National Plumbing Code of Quebec and the manufacturer's recommendations. Provide all necessary equipment and labor to complete testing.

3.3 CERTIFICATION OF COMPLIANCE

.1 Upon work completion, obtain a certification of compliance issued from the piping inspection service from the Régie du bâtiment. Provide the letter to the client stating the the plumbing work completed complies with all requirements from the National Plumbing Code.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)
- .1 CAN/CSA C22.2 No.110, Construction and Test of Electric Storage Tank Water Heaters.
- .2 CAN/CSA-C191, Performance of Electric Storage Tank Water Heaters for Household Service.
- .3 CAN/CSA-C309, Performance Requirements for Glass-Lined Storage Tanks for Household Hot Water Service.

PART 2 - PRODUCTS

2.1 ELECTRIC WATER HEATER (CE-1)

.1 Commercial electric water heater for intensive usage, capacity of 450 L (119 gus), recovery of 140 L/h (37 gus/h) at a temperature of 100 °F, 3 elements of 3.0 kW, single phase or triphase, glass-lined interior, 150 psi working pressure, insulation meets ASHRAE–90.1b-1992 and ASHRAE/IESNA–90.1-2004 standard, low watt density 24k Goldenrod elements with superior scaling resistance, providing longer life and more surface to heat water, elements, thermostats and internal wiring circuits are protected against excess current flow, one temperature control (adjustable through a range of 120 °F to 180 °F) and manual reset high temperature cut-off per element, panel control box, 2 anode rods for maximum corrosion protection, brass drain valve, T & P relief valve, cabinet has bonderized undercoating with baked enamel finish

.2 Product : model DRE-120-9 Gold from AO Smith, or approved equivalent.

2.2 ELECTRIC WATER HEATER (CE-2)

.1 Hot water heater identical to CE-1.

2.3 TRIM AND INSTRUMENTATION

.1 Drain valve: NPS 1 with hose end.

.2 Thermometer: 100 mm dial type with red pointer and thermowell filled with conductive paste.

.3 Pressure gauge: 75 mm dial type with red pointer and shut-off cock.

.4 Thermowell filled with conductive paste for control valve temperature sensor.

.5 ASME rated temperature and pressure relief valve sized for capacity of heating system, having discharge terminating over floor drain and visible to operators.

2.4 ANCHOR BOLTS AND TEMPLATES

.1 Supply anchor bolts and templates for installation in concrete support pad.

.2 Size anchor bolts to withstand seismic zone acceleration and velocity forces.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install in accordance with recommendations of authority having jurisdiction.

.2 Provide insulation between tank and supports.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM).
- .1 ASTM A 126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
- .2 ASTM B 62, Specification for Composition Bronze or Ounce Metal Castings.

.2 American Water Works Association (AWWA).
- .1 AWWA C700, Cold Water Meters-Displacement Type, Bronze Main Case.
- .2 AWWA C701, Cold Water Meters-Turbine Type for Customer Service.
- .3 AWWA C702-1, Cold Water Meters-Compound Type.

.3 Canadian Standards Association (CSA International).
- .1 CSA-B64 Series, Backflow Preventers and Vacuum Breakers.
- .2 CSA-B79, Floor, Area and Shower Drains, and Cleanouts for Residential Construction.

.4 Plumbing and Drainage Institute (PDI).
- .1 PDI-WH201, Water Hammer Arresters Standard.

1.2 SUBMITTALS

.1 Product Data:
- .1 Submit manufacturer's printed product literature, specifications and datasheet for fixtures and equipment.
- .2 Indicate dimensions, construction details and materials for specified items.

.2 Shop Drawings:
- .1 Submit shop drawings to indicate materials, finishes, method of anchorage, number of anchors, dimensions, construction and assembly details, and accessories.

.3 Instructions: submit manufacturer's installation instructions.

PART 2 - PRODUCTS

2.1 PLUMBING FIXTURES

.1 CA-1

High efficiency two piece vitreous china water closet, elongated bowl, siphon jet action, 76 mm (3 in) flush valve, 54 mm (2 1/8 in) completely glazed trapway, chrome finish metal handle, extra-large base, bolt caps, 6 L (1.3 imp. gal.) per flush, vandal lock tank. Flush performance according to Map test - 1000 grams. Product: model Z5552-K-VL from Zurn, or approved equivalent.

Solid plastic elongated seat for intensive use, open front, coverless, molded bumper guard, stainless steel check hinges and fasteners. (White). Product: model Z5955SS-EL from Zurn, or approved equivalent.

10 x 300 mm (3/8 x 12") Extra heavy duty quarter turn stops, DN 1/2" compr., loose key, vertical flexible stainless braided hose of 10 x 300 mm (3/8 x 12"), flange, chrome plated finish. Product: model ZH8824CRLKQ-8870-12-PC from Zurn, or approved equivalent.

.2 CAH-2 :

Two piece vitreous china water closet, elongated bowl for handicapped persons, 419 mm (16 1/2 in) in height, 54 mm (2 1/8 in) completely glazed trapway, siphon jet action, insulated tank, chrome finish metal handle, bolt caps, 6 L (1.3 imp. gal.) per flush, vandal lock tank. Flush performance according to Map test – 1000 grams. Product: model Z5551-K-VL from Zurn, or approved equivalent.

Heavy duty solid plastic elongated seat, open front, with cover, molded bumper guard, stainless steel check hinges. (White). Product: model Z5957SS-EL from Zurn, or approved equivalent.

10 x 300 mm (3/8 x 12") Extra heavy duty quarter turn stops, DN 1/2" compr., loose key, vertical flexible stainless braided hose of 10 x 300 mm (3/8 x 12"), flange, chrome plated finish. Product: model ZH8824CRLKQ-8870-12-PC from Zurn, or approved equivalent.

.3 D-1 :

Metering push-button shower system, recessed with stainless steel faceplate. Includes pneumatic servomotor valve with forged brass body and stainless steel seat, service stop with incorporated filter, chrome brass plated push-button mounted on front panel, automatic shut-off, 10 to 60 seconds adjustable cycle, type 304, 18 gauge, polished satin finish stainless steel faceplate measuring 254 x 254 mm (10 x 10 in), 4 vandal resistant stainless steel screws, flexible connecting tubing from the valve to the actuator, pre-mixed water supply, DN 1/2 in fem. inlet and outlet. Push-button conforms to ADA requiring less than 5 lbs (2.2 kg) pressure to operate. Note: Possibility to install the pneumatic servomotor valve at a maximum distance of 3 m (10 feet) of the push-button actuator (ex: in a suspended ceiling). In this case, a faceplate of 152 x 152 mm (6 x 6 in) or 102 x 102 mm (4 x 4 in) may be used for the push-button actuator. Access to the pneumatic actuator must be provided. Product: model Modèle RC-3000 from Can-Aqua, or approved equivalent.

Single handle pressure balancing mixing shower unit for shower or bath/shower, ceramic disc cartridge with stainless steel balancing piston, brass body, ceramic disc cartridge, exposed trim and lever handle polished chromed plated metal with color-coded indicator, combined service stops/check stops, DN 1/2 in sweat inlets and outlets. Product: model Z7300-SSC-MT from Zurn, or approved equivalent.

Recessed diverter, chrome plated 5 point handle with flange, DN 1/2 in sweat. Product: model D-2 from Leonard, or approved equivalent.

Handshower kit including: 38 mm (1-1/2") in diam. x 610 mm (24") grab bar, sliding and pivoting handshower hanger manageable by hand or with closed fist requires no more than 2.27 kg (5 lbs) pressure to operate, institutional handshower with instant shut-off button, 9.5 l/min (2.5 usgpm) flow with integral checkstops, 1753 mm (69") double spiral metalic hose, DN 1/2" wall mount supply elbow with flange. Conforms to ADA. Product: model 62001 from Leonard, or approved equivalent.

Institutional shower head, adjustable spray, ball joint, 51 mm (2 1/4") diam., anchor plate, 9.5 L/min (2.5 usgpm). Product: model Z7000-I5-AP from Zurn, or approved equivalent.

.4 DP-1 :

Cast iron floor drain for membrane with a 213 mm (8 3/8") in diam., reversible clamp collar with lateral openings on top, body with a 102 mm (4 in) in diam. threaded throat to receive adjustable 127 mm (5") in diam. adjustable round strainer combined with 13 mm (1/2") round polished nickel bronze regular traffic grate. Product: model ZN415-B5 from Zurn, or approved equivalent.

Diaphragm trap sealer 76 mm (3") can be installed in a floor drain. Prevents the sewer gases and bad odors from escaping into the building when the trap water seal has dried up, while allowing the water to flow freely down the drain. Integrated vent. Prevents the trap water seal from being exposed to the atmosphere, and consequently reduces the evaporation of the trap water seal. The diaphragm is made of a proprietary neoprene rubber with 2 soft rubber sealing gaskets. Approved by RBQ, complies with the ASSE 1072 requirements, listed IAPMO #4165. 3" diameter. Product: model SS3009 from Sure Seal, or approved equivalent.

.5 EV-1 :

Single-piece faucet for intensive use, 203 mm (8 in) center, 64 mm (2 1/2 in) vandal-resistant color-coded metal lever handle, 203 mm (8 in) swing spout with 8.3 L/min. (2.2 usgpm) pressure compensating aerator, 3 holes installation. Product: model Z871G1-XL from Zurn, or approved equivalent.

10 x 300 mm (3/8 x 12") Extra heavy duty quarter turn stops, low lead, DN 1/2" compr., loose key, vertical flexible stainless braided hose of 10 x 300 mm (3/8 x 12"), flange, chrome plated finish. Product: model ZH8824XL-LRLKQ-8860-12-PC (2) from Zurn, or approved equivalent.

Tubular construction adjustable P-trap, cast brass elbow, 38 mm (1 1/2 in) sweat outlet, rough brass. Product: model 1227 from OS&B, or approved equivalent.

.6 LH-1 :

Single compartment self-rimming vanity basin less faucet ledge. 18 gauge (1.2mm), type 304 (CNS 18/10) stainless steel. Mirror finished rim, #4 satin finished bowl. Undercoated to reduce condensation and resonance. Includes factory applied rim seal, cutout template, and installation hardware. Certified to ASME A112.19.3-2008 / CSA B45.4-08. Product: model V1114/5 | 2000102516 from FRANKE, or approved equivalent.

Electronic battery sensor operated faucet, long life lithium battery (10 years), 5.7 L/min. (1.5 usgpm) laminar flow spout outlet, 102 mm (4 in) center, polished chrome finish, infrared convergence type proximity sensor, ondemand activation with a 30 seconds run time, in-line filter, pre-mixed water supply, braided stainless steel hose supplies. Product: model Z6955XL-J-LL from Zurn, or approved equivalent.

Lavatory extra heavy duty quarter turn stops, low lead, DN 1/2" compr. x 3/8" compr., loose key, flange chrome plated finish. Product: model ZH8824XL-LKQ-PC/Z8952-58 (2) from Zurn, or approved equivalent.

Thermostatic mixing valve supplying 1 or mutliple lavatories/sinks designed for point of use; 37.8 L/min (10 usgpm) flow at a 45 psi pressure differential; temperature setting at 35 to 46 ºC (95 to 115 ºF) with a + 1.78 ºC (3 ºF) precision at a 1.9 L/min (0.5 usgpm) minimum flow; inlets checkstops incorporated filters, [1/2" sweat] inlets and outlet; complies to CSA, ASSE 1016 (1996) and ASSE 1070 standards. Product: model 12-ZW1070XL-C from Zurn, or approved equivalent.

"Daisy" type strainer drain assembly, cast brass body, 32 mm (1 1/4 in), polished chrome finish. Product: model model 37D from OS&B, or approved equivalent.

Cast brass adjustable P-trap, 32 mm (1 1/4 in) with deep wall flange and cleanout, chrome plate finish. Product: model Z8700-8-PC-BD from Zurn, or approved equivalent.

.7 U-1 :

Vitreous china wall hung Omniflo urinal, washdown action, consuming between 3.8 L (0.83 imp. gal.) and as little as 0.5 L (1/8 gus) per flush, gravity flush, incorporated privacy screen, integral trap 19 mm (3/4 in) top spud connection, DN 2 in fem. IPS back outlet, wall hooks, basin front at 361 mm (14 1/4 in) from finished wall. Vandal resistant stainless steel strainer included. Product: model Z5755 from Zurn, or approved equivalent.

Concealed wall hung urinal carrier, extraheavy duty top and bottom adjustable plates, steel uprights with welded feet, mounting fastener. Product: model Z1222 from Zurn, or approved equivalent.

1.9 L (0.5 gus) Piston type electronic flush valve powered by a lithium long life battery (10 years), infrared covergence type proximity sensor, mechanical manual override button, chloramine resistant internal seals, spud coupling and flange, control stop of DN 1" sweat with vandal resistant stop cap and cast wall flange, 19 mm (3/4 in) vacuum breaker flush tube, 1.9 L (0.42 imp. gal.) per flush. Flush valve body DR resistant low lead brass alloy. Chrome plated finished. Requires a min. dynamic pression of 35 psi. Product: model ZTR6203-EWS-LL from Zurn, or approved equivalent.

2.2 WATER METER

.1 Water meter, 25mm diameter, direct reading in M3, 1 pulse for each 10 liters, nutate disc transferred by magnetic drive register, complete with threaded of welded joints for copper.

.2 Product : model M55D (water meter) and RTR (pulse register) from Badger Meter, distributed by « Les compteurs d'eau Lecomte », ou approved equivalent.

2.3 CLEANOUTS

.1 Cleanout Plugs: heavy cast iron male ferrule with brass screws and threaded brass or bronze plug. Sealing-caulked lead seat or neoprene gasket.

.2 Access Covers:

.1 Wall Access: face or wall type, polished nickel bronze or stainless steel square cover with flush head securing screws, bevelled edge frame complete with anchoring lugs.

.2 Floor Access: rectangular cast iron body and frame with adjustable secured nickel bronze top cast box with anchor lugs and:

.1 Plugs: bolted bronze with neoprene gasket.

.2 Cover for Unfinished Concrete Floors: nickel bronze square, gasket, vandal-proof screws.

2.4 WATER HAMMER ARRESTORS

.1 Stainless steel or Copper construction, piston type: to PDI-WH201.

2.5 BACKFLOW PREVENTERS

.1 Preventers: to CSA-B64 Series, application as indicated.

2.6 VACUUM BREAKERS

.1 Breakers: to CSA-B64 Series, vacuum breaker atmospheric with hose connection.

2.7 BACKWATER VALVES

.1 Coated extra heavy cast iron with bronze seat, revolving bronze flapper and threaded cover.

2.8 HOSE BIBBS AND SEDIMENT FAUCETS

.1 Bronze construction complete with integral back flow preventer, hose thread spout, replaceable composition disc, and chrome plated in finished areas.

2.9 STRAINERS

.1 860 kPa, Y type with 20 mesh, monel, bronze or stainless steel removable screen

.2 NPS2 and under, bronze body, screwed ends, with brass cap.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install in accordance with National Plumbing Code of Canada.

.2 Install in accordance with manufacturer's instructions and as specified.

3.3 CLEANOUTS

.1 Install cleanouts at base of soil and waste stacks, and rainwater leaders, at locations required code, and as indicated.

.2 Bring cleanouts to wall or finished floor unless serviceable from below floor.

.3 Building drain cleanout and stack base cleanouts: line size to maximum NPS4.

3.4 WATER HAMMER ARRESTORS

.1 Install on branch supplies to fixtures or group of fixtures where indicated.

3.5 BACK FLOW PREVENTORS

.1 Install in accordance with CSA-B64 Series, where indicated and elsewhere as required by code.

.2 Pipe discharge to terminate over nearest drain or service sink.

3.6 HOSE BIBBS AND SEDIMENT FAUCETS

.1 Install at bottom of risers, at low points to drain systems, and as indicated.

3.7 DIAPHRAGM TRAP SEALER

.1 Install diaphragm trap sealer on all floor drains.

3.8 STRAINERS

.1 Install with sufficient room to remove basket.

3.9 START-UP

.1 General:
.1 As specified herein.

.2 Timing: start-up only after:
.1 Pressure tests have been completed.
.2 Disinfection procedures have been completed.
.3 Certificate of static completion has been issued.
.4 Water treatment systems operational.

.3 Provide continuous supervision during start-up.

3.10 TESTING AND ADJUSTING

.1 General:

.1 As specified herein.

.2 Timing:
.1 After start-up deficiencies rectified.
.2 After certificate of completion has been issued by authority having jurisdiction.

.3 Application tolerances:
.1 Pressure at fixtures: +/- 70 kPa.
.2 Flow rate at fixtures: +/- 20%.

.4 Adjustments:
.1 Verify that flow rate and pressure meet design criteria.
.2 Make adjustments while flow rate or withdrawal is (1) maximum and (2) 25% of maximum and while pressure is (1) maximum and (2) minimum.

.5 Floor drains:
.1 Check security, accessibility, removeability of strainer.
.2 Clean out baskets.

.6 Vacuum breakers, backflow preventers, backwater valves:
.1 Test tightness, accessibility for O&M of cover and of valve.
.2 Simulate reverse flow and back-pressure conditions to test operation of vacuum breakers, backflow preventers.
.3 Verify visibility of discharge from open ports.

.7 Access doors:
.1 Verify size and location relative to items to be accessed.

.8 Cleanouts:
.1 Verify covers are gas-tight, secure, yet readily removable.

.9 Water hammer arrestors:
- .1 Verify proper installation of correct type of water hammer arrester.

.10 Strainers:
- .1 Clean out repeatedly until clear.
- .2 Verify accessibility of cleanout plug and basket.
- .3 Verify that cleanout plug does not leak.

.11 Commissioning Reports:
- .1 As specified herein.

.12 Training:
- .1 As specified herein.
- .2 Demonstrate full compliance with Design Criteria.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.

.2 Canada Green Building Council (CaGBC)
  .1 LEED Canada-NC Version 1.0, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.

.3 Green Seal Environmental Standards (GSES_

4. Code national de prevention ds incendies du Canada (CNPI 2005)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide required technical documentation and specifications from manufacturer. Technical sheet shall include the product characteristics, performance criteria, dimensions, restrictions and finish.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, paddling and packaging materials.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 APPLICATION

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

3.2 CONNECTIONS TO EQUIPMENT

.1 In accordance with manufacturer's instructions unless otherwise indicated.

.2 Use valves and either unions or flanges for isolation and ease of maintenance and assembly.

.3 Use double swing joints when equipment mounted on vibration isolation and when piping subject to movement.

3.3 CLEARANCES

.1 Provide clearance around systems, equipment and components for observation of operation, inspection, servicing, maintenance and as recommended by manufacturer.

.2 Provide space for disassembly, removal of equipment and components as recommended by manufacturer or as indicated (whichever is greater) without interrupting operation of other system, equipment, components.

3.4 DRAINS

.1 Install piping with grade in direction of flow except as indicated.

.2 Install drain valve at low points in piping systems, at equipment and at section isolating valves.

.3 Pipe each drain valve discharge separately to above floor drain. Discharge to be visible.

.4 Drain valves: NPS 3/4 gate or globe valves unless indicated otherwise, with hose end male thread, cap and chain.

3.5 AIR VENTS

.1 Install manual air vents at high points in piping systems.

.2 Install isolating valve at each automatic air valve.

.3 Install drain piping to approved location and terminate where discharge is visible.

3.6 DIELECTRIC COUPLINGS

.1 General: compatible with system, to suit pressure rating of system.

.2 Locations: where dissimilar metals are joined.

.3 NPS 2 and under: isolating unions or bronze valves.

.4 Over NPS 2: isolating flanges.

3.7 PIPEWORK INSTALLATION

.1 Install piping to CSA B139.

.2 Screwed fittings jointed with Teflon tape.

.3 Protect openings against entry of foreign material.

.4 Install to isolate equipment and allow removal without interrupting operation of other equipment or systems.

.5 Assemble piping using fittings manufactured to ANSI standards.

.6 Saddle type branch fittings may be used on mains if branch line is no larger than half size of main.

.1 Hole saw (or drill) and ream main to maintain full inside diameter of branch line prior to welding saddle.

.7 Install exposed piping, equipment, rectangular cleanouts and similar items parallel or perpendicular to building lines.

.8 Install concealed pipework to minimize furring space, maximize headroom, conserve space.

.9 Slope piping, except where indicated, in direction of flow for positive drainage and venting.

.10 Install, except where indicated, to permit separate thermal insulation of each pipe.

.11 Group piping wherever possible.

.12 Ream pipes, remove scale and other foreign material before assembly.

.13 Use eccentric reducers at pipe size changes to ensure positive drainage and venting.

.14 Provide for thermal expansion as indicated.

.15 Valves:
- .1 Install in accessible locations.
- .2 Remove interior parts before soldering.
- .3 Install with stems above horizontal position unless otherwise indicated.
- .4 Valves accessible for maintenance without removing adjacent piping.
- .5 Use ball valves at branch take-offs for isolating purposes except where otherwise specified.

.16 Check Valves:
- .1 Install silent check valves [on discharge of pumps] [and] [in vertical pipes with downward flow] and elsewhere as indicated.
- .2 Install swing check valves in horizontal lines on discharge of pumps and elsewhere as indicated.

3.8 SLEEVES

.1 General: install where pipes pass through masonry, concrete structures, fire rated assemblies, and elsewhere as indicated.

.2 Material: schedule 40 black steel pipe.

.3 Construction: foundation walls and where sleeves extend above finished floors to have annular fins continuously welded on at mid-point.

.4 Sizes: 6 mm minimum clearance between sleeve and uninsulated pipe or between sleeve and insulation.

.5 Installation:
- .1 Concrete, masonry walls, concrete floors on grade: terminate flush with finished surface.
- .2 Other floors: terminate 25 mm above finished floor.
- .3 Before installation, paint exposed exterior surfaces with heavy application of zinc-rich paint to CAN/CGSB-1.181.

.6 Sealing:
- .1 Foundation walls and below grade floors: fire retardant, waterproof non-hardening mastic.
- .2 Elsewhere: Provide space for firestopping. Maintain fire rating integrity.
- .3 Sleeves installed for future use: fill with lime plaster or other easily removable filler.
- .4 Ensure no contact between copper pipe or tube and sleeve.

3.9 ESCUTCHEONS

.1 Install on pipes passing through walls, partitions, floors, and ceilings in finished areas.

.2 Construction: one piece type with set screws. Chrome or nickel plated brass or type 302 stainless steel.

.3 Sizes: outside diameter to cover opening or sleeve. Inside diameter to fit around pipe or outside of insulation if so provided.

3.10 PREPARATION FOR FIRE STOPPING

.1 Material and installation within annular space between pipes, ducts, insulation and adjacent fire separation.

.2 Uninsulated unheated pipes not subject to movement: No special preparation.

.3 Uninsulated heated pipes subject to movement: wrap with non-combustible smooth material to permit pipe movement without damaging fires topping material or installation.

.4 Insulated pipes and ducts: ensure integrity of insulation and vapour barriers.

3.11 EXISTING SYSTEMS

.1 Connect into existing piping systems at times approved by Departmental Representative.

.2 Be responsible for damage to existing plant by this work.

3.12 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 reuse and recycling.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 National Building Code of Canada (NBC) - [1995]

PART 2 - PRODUCTS

2.1 GENERAL

.1 Size and shape of bases type and performance of vibration isolation as indicated.

2.2 SPRINGS

.1 Design stable springs: ratio of lateral to axial stiffness is equal to or greater than 1.2 times ratio of static deflection to working height. Select for 50% travel beyond rated load. Units complete with levelling devices.

.2 Ratio of height when loaded to diameter of spring between 0.8 to 1.0.

.3 Cadmium plate for outdoor 100% relative humidity installations.

.4 Colour code springs.

2.3 SPRING MOUNT

.1 Zinc or cadmium plated hardware; housings coated with rust resistant paint.

.2 Type M2 - stable open spring: support on bonded 6 mm minimum thick ribbed neoprene or rubber friction and acoustic pad.

.3 Type M3 - stable open spring: 6 mm minimum thick ribbed neoprene or rubber friction and acoustic pad, bonded under isolator and on isolator top plate; levelling bolt for rigidly mounting to equipment.

.4 Type M4 - restrained stable open spring: supported on bonded 6 mm minimum thick ribbed neoprene or rubber friction and acoustic pad; built-in resilient limit stops, removable spacer plates.

.5 Type M5 - enclosed spring mounts with snubbers for isolation up to 950 kg maximum.

.6 Performance: as indicated.

2.4 SEISMIC CONTROL MEASURES

.1 General:
- .1 Seismic control systems to work in every direction.
- .2 Fasteners and attachment points to resist same maximum load as seismic restraint.
- .3 Drilled or power driven anchors and fasteners not permitted.
- .4 No equipment, equipment supports or mounts to fail before failure of structure.
- .5 Supports of cast iron or threaded pipe not permitted.
- .6 Seismic control measures not to interfere with integrity of firestopping.

.2 Static equipment:
- .1 Anchor equipment to equipment supports. Anchor equipment supports to structure.
- .2 Suspended equipment:
  - .1 Use one or more of following methods depending upon site conditions or as indicated:
    - .1 Install tight to structure.
    - .2 Cross brace in every direction.
    - .3 Brace back to structure.
    - .4 Cable restraint system.
- .3 Seismic restraints:
  - .1 Cushioning action gentle and steady.
  - .2 Never reach metal-like stiffness.

.3 Vibration isolated equipment:
- .1 Seismic control measures not to jeopardize noise and vibration isolation systems. Provide 6 to 9 mm clearance during normal operation of equipment and systems between seismic restraint and equipment.
- .2 Incorporate seismic restraints into vibration isolation system to resist complete isolator unloading.
- .3 As indicated.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Seismic control measures to meet requirements of NBC.

.2 Install vibration isolation equipment in accordance with manufacturers instructions and adjust mountings to level equipment.

.3 Ensure piping, ducting and electrical connections to isolated equipment do not reduce system flexibility and that piping, conduit and ducting passage through walls and floors do not transmit vibrations.

.4 Unless indicated otherwise, support piping connected to isolated equipment with spring mounts or spring hangers with 25 mm minimum static deflection as follows:
- .1 Up to NPS4: first 3 points of support. NPS5 to NPS8: first 4 points of support. NPS10 and over: first 6 points of support.
- .2 First point of support: static deflection of twice deflection of isolated equipment, but not more than 50 mm.

.5 Where isolation is bolted to floor use vibration isolation rubber washers.

.6 Block and shim level bases so that ductwork and piping connections can be made to rigid system at operating level, before isolator adjustment is made. Ensure that there is no physical contact between isolated equipment and building structure.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.60, Interior Alkyd Gloss Enamel.
- .2 CAN/CGSB-24.3, Identification of Piping Systems.

PART 2 - PRODUCTS

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

.1 Metal or plastic laminate nameplate mechanically fastened to each piece of equipment by manufacturer.

.2 Lettering and numbers raised or recessed.

.3 Information to include, as appropriate:
- .1 Equipment: manufacturer's name, model, size, serial number, capacity.
- .2 Motor: voltage, Hz, phase, power factor, duty, frame size.

2.2 IDENTIFICATION OF PIPING SYSTEMS

.1 Legend:
- .1 Block capitals to sizes and colours listed in CAN/CGSB 24.3.

.2 Extent of background colour marking:
- .1 To full circumference of pipe or insulation.
- .2 Length to accommodate pictogram, full length of legend and arrows.

.3 Materials for background colour marking, legend, arrows:
- .1 Pipes and tubing 20 mm and smaller: waterproof and heat-resistant pressure sensitive plastic marker tags.
- .2 Other pipes: pressure sensitive vinyl with protective overcoating, waterproof contact adhesive undercoating, suitable for ambient of 100% RH and continuous operating temperature of 150 degrees C and intermittent temperature of 200 degrees C.

.4 Colours and Legends:
- .1 Where not listed, obtain direction from Departmental Representative.
- .2 Colours for legends, arrows: to following table:

Background colour:	Legend, arrows:
Yellow	BLACK
Green	WHITE
Red	WHITE

.3 Background colour marking and legends for piping systems:

Contents	Background colour	Legend marking
Domestic hot water supply	Green	DOM. HW SUPPLY
Domestic cold water supply	Green	DOM. CW SUPPLY
Sanitary	Green	SAN

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Perform work in accordance with CAN/CGSB-24.3 except as specified otherwise.

.2 Provide ULC or CSA registration plates as required by respective agency.

.3 Identify systems, equipment to conform to PWGSC PMSS.

3.3 LOCATION OF IDENTIFICATION ON PIPING AND DUCTWORK SYSTEMS

.1 On long straight runs in open areas: at not more than 17 m intervals and more frequently if required to ensure that at least one is visible from any one viewpoint in operating areas and walking aisles.

.2 Adjacent to each change in direction.

.3 At least once in each small room through which piping or ductwork passes.

.4 On both sides of visual obstruction or where run is difficult to follow.

.5 On both sides of separations such as walls, floors, partitions.

.6 Where system is installed in pipe chases, ceiling spaces, galleries, confined spaces, at entry and exit points, and at access openings.

.7 At beginning and end points of each run and at each piece of equipment in run.

.8 At point immediately upstream of major manually operated or automatically controlled valves, and dampers. Where this is not possible, place identification as close as possible, preferably on upstream side.

.9 Identification easily and accurately readable from usual operating areas and from access points.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 TAB is used throughout this Section to describe the process, methods and requirements of testing, adjusting and balancing for HVAC.

.2 TAB means to test, adjust and balance to perform in accordance with requirements of Contract Documents and to do other work as specified in this section.

1.2 PURPOSE OF TAB

.1 Test to verify proper and safe operation, determine actual point of performance, evaluate qualitative and quantitative performance of equipment, systems and controls at design, average and low loads using actual or simulated loads

.2 Adjust and regulate equipment and systems to meet specified performance requirements and to achieve specified interaction with other related systems under normal and emergency loads and operating conditions.

.3 Balance systems and equipment to regulate flow rates to match load requirements over full operating ranges.

1.3 CO-ORDINATION

.1 Schedule time required for TAB (including repairs, re-testing) into project construction and completion schedule to ensure completion before acceptance of project.

.2 Do TAB of each system independently and subsequently, where interlocked with other systems, in unison with those systems.

1.4 APPLICATION TOLERANCES

.1 Do TAB to following tolerances of design values:
.1 HVAC systems: plus 5%, minus 5%.

1.5 INSTRUMENTS

.1 Prior to TAB, submit to Client Representative list of instruments used together with serial numbers.

.2 Calibrate in accordance with requirements of most stringent of referenced standard for either applicable system or HVAC system.

.3 Calibrate within three (3) months of TAB. Provide certificate of calibration to Client Representative.

1.6 TAB REPORT

.1 Format in accordance with referenced standard.

.2 TAB report to show results in SI units and to include:
.1 Project record drawings.
.2 System schematics.

.3 Submit one copy in PDF format of TAB Report to Client Representative for verification and approval, in French.

1.7 SETTINGS

.1 After TAB is completed to satisfaction of Client Representative, replace drive guards, close access doors, lock devices in set positions, ensure sensors are at required settings.

.2 Permanently mark settings to allow restoration at any time during life of facility. Do not eradicate or cover markings.

1.8 COMPLETION OF TAB

.1 TAB considered complete when final TAB Report received and approved by Consultant.

1.9 AIR SYSTEMS

.1 Standard: TAB to most stringent of this section or TAB standards of SMACNA and ASHRAE.

.2 Do TAB of systems, equipment, components, controls specified Division 23

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Definitions:
- .1 For purposes of this section:
  - .1 "CONCEALED" - insulated mechanical services and equipment in suspended ceilings and non-accessible chases and furred-in spaces.
  - .2 "EXPOSED" - means "not concealed" as previouslydefined.
  - .3 Insulation systems - insulation material, fasteners, jackets, and other accessories.
- .2 TIAC Codes:
  - .1 CRD: Code Round Ductwork,
  - .2 CRF: Code Rectangular Finish.

.2 Reference Standards:

- .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
  - .1 ANSI/ASHRAE/IESNA 90.1, SI; Energy Standard for Buildings Except Low-Rise Residential Buildings.
- .2 ASTM International Inc.
  - .1 ASTM C 449/C 449M, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
  - .2 ASTM C 553, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
  - .3 ASTM C 612, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
  - .4 ASTM C 921, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
- .3 Canadian General Standards Board (CGSB)
  - .1 CGSB 51-GP-52Ma, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
- .4 Green Seal Environmental Standards (GSES)
  - .1 Standard GS-36, Commercial Adhesives.
- .5 Thermal Insulation Association of Canada (TIAC): National Insulation Standards.
- .6 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
  - .2 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:
.1 Provide manufacturer's printed product literature and datasheets for duct insulation, and include product characteristics, performance criteria, physical size, finish and limitations.
.1 Description of equipment giving manufacturer's name, type, model, year and capacity.
.2 Details of operation, servicing and maintenance.
.3 Recommended spare parts list.

.2 Manufacturers' Instructions:
.1 Provide manufacture's written duct insulation jointing recommendations. and special handling criteria, installation sequence, cleaning procedures.

1.3 QUALITY ASSURANCE

.1 Qualifications:
.1 Installer: specialist in performing work of this section, and have at least 3 years successful experience in this size and type of project, qualified to standards member of TIAC.

PART 2 - PRODUCTS

2.1 FIRE AND SMOKE RATING

.1 To CAN/ULC-S102:

.2 Maximum flame spread rating: 25.

.3 Maximum smoke developed rating: 50.

2.2 INSULATION

.1 Mineral fibre: as specified includes glass fibre, rock wool, slag wool.

.2 Thermal conductivity ("k" factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C 335.

.3 TIAC Code C-1: Rigid mineral fibre board to ASTM C 612, with factory applied vapour retarder jacket to CGSB 51-GP-52Ma (as scheduled in PART 3 of this Section).

.4 TIAC Code C-2: Mineral fibre blanket to ASTM C 553 faced with factory applied vapour retarder jacket to CGSB 51-GP-52Ma (as scheduled in PART 3 of this section).

.1 Mineral fibre: to ASTM C 553.
.2 Jacket: to CGSB 51-GP-52Ma.
.3 Maximum "k" factor: to ASTM C 553.

2.3 JACKETS

.1 Canvas:
.1 220 gm/m² cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.

.2 Lagging adhesive: compatible with insulation.

2.4 ACCESSORIES

.1 Vapour retarder lap adhesive:
.1 Water based, fire retardant type, compatible with insulation.

.2 Indoor Vapour Retarder Finish:
.1 Vinyl emulsion type acrylic, compatible with insulation.

.3 Insulating Cement: hydraulic setting on mineral wool, to ASTM C 449.

.4 ULC Listed Canvas Jacket:
.1 220 gm/m² cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C 921.

.5 Tape: self-adhesive, aluminum, reinforced, 75 mm wide minimum.

.6 Contact adhesive: quick-setting

.7 Canvas adhesive: washable.

.8 Tie wire: 1.5 mm stainless steel.

.9 Banding: 19 mm wide, 0.5 mm thick stainless steel.

.10 Facing: 25 mm galvanized steel hexagonal wire mesh stitched on one face of insulation.

.11 Fasteners: 2 mm diameter pins with 35 mm diameter clips, length to suit thickness of insulation.

PART 3 - EXECUTION

3.1 APPLICATION

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

3.2 PRE-INSTALLATION REQUIREMENTS

.1 Pressure test ductwork systems complete, witness and certify.

.2 Ensure surfaces are clean, dry, free from foreign material.

3.3 INSTALLATION

.1 Install in accordance with TIAC National Standards.

.2 Apply materials in accordance with manufacturer's instructions and as indicated.

.3 Use 2 layers with staggered joints when required nominal thickness exceeds 75 mm.

.4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
.1 Ensure hangers, and supports are outside vapour retarder jacket.

.5 Fasteners: install at 300 mm on centre in horizontal and vertical directions, minimum 2 rows each side.

3.4 DUCTWORK INSULATION SCHEDULE

.1 Insulation types and thicknesses: conform to following table:

	TIAC Code	Vapour Retarder	Thickness (mm)
Air intake and exhaust plenums	[C-1]	[yes]	[50]
Rectangular exhaust air ductwork between louvers and dampers, and up to 3m into the heated building (most restrictive of the two)	[C-1]	[yes]	[25]
Rectangular air transfer (from outdoor)			

between louvers and dampers, and up to 3m into the heated building (most restrictive of the two)	[C-1]	[yes]	[25]

END OF SECTION

PART 1 – GENERAL

1.1 REFERENCES

.1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
- .1 ASHRAE Standard 90.1-01, Energy Standard for Buildings Except Low-Rise Residential Buildings (IESNA co-sponsored; ANSI approved; Continuous Maintenance Standard).

.2 American Society for Testing and Materials International (ASTM)
- .1 ASTM C 335 – Standard Test Method for Steady-State Heat Transfer Properties of Horizontal Pipe Insulation
- .2 ASTM C 449/C 449M – Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement
- .3 ASTM C 547 Mineral Fiber Pipe Insulation
- .4 ASTM C 921 – Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation

.3 Canadian General Standards Board (CGSB)
- .1 CGSB 51-GP-52MA – Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation
- .2 CAN/CGSB 51.53 – Poly (Vinyl Chloride) Jacketing Sheet, for Insulated Pipes, Vessels and Round Ducts

.4 Department of Justice Canada (Jus)
- .1 Canadian Environmental Assessment Act (CEAA), c. 37.
- .2 Canadian Environmental Protection Act (CEPA), c. 33.
- .3 Transportation of Dangerous Goods Act (TDGA), c. 34.

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

.6 Manufacturer's Trade Associations
- .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (Revised 2004).

.7 Underwriters' Laboratories of Canada (ULC)
- .1 CAN/ULC S102 – Latest Edition, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
- .2 CAN/ULC-S701 – Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering
- .3 CAN/ULC-S702 – Thermal Insulation, Mineral Fibre, for Buildings
- .4 CAN/ULC-S702.2 – Thermal Insulation, Mineral Fibre, for Buildings, Part 2: Application Guidelines.

1.2 DEFINITIONS

.1 For purposes of this section:
- .1 "CONCEALED" – insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.

.2 "EXPOSED" – will mean "not concealed" as specified.

.2 TIAC codes:
.1 CRF: Code Rectangular Finish.
.2 CPF: Code Piping Finish.

1.3 SUBMITTALS

.1 Fiches techniques
.1 Soumettre les fiches techniques requises ainsi que les spécifications et la documentation des fabricants concernant les produits conformément à la section 01 33 00 - Documents et échantillons à soumettre. Préciser les caractéristiques des produits, les critères de performance et les contraintes.

.2 Dessins d'atelier
.1 Soumettre les dessins d'atelier requis conformément à la section 01 33 00 - Documents et échantillons à soumettre.

1.4 QUALITY ASSURANCE

.1 Qualifications:
.1 Installer: specialist in performing work of this Section, and have at least 3 years successful experience in this size and type of project, qualified to standards member of TIAC.

PART 2 – PRODUCTS

2.1 FIRE AND SMOKE RATING

.1 In accordance with CAN/ULC-S102.

.2 Maximum flame spread rating: 25.

.3 Maximum smoke developed rating: 50.

2.2 INSULATION

.1 Mineral fibre specified includes glass fibre, rock wool, slag wool.

.2 Thermal conductivity ("k" factor) not to exceed specified values at 24°C mean temperature when tested in accordance with ASTM C 335.

.3 TIAC Code A-1: rigid moulded mineral fibre without factory applied vapour retarder jacket.
.1 Mineral fibre: to CAN/ULC-S702.
.2 Maximum "k" factor: to CAN/ULC-S702.

.4 TIAC Code A-3: rigid moulded mineral fibre with factory applied vapour retarder jacket.
.1 Mineral fibre: to CAN/ULC-S702.
.2 Jacket: to CGSB 51-GP-52Ma.
.3 Maximum "k" factor: to CAN/ULC-S702.

2.3 INSULATION SECUREMENT

.1 Tape: self-adhesive, aluminum, reinforced, 50 mm wide minimum.

.2 Contact adhesive: quick setting.

.3 Canvas adhesive: washable.

.4 Tie wire: 1.5 mm diameter stainless steel.

.5 Bands: stainless steel, 19 mm wide, 0.5 mm thick.

2.4 VAPOUR RETARDER LAP ADHESIVE

.1 Water based, fire retardant type, compatible with insulation.

2.5 INDOOR VAPOUR RETARDER FINISH

.1 Vinyl emulsion type acrylic, compatible with insulation.

2.6 JACKETS

.1 Polyvinyl Chloride (PVC):
- .1 One-piece moulded type and sheet to CAN/CGSB-51.53 with pre-formed shapes as required.
- .2 Colours: to match adjacent finish paint by client's representative.
- .3 Minimum service temperatures: –20°C.
- .4 Maximum service temperature: 65°C.
- .5 Moisture vapour transmission: 0.02 perm.
- .6 Fastenings:
  - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
  - .2 Tacks.
  - .3 Pressure sensitive vinyl tape of matching colour.

PART 3 – EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 PRE-INSTALLATION REQUIREMENT

.1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified.

.2 Surfaces clean, dry, free from foreign material.

3.3 INSTALLATION

.1 Install in accordance with TIAC National Standards.

.2 Apply materials in accordance with manufacturers instructions and this specification.

.3 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
.1 Install hangers, supports outside vapour retarder jacket.

.4 Supports, Hangers:
.1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.4 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES

.1 Application: at expansion joints, valves, primary flow measuring elements, flanges and unions at equipment.

.2 Design: to permit movement of expansion joint and to permit periodic removal and replacement without damage to adjacent insulation.

.3 Insulation:
.1 Insulation, fastenings and finishes: same as system.
.2 Jacket: PVC.

3.5 INSTALLATION OF ELASTOMERIC INSULATION

.1 Insulation to remain dry. Overlaps to manufacturer's instructions. Ensure tight joints.

.2 Provide vapour retarder as recommended by manufacturer.

3.6 PIPING INSULATION SCHEDULES

.1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.

.2 TIAC Code: A-1.
.1 Securements: SS bands at 300 mm on centre.
.2 Seals: lap seal adhesive, lagging adhesive.
.3 Installation: TIAC Code 1501-H.
.4 Application: Domestic hot water.

.3 TIAC Code: A-3.
.1 Securements: SS bands at 300 mm on centre.
.2 Seals: VR lap seal adhesive, VR lagging adhesive.
.3 Installation: TIAC Code: 1501-C.
.4 Application: Domestic cold water piping

.4 Thickness of insulation as listed in following table.

.1 Run-outs to individual units and equipment not exceeding 4000 mm long.

.2 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

Application	Temp °C	TIAC Code	Pipe sizes (NPS) and insulation thickness (mm)					
			Run out	to 1	1¼–2	2½–4	5–6	8 & over
Domestic hot water		A-1	25	25	25	38	38	38
Domestic cold water		A-3	25	25	25	25	25	25

.5 Finishes:

.1 Exposed indoors: PVC jacket.

.2 Exposed in mechanical rooms PVC jacket.

.3 Concealed, indoors: canvas on valves, fittings. No further finish.

.4 Use vapour retarder jacket on TIAC code A-3 insulation compatible with insulation.

.5 Finish attachments: SS bands, at 150 mm on centre. Seals: wing.

.6 Installation: to appropriate TIAC code CRF/1 through CPF/5.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).

.2 American Society for Testing and Materials International, (ASTM).
- .1 ASTM A 480/A 480M, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
- .2 ASTM A 635/A 635M, Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Carbon, Hot Rolled.
- .3 ASTM A 653/A 653M, Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.

.3 Department of Justice Canada (Jus).
- .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33 .

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

.5 National Fire Protection Association (NFPA).
- .1 NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems.
- .2 NFPA 90B, Standard for the Installation of Warm Air Heating and Air-Conditioning Systems

.6 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
- .1 SMACNA HVAC Duct Construction Standards - Metal and Flexible, 2nd Edition and Addendum No. 1.
- .2 SMACNA HVAC Air Duct Leakage Test Manual, 1st Edition.

1.2 SUBMITTALS

.1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

1.3 QUALITY ASSURANCE

.1 Certification of Ratings:
- .1 Catalogue or published ratings shall be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.

PART 2 - PRODUCTS

2.1 SEAL CLASSIFICATION

.1 Classification as follows:

Maximum Pressure Pa	SMACNA Seal Class
500	[C]
250	[C]
125	[C]
125	[Unsealed]

.2 Seal classification:

.1 Class A: longitudinal seams, transverse joints, duct wall penetrations and connections made airtight with sealant and tape.

.2 Class B: longitudinal seams, transverse joints and connections made airtight with sealant, tape or combination thereof.

.3 Class C: transverse joints and connections made air tight with gaskets, sealant tape or combination thereof. Longitudinal seams unsealed.

.4 Unsealed seams and joints.

2.2 SEALANT

.1 Sealant: oil resistant, water borne, polymer type flame resistant duct sealant. Temperature range of minus 30 degrees C to plus 93 degrees C.

2.3 TAPE

.1 Tape: polyvinyl treated, open weave fiberglass tape, 50 mm wide.

2.4 DUCT LEAKAGE

.1 In accordance with SMACNA HVAC Air Duct Leakage Test Manual.

2.5 FITTINGS

.1 Fabrication: to SMACNA.

.2 Radiused elbows.

.1 Rectangular: standard radius or short radius with single thickness turning vanes. Centreline radius: 1.5 times width of duct.

.2 Round: smooth radius, five (5) pieces. Centreline radius: 1.5 times diameter.

.3 Mitred elbows, rectangular:

.1 To 400 mm: with single thickness turning vanes.

.2 Over 400 mm: with double thickness turning vanes.

.4 Branches:
.1 Rectangular main and branch: with radius on branch 1.5 times width of duct 45 degrees entry on branch.
.2 Round main and branch: enter main duct at 45 degrees with conical connection.
.3 Provide volume control damper in branch duct near connection to main duct.
.4 Main duct branches: with splitter damper.

.5 Transitions:
.1 Diverging: 20 degrees maximum included angle.
.2 Converging: 30 degrees maximum included angle.

.6 Offsets:
.1 Full radiused elbows.

.7 Obstruction deflectors: maintain full cross-sectional area.
.1 Maximum included angles: as for transitions.

2.6 FIRE STOPPING

.1 Retaining angles around duct, on both sides of fire.

.2 Fire stopping material and installation must not distort duct.

2.7 GALVANIZED STEEL

.1 Lock forming quality: to ASTM A 653/A 653M, Z90 zinc coating.

.2 Thickness, fabrication and reinforcement: to SMACNA.

.3 Joints: to SMACNA, proprietary manufactured duct joint. Proprietary manufactured flanged duct joint to be considered to be a class A seal.

2.8 HANGERS AND SUPPORTS

.1 Hangers and Supports:
.1 Strap hangers: of same material as duct but next sheet metal thickness heavier than duct.
.1 Maximum size duct supported by strap hanger: 500.
.2 Hanger configuration: to SMACNA.

.3 Hangers: galvanized steel angle with galvanized steel rods to SMACNA and following table:

Duct Size (mm	Angle Size (mm)	Rod Size (mm)
up to 750	25 x 25 x 3	6
751 to 1050	40 x 40 x 3	6
1051 to 1500	40 x 40 x 3	10
1501 to 2100	50 x 50 x 3	10
2101 to 2400	50 x 50 x 5	10
2401 and over	50 x 50 x 6	10

PART 3 - EXECUTION

3.1 GENERAL

.1 Do work in accordance with NFPA 90A, NFPA 90B, ASHRAE and SMACNA.

.2 Do not break continuity of insulation vapour barrier with hangers or rods.
.1 Insulate strap hangers 100 mm beyond insulated duct. Ensure diffuser is fully seated.

.3 Support risers in accordance with ASHRAE and SMACNA as indicated.

.4 Install breakaway joints in ductwork on sides of fire separation.

.5 Install proprietary manufactured flanged duct joints in accordance with manufacturer's instructions.

.6 Manufacture duct in lengths and diameter to accommodate installation of acoustic duct lining.

3.2 HANGERS

.1 Strap hangers: install in accordance with SMACNA.

.2 Angle hangers: complete with locking nuts and washers.

.3 Hanger spacing: in accordance with SMACNA as follows:

Duct Size (mm)	Spacing (mm)
to 1500	3000
1501 and over	2500

3.3 SEALING AND TAPING

.1 Apply sealant to outside of joint to manufacturer's recommendations.

.2 Bed tape in sealant and recoat with minimum of one coat of sealant to manufacturers recommendations.

3.4 LEAKAGE TESTS

.1 In accordance with SMACNA HVAC Duct Leakage Test Manual.

.2 Complete test before performance insulation or concealment Work.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

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

.2 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
  .1 SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

1.2 SUBMITTALS

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

.2 Product Data:
  .1 Submit manufacturer's printed product literature, specifications and data sheet. Indicate the following:
    .1 Flexible connections.
    .2 Duct access doors.
    .3 Turning vanes.
    .4 Instrument test ports.

PART 2 - PRODUCTS

2.1 GENERAL

.1 Manufacture in accordance with SMACNA - HVAC Duct Construction Standards.

2.2 FLEXIBLE CONNECTIONS

.1 Frame: galvanized sheet metal frame with fabric clenched by means of double locked seams.

.2 Material:
  .1 Fire resistant, self extinguishing, neoprene coated glass fabric, temperature rated at minus 40 degrees C to plus 90 degrees C, density of 1.3 kg/m².

2.3 ACCESS DOORS IN DUCTS

.1 Non-Insulated Ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm thick complete with sheet metal angle frame.

.2 Insulated Ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm thick complete with sheet metal angle frame and 25 mm thick rigid glass fibre insulation.

.3 Gaskets: neoprene.

.4 Hardware:
- .1 Up to 300 x 300 mm: two sash locks complete with safety chain.
- .2 301 to 450 mm: four sash locks complete with safety chain.
- .3 451 to 1000 mm: piano hinge and minimum two sash locks.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Flexible Connections:
- .1 Install in following locations:
  - .1 Inlets and outlets to supply air units and fans.
  - .2 Inlets and outlets of exhaust and return air fans.
  - .3 As indicated.
- .2 Length of connection: 100 mm.
- .3 Minimum distance between metal parts when system in operation: 75 mm.
- .4 Install in accordance with recommendations of SMACNA.
- .5 When fan is running:
  - .1 Ducting on sides of flexible connection to be in alignment.
  - .2 Ensure slack material in flexible connection.

.2 Access Doors and Viewing Panels:
- .1 Locations:
  - .1 Control dampers.
  - .2 Devices requiring maintenance.
  - .3 Required by code.
  - .4 Elsewhere as indicated.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
  .1 ASTM A 653/A 653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.

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

1.2 SUBMITTALS

.1 Product Data:
  .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.
  .2 Indicate the following:
    .1 Performance data.

PART 2 - PRODUCTS

2.1 MULTI-LEAF DAMPERS

.1 Opposed or parallel blade type as indicated.

.2 Structurally formed steel or Extruded aluminum, interlocking blades, complete with extruded vinyl seals, spring stainless steel side seals, structurally formed and welded galvanized steel extruded aluminum frame.

.3 Pressure fit self-lubricated bronze bearings.

.4 Linkage: plated steel tie rods, brass pivots and plated steel brackets, complete with plated steel control rod.

.5 Performance:
  .1 Leakage: in closed position less than 2% of rated air flow at 900 Pa differential across damper.
  .2 Pressure drop: at full open position less than 12 Pa.

.6 Insulated aluminum dampers:
  .1 Frames: insulated with extruded polystyrene foam with RSI 0.88.
  .2 Blades: constructed from aluminum extrusions with internal hollows insulated with polyurethane or polystyrene foam, RSI 0.88.

2.2 BACK DRAFT DAMPERS

.1 Automatic gravity operated, single leaf, aluminum construction with nylon bearings, centre pivoted or counterweighted, as indicated.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install where indicated.

.2 Install in accordance with recommendations of SMACNA and manufacturer's instructions.

.3 Seal multiple damper modules with silicon sealant.

.4 Ensure dampers are observable and accessible.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
  .1 ASTM E 90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.2 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)

.3 Society of Automotive Engineers (SAE)

1.2 SYSTEM DESCRIPTION

.1 Performance Requirements:
  .1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards.

1.3 SUBMITTALS

.1 Product Data:
  .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.
  .2 Indicate following:
    .1 Pressure drop.
    .2 Face area.
    .3 Free area.

PART 2 - PRODUCTS

2.1 FIXED LOUVRES - ALUMINUM

.1 Construction: welded with exposed joints ground flush and smooth.

.2 Material: extruded aluminum alloy 6063-T5.

.3 Blade: stormproof pattern with centre watershed in blade, reinforcing bosses and maximum blade length of 1500 mm.

.4 Frame, head, sill and jamb: 150 mm deep one piece extruded aluminum, minimum 3 mm thick with approved caulking slot, integral to unit.

.5 Mullions: at 1500 mm maximum centres.

.6 Fastenings: stainless steel SAE-194-8F with SAE-194-SFB nuts and resilient neoprene washers between aluminum and head of bolt, or between nut, ss washer and aluminum body.

.7 Screen: 12 mm exhaust mesh, 2 mm diameter wire aluminum birdscreen on inside face of louvres in formed U-frame.

.8 Finish: factory applied enamel, prime coated anodized. Colour: to Consultant's approval.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 In accordance with manufacturer's and SMACNA recommendations.

.2 Reinforce and brace as indicated.

.3 Anchor securely into opening. Seal with caulking to ensure weather tightness.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Definitions:
- .1 For purposes of this section:
  - .1 "CONCEALED" - insulated mechanical services and equipment in suspended ceilings and non-accessible chases and furred-in spaces.
  - .2 "EXPOSED" - means "not concealed" as previouslydefined.
  - .3 Insulation systems - insulation material, fasteners, jackets, and other accessories.
- .2 TIAC Codes:
  - .1 CRD: Code Round Ductwork,
  - .2 CRF: Code Rectangular Finish.

.2 Reference Standards:

- .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
  - .1 ANSI/ASHRAE/IESNA 90.1, SI; Energy Standard for Buildings Except Low-Rise Residential Buildings.
- .2 ASTM International Inc.
  - .1 ASTM C 449/C 449M, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
  - .2 ASTM C 553, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
  - .3 ASTM C 612, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
  - .4 ASTM C 921, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
- .3 Canadian General Standards Board (CGSB)
  - .1 CGSB 51-GP-52Ma, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
- .4 Green Seal Environmental Standards (GSES)
  - .1 Standard GS-36, Commercial Adhesives.
- .5 Thermal Insulation Association of Canada (TIAC): National Insulation Standards.
- .6 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
  - .2 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:
.1 Provide manufacturer's printed product literature and datasheets for duct insulation, and include product characteristics, performance criteria, physical size, finish and limitations.
.1 Description of equipment giving manufacturer's name, type, model, year and capacity.
.2 Details of operation, servicing and maintenance.
.3 Recommended spare parts list.

.2 Manufacturers' Instructions:
.1 Provide manufacture's written duct insulation jointing recommendations. and special handling criteria, installation sequence, cleaning procedures.

1.3 QUALITY ASSURANCE

.1 Qualifications:
.1 Installer: specialist in performing work of this section, and have at least 3 years successful experience in this size and type of project, qualified to standards member of TIAC.

PART 2 - PRODUCTS

2.1 FIRE AND SMOKE RATING

.1 To CAN/ULC-S102:

.2 Maximum flame spread rating: 25.

.3 Maximum smoke developed rating: 50.

2.2 INSULATION

.1 Mineral fibre: as specified includes glass fibre, rock wool, slag wool.

.2 Thermal conductivity ("k" factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C 335.

.3 TIAC Code C-1: Rigid mineral fibre board to ASTM C 612, with factory applied vapour retarder jacket to CGSB 51-GP-52Ma (as scheduled in PART 3 of this Section).

.4 TIAC Code C-2: Mineral fibre blanket to ASTM C 553 faced with factory applied vapour retarder jacket to CGSB 51-GP-52Ma (as scheduled in PART 3 of this section).

.1 Mineral fibre: to ASTM C 553.
.2 Jacket: to CGSB 51-GP-52Ma.
.3 Maximum "k" factor: to ASTM C 553.

2.3 JACKETS

.1 Canvas:
.1 220 gm/m² cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.

.2 Lagging adhesive: compatible with insulation.

2.4 ACCESSORIES

.1 Vapour retarder lap adhesive:
.1 Water based, fire retardant type, compatible with insulation.

.2 Indoor Vapour Retarder Finish:
.1 Vinyl emulsion type acrylic, compatible with insulation.

.3 Insulating Cement: hydraulic setting on mineral wool, to ASTM C 449.

.4 ULC Listed Canvas Jacket:
.1 220 gm/m² cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C 921.

.5 Tape: self-adhesive, aluminum, reinforced, 75 mm wide minimum.

.6 Contact adhesive: quick-setting

.7 Canvas adhesive: washable.

.8 Tie wire: 1.5 mm stainless steel.

.9 Banding: 19 mm wide, 0.5 mm thick stainless steel.

.10 Facing: 25 mm galvanized steel hexagonal wire mesh stitched on one face of insulation.

.11 Fasteners: 2 mm diameter pins with 35 mm diameter clips, length to suit thickness of insulation.

PART 3 - EXECUTION

3.1 APPLICATION

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

3.2 PRE-INSTALLATION REQUIREMENTS

.1 Pressure test ductwork systems complete, witness and certify.

.2 Ensure surfaces are clean, dry, free from foreign material.

3.3 INSTALLATION

.1 Install in accordance with TIAC National Standards.

.2 Apply materials in accordance with manufacturer's instructions and as indicated.

.3 Use 2 layers with staggered joints when required nominal thickness exceeds 75 mm.

.4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
.1 Ensure hangers, and supports are outside vapour retarder jacket.

.5 Fasteners: install at 300 mm on centre in horizontal and vertical directions, minimum 2 rows each side.

3.4 DUCTWORK INSULATION SCHEDULE

.1 Insulation types and thicknesses: conform to following table:

	TIAC Code	Vapour Retarder	Thickness (mm)
Air intake and exhaust plenums	[C-1]	[yes]	[50]
Rectangular exhaust air ductwork between louvers and dampers, and up to 3m into the heated building (most restrictive of the two)	[C-1]	[yes]	[25]
Rectangular air transfer (from outdoor)			

between louvers and dampers, and up to 3m into the heated building (most restrictive of the two)	[C-1]	[yes]	[25]

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

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

.2 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
  .1 SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

1.2 SUBMITTALS

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

.2 Product Data:
  .1 Submit manufacturer's printed product literature, specifications and data sheet. Indicate the following:
    .1 Flexible connections.
    .2 Duct access doors.
    .3 Turning vanes.
    .4 Instrument test ports.

PART 2 - PRODUCTS

2.1 GENERAL

.1 Manufacture in accordance with SMACNA - HVAC Duct Construction Standards.

2.2 FLEXIBLE CONNECTIONS

.1 Frame: galvanized sheet metal frame with fabric clenched by means of double locked seams.

.2 Material:
  .1 Fire resistant, self extinguishing, neoprene coated glass fabric, temperature rated at minus 40 degrees C to plus 90 degrees C, density of 1.3 kg/m².

2.3 ACCESS DOORS IN DUCTS

.1 Non-Insulated Ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm thick complete with sheet metal angle frame.

.2 Insulated Ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm thick complete with sheet metal angle frame and 25 mm thick rigid glass fibre insulation.

.3 Gaskets: neoprene.

.4 Hardware:
- .1 Up to 300 x 300 mm: two sash locks complete with safety chain.
- .2 301 to 450 mm: four sash locks complete with safety chain.
- .3 451 to 1000 mm: piano hinge and minimum two sash locks.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Flexible Connections:
- .1 Install in following locations:
  - .1 Inlets and outlets to supply air units and fans.
  - .2 Inlets and outlets of exhaust and return air fans.
  - .3 As indicated.
- .2 Length of connection: 100 mm.
- .3 Minimum distance between metal parts when system in operation: 75 mm.
- .4 Install in accordance with recommendations of SMACNA.
- .5 When fan is running:
  - .1 Ducting on sides of flexible connection to be in alignment.
  - .2 Ensure slack material in flexible connection.

.2 Access Doors and Viewing Panels:
- .1 Locations:
  - .1 Control dampers.
  - .2 Devices requiring maintenance.
  - .3 Required by code.
  - .4 Elsewhere as indicated.

END OF SECTION

Approved: 2013-06-30

Part 1 General

1.1 REFERENCES

.1 Definitions:

.1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

.2 Reference Standards:

.1 CSA Group

.1 CSA C22.1-10, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.

.2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)

.1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Submit for review single line electrical diagrams under plexiglass and locate as indicated.

.1 Electrical distribution system in main electrical room.

.2 Electrical power generation and distribution systems in power plant rooms.

.4 Submit for review fire alarm riser diagram, plan and zoning of building under plexiglass at fire alarm control panel and annunciator.

.5 Shop drawings:

.1 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.

.2 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.

.3 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.

.4 Submit a PDF fileand product data to authority having jurisdiction.

.5 If changes are required, notify Departmental Representative] of these changes before they are made.

.6 Certificates:

.1 Provide CSA certified equipmentandmaterial].

.2 Submit test results of installed electrical systems and instrumentation.

.3 Permits and fees: in accordance with General Conditions of contract.

.4 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.

.5 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for for incorporation into manual.

.1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.

.2 Operating instructions to include following:

.1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.

.2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.

.3 Safety precautions.

.4 Procedures to be followed in event of equipment failure.

.5 Other items of instruction as recommended by manufacturer of each system or item of equipment.

.3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.

.4 Post instructions where directed.

.5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.

.6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance 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 in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235.

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.

.1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

.3 Language operating requirements: provide identification nameplates for control items in English and French.

.4 Use onenameplateboth languages.

2.2 MATERIALS AND EQUIPMENT

.1 Provide materialand equipment in accordance with Section 01 61 00 - Common Product Requirements.

.2 Materialandequipment to be CSA certified. Where CSA certified materialand equipmentare]not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

.3 Factory assemble control panels and component assemblies.

2.3 WARNING SIGNS

.1 Warning Signs: in accordance with requirements of Departmental Representative.

.2 Porcelain enamel signs, minimum size 175 x 250 mm.

2.4 WIRING TERMINATIONS

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

2.5 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates as follows:

.1 Nameplates: plastic laminate3 mm thick plastic engraving sheet, black face, white core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.

.2 Sizes as follows:

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

Size 7	25 x 100 mm	2 lines	6 mm high letters

.2 Wording on nameplates to be approved by Departmental Representative prior to manufacture.

.3 Allow for minimum of twenty-five (25) letters per nameplate.

.4 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

.5 Identify equipment with Size 3 labels engraved "ASSET INVENTORY NO. [_____]" as directed by Departmental Representative.

.6 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

.7 Terminal cabinets and pull boxes: indicate system and voltage.

.8 Transformers: indicate capacity, primary and secondary voltages.

2.6 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, numberedplastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour coding: to CSA C22.1.

.4 Use colour coded wires in communication cables, matched throughout system.

2.7 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code conduits, boxes and metallic sheathed cables.

.2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

.3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

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

2.8 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

Part 3 Execution

3.1 EXAMINATION

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

.1 Visually inspect substrate .

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been.

3.2 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

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

3.3 NAMEPLATES AND LABELS

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

3.4 CONDUIT AND CABLE INSTALLATION

.1 Install conduit and sleeves prior to pouring of concrete.

.1 Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm.

.2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

.3 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

3.5 LOCATION OF OUTLETS

.1 Locate outlets in accordance with Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.

.2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.

.3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.

.4 Locate light switches on latch side of doors.

.1 Locate disconnect devices in mechanical and elevator machine rooms on latch side of floor.

3.6 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

.3 Install electrical equipment at following heights unless indicated otherwise.

- .1 Local switches: 1400 mm.
- .2 Wall receptacles:
  - .1 General: 300 mm.
  - .2 Above top of continuous baseboard heater: 200 mm.
  - .3 Above top of counters or counter splash backs: 175 mm.
  - .4 In mechanical rooms: 1400 mm.
- .3 Panelboards: as required by Code or as indicated.
- .4 Telephone and interphone outlets: 300 mm.
- .5 Wall mounted telephone and interphone outlets: 1500 mm.
- .6 Fire alarm stations: 1500 mm.
- .7 Fire alarm bells: 2100 mm.

3.7 CO-ORDINATION OF PROTECTIVE DEVICES

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

3.8 FIELD QUALITY CONTROL

.1 Load Balance:

- .1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
- .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
- .3 Provide upon completion of work, load balance report as directed in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS, phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.

.2 Conduct following tests in accordance with Section 01 45 00 - Quality Control.

- .1 Circuits originating from branch distribution panels.
- .2 Lighting and its control.
- .3 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
- .4 Systems: fire alarm.

.5 Insulation resistance testing:

.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.

.2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.

.3 Check resistance to ground before energizing.

.3 Carry out tests in presence of Departmental Representative.

.4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

3.9 SYSTEM STARTUP

.1 Instruct Departmental Representative and operating personnel in operation, care and maintenance of systems, system equipment and components.

.2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.

.3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

3.10 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.

OF SECTION

Part 1 General

1.1 REFERENCES

.1 CSA International

.1 CAN/CSA-C22.2 No.18-98(R2003), Outlet Boxes, Conduit Boxes and Fittings.

.2 CAN/CSA-C22.2 No.65-03(R2008), Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).

.2 National Electrical Manufacturers Association (NEMA)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for wire and box connectors and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for wire and box connectors for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect wire and box connectors from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Pressure type wire connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.

.2 Fixture type splicing connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

.3 Clamps or connectors for armoured cable, TECK cable and [non-metallic sheathed cable as required to: CAN/CSA-C22.2 No.18.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wire and box connectors installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Remove insulation carefully from ends of conductors or cables and:

.1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.

.2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No.65.

.3 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65. Replace insulating cap.

3.3 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.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 - Common Work Results for Electrical.

.2 Section 26 05 20 - Wire and Box Connectors - (0-1000 V)

.3 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings

1.2 PRODUCT DATA

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

Part 2 Products

2.1 BUILDING WIRES

.1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, with 1000 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE or RWU90 XLPE, Jacketted.

2.2 TECK 90 CABLE

.1 Cable: in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Conductors:

- .1 Grounding conductor: copper as indicated.
- .2 Circuit conductors: copper as indicated, size as indicated.

.3 Insulation:

- .1 Ethylene propylene rubber EP.
- .2 Cross-linked polyethylene XLPE.
- .3 Rating: , 1000 V.

.4 Inner jacket: polyvinyl chlorid] material.

.5 Armour: galvanized steel.

.6 Overall covering: thermoplastic polyvinyl chloride.

.7 Fastenings:

- .1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.
- .2 Channel type supports for two or more cables at 1500 mm centers.
- .3 Threaded rods: 6 mm diameter to support suspended channels.

.8 Connectors:

- .1 Watertight, approved for TECK cable.

2.3 ARMOURED CABLES

.1 Conductors: insulated, copper, size as indicated.

.2 Type: AC90.

.3 Armour: interlocking type fabricated from galvanized steel strip.

.4 Connectors: anti short connectors.

2.4 NON-METALLIC SHEATHED CABLE

.1 Non-metallic sheathed copper cable type: NMD90XLPE, size as indicated.

Part 3 Execution

3.1 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Perform tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

3.2 GENERAL CABLE INSTALLATION

.1 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).

.2 Cable Colour Coding: to Section 26 05 00 - Common Work Results for Electrical.

.3 Conductor length for parallel feeders to be identical.

.4 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.

.5 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.

.6 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.

.7 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

3.3 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:

.1 In conduit systems in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

.2 In underground ducts.

3.4 INSTALLATION OF TECK90 CABLE (0 -1000 V)

.1 Group cables wherever possible on channels.

.2 Install cable exposed, securely supported by straps.

3.5 INSTALLATION OF ARMOURED CABLES

.1 Group cables wherever possible on channels.

3.6 INSTALLATION OF NON-METALLIC SHEATHED CABLE

.1 Install cables.

.2 Install straps and box connectors to cables as required.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 33 - Raceway and Boxes for Electrical Systems..

1.2 REFERENCES

.1 CSA Group

.1 CSA C22.10-10,Code de Construction du Québec – Chapitre V.

.2 CSA C22.2 No.41-13, Grounding and Bonding Equipment (Tri-National Standard, with NMX-J-590ANCE and UL 467).

.3 CSA C22.2 No.65-13, Wire connectors (Tri-National Standard, with UL 486A-486B NMX-J-543-ANCE).

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 connectors and terminations and include product characteristics, performance criteria, physical size, finish and limitations.

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 connectors and terminations for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in 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 in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect connectors and terminations from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 CONNECTORS AND TERMINATIONS

.1 Compression connectors to CSA C22.2 No.65 as required sized for conductors.

.2 Contact aid for aluminum cables where applicable.

.3 Joint boxes dry location type in accordance with Section 26 05 33 - Raceway and Boxes for Electrical Systems.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for connectors and terminations installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Install stress cones, terminations, and splices in accordance with manufacturer's instructions.

.2 Bond and ground as required to CSA C22.2No.41.

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.

OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCES

.1 American National Standards Institute /Institute of Electrical and Electronics Engineers (ANSI/IEEE)

.1 ANSI/IEEE 837-02, IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.

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 grounding equipment and include product characteristics, performance criteria, physical size, finish and limitations.

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 grounding equipment for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect grounding equipment from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 EQUIPMENT

.1 Clamps for grounding of conductor: size as required to electrically conductive underground water pipe.

.2 Grounding conductors: bare stranded copper, tinned, soft annealed, size as indicated.

.3 Insulated grounding conductors: green, copper conductors, size as indicated.

.4 Ground bus: copper, size as indicated, complete with insulated supports, fastenings, connectors.

.5 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:

.1 Grounding and bonding bushings.

.2 Protective type clamps.

.3 Bolted type conductor connectors.

.4 Thermit welded type conductor connectors.

.5 Bonding jumpers, straps.

.6 Pressure wire connectors.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for grounding equipment installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION GENERAL

.1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Where EMT is used, run ground wire in conduit.

.2 Install connectors in accordance with manufacturer's instructions.

.3 Protect exposed grounding conductors from mechanical injury.

.4 Use mechanical connectors for grounding connections to equipment provided with lugs.

.5 Soldered joints not permitted.

.6 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.

.7 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.

.8 Install separate ground conductor to outdoor lighting standards.

3.3 EQUIPMENT GROUNDING

.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 centres, starters, control panels, building steel work, generators, elevators and escalators, distribution panels, outdoor lighting, cable trays.

3.4 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

.4 Disconnect ground fault indicator during tests.

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.

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for hangers and supports and include product characteristics, performance criteria, physical size, finish and limitations.

1.2 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect hangers and supports from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 SUPPORT CHANNELS

.1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for hangers and supports installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Secure equipment to masonry, tile and plaster surfaces with lead anchors.

.2 Secure equipment to poured concrete with expandable inserts.

.3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.

.4 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.

.5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.6 Fasten exposed conduit or cables to building construction or support system using straps.

.1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.

.2 Two-hole steel straps for conduits and cables larger than 50 mm.

.3 Beam clamps to secure conduit to exposed steel work.

.7 Suspended support systems.

.1 Support individual cable or conduit runs with 6 mm diameter threaded rods and spring clips.

.2 Support 2 or more cables or conduits on channels supported by 6 mm diameter threaded rod hangers where direct fastening to building construction is impractical.

.8 For surface mounting of two or more conduits use channels at 1,5 m on centre spacing.

.9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

.11 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.12 Do not use supports or equipment installed for other trades for conduit or cable.

.13 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 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.

END OF SECTION

Approved: 2008-06-30

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.10-10, Code de Construction du Québec – Chapitre V.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.

.1 Provide drawings stamped and signed by professional engineer registered or

Part 2 Products

2.1 SPLITTERS

.1 Construction: sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.

.2 Terminations: connection blocks to match required size and number of incoming and outgoing conductors as indicated.

.3 Spare Terminals: minimum three spare terminals on each connection or lug block sized less than 400 A.

2.2 JUNCTION AND PULL BOXES

.1 Construction:welded steel enclosure.

.2 Covers Flush Mounted: 25 mm minimum extension all around.

.3 Covers Surface Mounted: screw-on flat covers.

Part 3 Execution

3.1 SPLITTER INSTALLATION

.1 Mount plumb, true and square to building lines.

.2 Extend splitters full length of equipment arrangement except where indicated otherwise.

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Mount cabinets with top not higher than 2 m above finished floor except where indicated otherwise.

.3 Install terminal block as indicated in Type T cabinets.

.4 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.10.

3.3 IDENTIFICATION

.1 Equipment Identification: to Section 26 05 00 - Common Work Results for Electrical.

.2 Identification Labels: size 2 indicating system name, [voltage and phase or as indicated.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.10-10 Code de construction du Québec - Chapitre V.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

Part 2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.10.

.2 102 mm square or larger outlet boxes as required.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 GALVANIZED STEEL OUTLET BOXES

.1 One-piece electro-galvanized construction.

.2 Single 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.

.3 Utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.

.4 102 mm square or octagonal outlet boxes for lighting fixture outlets.

.5 Extension and plaster rings for flush mounting devices in finished plaster walls.

2.3 MASONRY BOXES

.1 Electro-galvanized steel masonry single gang boxes for devices flush mounted in exposed block walls.

2.4 CONCRETE BOXES

.1 Electro-galvanized sheet steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.

2.5 CONDUIT BOXES

.1 Cast FS aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of devices.

2.6 OUTLET BOXES FOR NON-METALLIC SHEATHED CABLE

.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.

2.7 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 35mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

Part 3 Execution

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

.4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Do not install reducing washers.

.5 Vacuum clean interior of outlet boxes before installation of wiring devices.

.6 Identify systems for outlet boxes as required.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

- .1 CAN/CSA C22.2 No. 18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
- .2 CSA C22.2 No. 45-M1981(R2003), Rigid Metal Conduit.
- .3 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
- .4 CSA C22.2 No. 83-M1985(R2003), Electrical Metallic Tubing.
- .5 CSA C22.2 No. 211.2-M1984(R2003), Rigid PVC (Unplasticized) Conduit.
- .6 CAN/CSA C22.2 No. 227.3-05, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product data: submit manufacturer's printed product literature, specifications and datasheets.

- .1 Submit cable manufacturing data.

.3 Quality assurance submittals:

- .1 Test reports: submit certified test reports.
- .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .3 Instructions: submit manufacturer's installation instructions.

Part 2 Products

2.1 CABLES AND REELS

.1 Provide cables on reels or coils.

- .1 Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.

.2 Each coil or reel of cable to contain only one continuous cable without splices.

.3 Identify cables for exclusively dc applications.

2.2 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, galvanized steel, threaded.

.2 Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.

.3 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.

.4 Rigid pvc conduit: to CSA C22.2 No. 211.2.

.5 Flexible metal conduit: to CSA C22.2 No. 56, liquid-tight flexible metal, steel.

2.3 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits 50 mm and smaller.

.1 Two hole steel straps for conduits larger than 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 1,5 m on centre.

.4 Threaded rods, 6 mm diameter, to support suspended channels.

2.4 CONDUIT FITTINGS

.1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.

.2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.

.3 Watertight connectors and couplings for EMT.

.1 Set-screws are not acceptable.

2.5 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.

.2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.

.3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.6 FISH CORD

.1 Polypropylene.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas].

.3 Use rigid pvc conduit underground.

.4 Use flexible metal conduit for connection to motors in dry areas, connection to recessed fixtures without prewired outlet box and work in movable metal partitions.

.5 Use liquid tight flexible metal conduit for [connection to motors or vibrating equipment in damp, wet or corrosive locations].

.6 Minimum conduit size for lighting and power circuits: 19 mm.

.7 Bend conduit cold:

.1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.8 Mechanically bend steel conduit over 19 mm diameter.

.9 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.10 Install fish cord in empty conduits.

.11 Remove and replace blocked conduit sections.

.1 Do not use liquids to clean out conduits.

.12 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

.3 Group conduits wherever possible on suspended channels.

.4 Do not pass conduits through structural members except as indicated.

.5 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.4 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Do not install horizontal runs in masonry walls.

.3 Do not install conduits in terrazzo or concrete toppings.

3.5 CONDUITS UNDERGROUND

.1 Slope conduits to provide drainage.

.2 Waterproof joints (pvc excepted) with heavy coat of bituminous paint.

3.6 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.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCES

.1 CSA International

.1 CAN/CSA-Z809-08, Sustainable Forest Management.

.2 Forest Stewardship Council (FSC)

.1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.3 Insulated Cable Engineers Association, Inc. (ICEA)

.4 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 [cables] and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect cables from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

Part 3 Execution

3.1 EXAMINATION

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

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 CABLE INSTALLATION IN DUCTS

.1 Install cables as indicated in ducts.

.2 Do not pull spliced cables inside ducts.

.3 Install multiple cables in duct simultaneously.

.4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.

.5 To facilitate matching of colour coded multiconductor control cables reel off in same direction during installation.

.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.

.7 After installation of cables, seal duct ends with duct sealing compound.

3.3 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Perform tests using qualified personnel.

.1 Include necessary instruments and equipment.

.3 Check phase rotation and identify each phase conductor of each feeder.

.4 Check each feeder for continuity, short circuits and grounds.

.1 Ensure resistance to ground of circuits is not less than 50 megohms.

.5 Pre-acceptance tests:

.1 After installing cable but before splicing and terminating, perform insulation resistance test with 1000 V megger on each phase conductor.

.2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.

.6 Acceptance Tests:

.1 Ensure that terminations and accessory equipment are disconnected.

.2 Ground shields, ground wires, metallic armour and conductors not under test.

.3 High Potential (Hipot) Testing.

.1 Conduct hipot test voltage in accordance with manufacturer's recommendations.

.7 Provide Departmental Representative with list of test results showing location at which each test was made, circuit tested and result of each test.

.8 Remove and replace entire length of cable if cable fails to meet any of test criteria.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

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

3.5 PROTECTION

.1 Repair damage to adjacent materials caused by cables installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCES

.1 CSA International

.1 CAN/CSA-C22.2 No.47-M90 (R2007), Air-Cooled Transformers (Dry Type).

.2 CSA C9-02(R2007), Dry-Type Transformers.

.3 CAN/CSA-C802.2-06, Minimum Efficiency Values for Dry Type Transformers.

.2 National Electrical Manufacturers Association (NEMA)

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 dry type transformers and include product characteristics, performance criteria, physical size, finish and limitations.

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 dry type transformers for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect dry type transformers from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 DESIGN DESCRIPTION

.1 Design [1].

- .1 Type: ANN
- .2 3 phases, 45 kVA, 600V input, 120/208 V output, 60 Hz.
- .3 Voltage taps: standard.
- .4 Insulation: Class 220, 150 degrees C temperature rise.
- .5 Basic Impulse Level (BIL): standard.
- .6 Hipot: standard.
- .7 Average sound level: 50dB
- .8 Impedance at 17 degrees C: standard
- .9 Enclosure: CSA-1, removable metal front panel.
- .10 Mounting: on the floor, on a 300mm high structural steel frame.
- .11 Finish: in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .12 Copper windings.
- .13 Winding configuration to be as noted on drawings.
- .14 Harmonic Mitigating Phase Shifting transformers as indicated on drawings.
- .15 KL-Rated Transformers as indicated on drawings.
- .16 Voltage Regulation to be 4% or better.

2.2 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Label size: 7.

.3 Nameplate indications: primary voltage, secondary voltage, load and charge identification

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for dry type transformers installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Mount dry type transformers up to 75 kVA as indicated.

.2 Ensure adequate clearance around transformer for ventilation.

.3 Install transformers in level upright position.

.4 Remove shipping supports only after transformer is installed and just before putting into service.

.5 Loosen isolation pad bolts until no compression is visible.

.6 Make primary and secondary connections in accordance with wiring diagram.

.7 Energize transformers after installation is complete.

.8 Make conduit entry into bottom 1/3 of transformer enclosure.

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.

3.4 PROTECTION

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

.2 Repair damage to adjacent materials caused by dry type transformers installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS.

.1 Section 26 05 00 - Common Work Results for Electrical.

.2 Section 26 28 16.02 - Moulded Case Circuit Breakers.

1.2 REFERENCES

.1 CSA International

.1 CSA C22.2 No.29-11, Panelboards and Enclosed Panelboards.

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 panelboards and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Include on drawings:

.1 Electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

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 panelboards for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect panelboards from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 PANELBOARDS

.1 Panelboards: to CSA C22.2 No.29 and product of one manufacturer.

.1 Install circuit breakers in panelboards before shipment.

.2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.

.2 250 and 600 V panelboards: bus and breakers rated for 22 000A (@600V) and 10 000A (@250V) (symmetrical) interrupting capacity or as indicated.

.3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.

.4 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated.

.5 Minimum of 2 flush locks for each panel board.

.6 Two keys for each panelboard and key panelboards alike.

.7 Copper bus with neutral of same ampere rating of mains.

.8 Mains: suitable for bolt-on breakers.

.9 Trim with concealed front bolts and hinges.

.10 Trim and door finish: baked enamel.

2.2 BREAKERS

.1 Breakers: to Section 26 28 16.02 - Moulded Case Circuit Breakers.

.2 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.

.3 Lock-on devices for 10% of 15 to 30 A breakers installed as indicated. Turn over unused lock-on devices to Departmental Representative.

2.3 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Nameplate for each panelboard size 4 engraved as indicated.

.3 Complete circuit directory with typewritten legend showing location and load of each circuit, mounted in plastic envelope at inside of panel door.

Part 3 Execution

3.1 EXAMINATION

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

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.

.2 Install surface mounted panelboards on plywood backboards in accordance with Section 06 10 00 - Rough Carpentry. Where practical, group panelboards on common backboard.

.3 Mount panelboards to height specified in Section 26 05 00 - Common Work Results for Electrical or as indicated.

.4 Connect loads to circuits.

.5 Connect neutral conductors to common neutral bus with respective neutral identified.

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.

3.4 PROTECTION

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

.2 Repair damage to adjacent materials caused by panelboards installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCES

.1 CSA International

.1 CSA C22.2 No.42-10, General Use Receptacles, Attachment Plugs and Similar Devices.

.2 CAN/CSA C22.2 No.42.1-00(R2009), Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).

.3 CSA C22.2 No.111-10, General-Use Snap Switches (Bi-national standard, with UL 20).

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 [wiring devices] and include product characteristics, performance criteria, physical size, finish and limitations.

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 [wiring devices] for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect wiring devices from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 SWITCHES

.1 15 A,[120 V, single pole switches to: CSA C22.2 No.55.

.2 Manually-operated general purpose AC switches with following features:

- .1 Terminal holes approved for No. 10 AWG wire.
- .2 Silver alloy contacts.
- .3 Urea or melamine moulding for parts subject to carbon tracking.
- .4 Suitable for back and side wiring.
- .5 White toggle.

.3 Switches of one manufacturer throughout project.

2.2 RECEPTACLES

.1 Duplex receptacles, CSA type 5-15 R, 125 V, 15 A, U ground, to: CSA C22.2 No.42 with following features:

- .1 White urea moulded housing.
- .2 Suitable for No. 10 AWG for back and side wiring.
- .3 Break-off links for use as split receptacles.
- .4 Eight back wired entrances, four side wiring screws.
- .5 Triple wipe contacts and rivetted grounding contacts.

.2 Single receptacles CSA type 5-15 R, 125 V, 15 A, U ground with following features:

- .1 White urea moulded housing.
- .2 Suitable for No. 10 AWG for back and side wiring.
- .3 Four back wired entrances, 2 side wiring screws.

.3 Other receptacles with ampacity and voltage as indicated.

.4 Receptacles of one manufacturer throughout project.

2.3 COVER PLATES

.1 Cover plates for wiring devices to: CSA C22.2 No.42.1.

.2 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.

.3 Plastic, white cover plates, thickness 2.5 mm for wiring devices mounted in flush-mounted outlet box.

.4 Sheet metal cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.

2.4 SOURCE QUALITY CONTROL

.1 Cover plates from one manufacturer throughout project.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wiring devices installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Switches:

.1 Install single throw switches with handle in "UP" position when switch closed.

.2 Install switches in gang type outlet box when more than one switch is required in one location.

.3 Mount toggle switches at height in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Receptacles:

.1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.

.2 Mount receptacles at height in accordance with Section 26 05 00 - Common Work Results for Electrical.

.3 Where split receptacle has one portion switched, mount vertically and switch upper portion.

.4 Install GFI type receptacles as indicated.

.3 Cover plates:

.1 Install suitable common cover plates where wiring devices are grouped.

.2 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

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.

3.4 PROTECTION

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

.2 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.

.3 Repair damage to adjacent materials caused by wiring device installation.

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Provide fuse performance data characteristics for each fuse type and size above 100 A. Performance data to include: average melting time-current characteristics.

.3 Shop Drawings:

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

1.2 DELIVERY, STORAGE AND HANDLING

.1 Ship fuses in original containers.

.2 Do not ship fuses installed in switchboard.

.3 Store fuses in original containers in moisture free location.

1.3 EXTRA MATERIALS

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 Three spare fuses of each type and size installed above [600] A.

Part 2 Products

2.1 FUSES - GENERAL

.1 Fuse type references L1, L2, J1, R1, etc. have been adopted for use in this specification.

.2 Fuses: product of one manufacturer.

2.2 FUSE TYPES

.1 Class L fuses.

.1 Type L1, time delay, capable of carrying 500% of its rated current for 10 s minimum.

.2 Type L2, fast acting.

.2 Class J fuses.

.1 Type J1, time delay, capable of carrying 500% of its rated current for 10 s minimum.

.2 Type J2, fast acting.

.3 Class R -R fuses.

.1 Type R1, (UL Class RK1), time delay, capable of carrying 500% of its rated current for 10 s minimum, to meet UL Class RK1 maximum let-through limits.

.2 Type R2, time delay, capable of carrying 500% of its rated current for 10 s minimum.

.3 Type R3, (UL Class RK1), fast acting Class R, to meet UL Class RK1 maximum let-through limits.

.4 Class C fuses.

Part 3 Execution

3.1 INSTALLATION

.1 Install fuses in mounting devices immediately before energizing circuit.

.2 Ensure correct fuses fitted to physically matched mounting devices.

.1 Install rejection clips for Class R fuses.

.3 Ensure correct fuses fitted to assigned electrical circuit.

.4 Where UL Class RK1 fuses are specified, install warning label "Use only UL Class RK1 fuses for replacement" on equipment.

.5 Install spare fuses in fuse storage cabinet.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 CSA International

.1 CSA C22.2 No. 5-09, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, and NMX-J-266-ANCE-2010).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for circuit breakers and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Include time-current characteristic curves for breakers with interrupting capacity of 22,000 A symmetrical (rms) and over at system.

.4 Certificates:

.1 Prior to installation of circuit breakers in either new or existing installation, Contractor must submit 3 copies of a production certificate of origin from the manufacturer. Production certificate of origin must be duly signed by factory and local manufacturer's representative certifying that circuit breakers come from this manufacturer and are new and meet standards and regulations.

.1 Production certificate of origin must be submitted to Departmental Representative for approval.

.2 Delay in submitting production of certificate of origin will not justify any extension of contract and additional compensation.

.3 Any work of manufacturing, assembly or installation to begin only after acceptance of production certificate of origin by Departmental Representative. Unless complying with this requirement, Departmental Representative reserves the right to mandate manufacturer listed on circuit breakers to authenticate new circuit breakers under the contract, and to Contractor's expense.

.4 Production certificate of origin must contain:

.1 Manufacturer's name and address and person responsible for authentication. Person responsible must sign and date certificate.

.2 Licensed dealer's name and address and person of distributor responsible for Contractor's account.

.3 Contractor's name and address and person responsible for project.

.4 Local manufacturer's representative name and address. Local manufacturer's representative must sign and date certificate.

.5 Name and address of building where circuit breakers will be installed:

.1 Project title
.2 List of circuit breakers

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store circuit breakers in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect circuit breakers from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 BREAKERS GENERAL

.1 Circuit breakers: to CSA C22.2 No. 5

.2 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation.

.3 Common-trip breakers: with single handle for multi-pole applications.

2.2 THERMAL MAGNETIC BREAKERS

.1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

Part 3 Execution

3.1 EXAMINATION

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

.1 Visually inspect subtract..

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Breakers must be factory installed prior shipping

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.

END OF SECTION

Approved: 2011-06-30

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCES

.1 CSA International

.1 CAN/CSA C22.2 No.144-M91(R2006), Ground Fault Circuit Interrupters.

.2 National Electrical Manufacturers Association (NEMA)

.1 NEMA PG 2.2-1999(R2009), Application Guide for Ground Fault Protection Devices for Equipment.

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 ground fault circuit interrupters and include product characteristics, performance criteria, physical size, finish and limitations.

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 ground fault circuit interrupters for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect ground fault circuit interrupters from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Equipment and components for ground fault circuit interrupters (GFCI): to CAN/CSA C22.2 No.144.

.2 Components comprising ground fault protective system to be of same manufacturer.

2.2 GROUND FAULT PROTECTOR UNIT

.1 Self-contained with 15 A, 120 V circuit interrupter and duplex receptacle complete with:

.1 Solid state ground sensing device.

.2 Facility for testing and reset.

.3 CSA Enclosure 1, flush mounted with face plate.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for ground fault circuit interrupters installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Do not ground neutral on load side of ground fault relay.

.2 Pass phase conductors including neutral through zero sequence transformers.

.3 Connect supply and load wiring to equipment in accordance with manufacturer's recommendations.

3.3 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical and co-ordinate with Section 01 45 00 - Quality Control if required.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 - Common Work Results for Electrical .

.2 Section 26 28 13.01 - Fuses - Low Voltage .

1.2 REFERENCES

.1 CSA Group

.1 CAN/CSA-C22.2 No.4-04(R2009), Enclosed and Dead-Front Switches (Tri-National Standard, with ANCE NMX-J-162-2004 and UL 98).

.2 CSA C22.2 No.39-13, Fuseholder 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 disconnect switches - fused and non-fused and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect disconnect switches - fused and non-fused from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 DISCONNECT SWITCHES

.1 Fusible or Non-fusible, disconnect switch in CSA enclosure 1, to CAN/CSA-C22.2 No.4 size as indicated.

.2 Provision for padlocking in on-off switch position by 3 locks.

.3 Mechanically interlocked door to prevent opening when handle in ON position.

.4 Fuses: size as indicated, in accordance with Section 26 28 13.01 - Fuses - Low Voltage.

.5 Fuseholders: to CSA C22.2 No.39, relocatable and suitable without adaptors, for type and size of fuse indicated.

.6 Quick-make, quick-break action.

.7 ON-OFF switch position indication on switch enclosure cover.

2.2 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Indicate name of load controlled on size 4 nameplate.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for disconnect switches - fused and non-fused installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Install disconnect switches complete with fuses if applicable.

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.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI C82.1-04, Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.

.2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)

.1 ANSI/IEEE C62.41-1991, Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.

.3 ASTM International Inc.

.1 ASTM F1137-00(2006), Standard Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.

.4 Canadian Standards Association (CSA International)

.5 ICES-005-07, Radio Frequency Lighting Devices.

.6 Underwriters' Laboratories of Canada (ULC)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Provide complete photometric data prepared by independent testing laboratory for luminaires where specified.

.3 Photometric data to include: VCP Table where applicable.

.3 Quality assurance submittals: provide following in accordance with Section 01 45 00 - Quality Control.

.1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence, cleaning procedures and maintenance.

1.3 QUALITY ASSURANCE

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

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

Part 2 Products

2.1 LAMPS

.1 Fluorescent lamps to be - T8, 32 Watt, medium bi-pin, rapid-start, 4100 K, 30,000 hour lamp life, 2950 initial lumens, CRI 80; or as indicated.

.2 Compact fluorescent lamps, as indicated, G24q-2 base, 12,000 hour lamp life, 12,000 initial lumens, 4100 K, CRI [80]; or as indicated.

2.2 BALLASTS

.1 Fluorescent ballast: CBM and CSA certified, energy efficient type, IC electronic.

.1 Rating: 120V, 60 Hz, for use with 2-32W, rapid start lamps.

.2 Totally encased and designed for 40 degrees Celsius ambient temperature.

.3 Power factor: minimum 95 % with 95% of rated lamp lumens.

.4 Current crest factor: 1.7maximum.

.5 Harmonics: 10 % maximum THD.

.6 Operating frequency of electronic ballast: 20 kHz minimum.

.7 Ballast factor: greater than 0.90.

.8 Sound rated: Class A.

.9 Mounting: integral with luminaire.

2.3 FINISHES

.1 Light fixture finish and construction to meet ULC listings and CSA certifications related to intended installation.

2.4 OPTICAL CONTROL DEVICES

.1 As indicated in luminaire schedule.

2.5 LUMINAIRES

.1 As indicated in luminaire schedule.

Part 3 Execution

3.1 INSTALLATION

.1 Locate and install luminaires as indicated.

.2 Provide adequate support to suit ceiling system.

3.2 WIRING

.1 Connect luminaires to lighting circuits:

.1 Install flexible or rigid conduit for luminaires as indicated.

3.3 LUMINAIRE SUPPORTS

.1 For suspended ceiling installations support luminaires independently of ceiling.

3.4 LUMINAIRE ALIGNMENT

.1 Align luminaires mounted in continuous rows to form straight uninterrupted line.

.2 Align luminaires mounted individually parallel or perpendicular to building grid lines.

3.5 CLEANING

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

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 CSA International

.1 CSA C22.2 No.141-10, Emergency Lighting Equipment.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for emergency lighting and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for emergency lighting for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instruction].

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect emergency lighting from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

1.5 WARRANTY

.1 For batteries in this Section 26 52 00 - Emergency Lighting, 12 months warranty period is extended to 120 months.

Part 2 Products

2.1 EQUIPMENT

.1 Emergency lighting equipment: to CSA C22.2 No.141.

.2 Supply voltage: 120 V, AC.

.3 Output voltage: 12 V DC.

.4 Operating time: 60 minutes.

.5 Battery: sealed, maintenance free.

.6 Charger: solid state, multi-rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01 V for plus or minus 10% input variations.

.7 Solid state transfer circuit.

.8 Low voltage disconnect: solid state, modular, operates at 80% battery output voltage.

.9 Signal lights: solid state, for 'AC Power ON] and 'High Charge'.

.10 Lamp heads: integral on unit, 345 degrees horizontal and 180 degrees vertical adjustment. Lamp type: LED, 4W.

.11 Cabinet: suitable for direct or shelf mounting to wall and c/w knockouts for conduit. Removable or hinged front panel for easy access to batteries.

.12 Finish: blanc.

.13 Auxiliary equipment:

- .1 Ammeter.
- .2 Voltmeter.
- .3 Test switch.
- .4 Time delay relay.
- .5 Battery disconnect device.
- .6 AC input and DC output terminal blocks inside cabinet.
- .7 RFI suppressors.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for emergency lighting installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Install unit equipment and remote mounted fixtures.

.2 Direct heads.

.3 Connect exit lights to unit equipment.

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.

3.4 PROTECTION

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

.2 Repair damage to adjacent materials caused by emergency lighting installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.2 No.141-02, Unit Equipment for Emergency Lighting.

.2 CSA C860-01(December 2002), Performance of Internally-Lighted Exit Signs.

.2 National Fire Protection Association (NFPA)

.1 NFPA 101-2006, Life Safety Code.

1.2 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.

.3 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.4 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.5 Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures and maintenance.

Part 2 Products

2.1 SELF-POWERED UNITS

.1 Exit lights: to CSA C22.2 No.141 and CSA C860.

.2 Housing: extruded aluminum housing, brush aluminum finish.

.3 Face plate: extruded aluminum.

.4 Lamps: LED 1,5W.

.5 Letters: 150]mm high x 19 mm wide, with 13 mm thick stroke, red on die-cast aluminum face, reading SORTIE.

.6 Downlight: translucent acrylic in bottom of unit.

.7 Face plate to remain captive for relamping.

.8 Supply voltage: 120 V, ac.

.9 Output voltage: 24 V dc.

.10 Operating time: 60 minimum.

.11 Recharge time: 12 hours

.12 Battery: sealed, maintenance free.

.13 Charger: solid state, voltage/current regulated, inverse temperature compensated, short circuit protected, with regulated output of plus or minus 0.01 V for plus or minus 10% V input variation.

.14 Solid state transfer circuit.

.15 Signal lights: solid state, for 'AC Power ON' and 'High Charge' condition.

.16 Lamp heads: integral on unit, 345 degrees horizontal and 180 degrees vertical adjustment.

.1 Lamp type: LED 4W.

.17 Mounting: suitable for universal mounting directly on junction box and c/w knockouts for conduit.

.1 Removable or hinged front panel for easy access to batteries.

.18 Cabinet: finish: white.

.19 Auxiliary equipment:

.1 Ammeter.
.2 Voltmeter.
.3 Lamp disconnect switch.
.4 Test switch.
.5 AC/DC output terminal blocks inside cabinet.
.6 RFI suppressor.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install exit lights to manufacturer's recommendations, listing requirements, NFPA standard and local regulatory requirements.

.2 Connect fixtures to exit light circuits.

.3 Connect emergency lamp sockets to emergency circuits.

.4 Ensure that exit light circuit breaker is locked in on position.

3.3 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.

END OF SECTION

Approved: 2006-03-31

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 This section is an explanatory document for additions to the existing fire alarm system (Mircom FA-1025T). The elements to be added are, but not limited to:.

.1 Manual alarm stations.

.2 Automatic alarm initiating devices.

.3 Audible signal devices.

.4 End-of-line devices.

.2 Related Requirements

.1 Section 26 05 00 - Common Work Results for Electrical .

1.2 REFERENCES

.1 Government of Canada

.1 TB OSH Chapter 3-03, 1997-01-28, Treasury Board of Canada, Occupational Safety and Health, Chapter 3-03, Standard for Fire protection Electronic Data Processing Equipment.

.2 TB OSH Chapter 3-04, 1994-12-22, Treasury Board of Canada, Occupational Safety and Health, Chapter 3-04, Standard for Fire Alarm Systems.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 Underwriter's Laboratories of Canada (ULC)

.1 CAN/ULC-S524, Standard for the Installation of Fire Alarm Systems.

.2 CAN/ULC-S525, Audible Signal Device for Fire Alarm Systems.

.3 CAN/ULC-S530, Heat Actuated Fire Detectors for Fire Alarm Systems.

.4 CAN/ULC-S531, Standard for Smoke Alarms.

.4 National Fire Protection Agency

.1 NFPA 72, National Fire Alarm Code.

.2 NFPA 90A, Installation of Air Conditioning and Ventilating Systems.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings:

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

.2 Include:

.1 Layout of equipment.

.2 Zoning.

.3 Complete wiring diagram, including schematics of modules.

.3 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.

.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.2 Instructions: submit manufacturer's installation instructions.

.3 Manufacturer's Field Reports: manufacturer's field reports specified.

.4 Closeout Submittals:

.1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals in accordance with ANSI/NFPA 20.

.2 Submit following:

.1 Manufacturer's Data for:

.1 Control panel and modules.

.2 Storage batteries.

.3 Battery charger.

.4 Manual pull stations.

.5 Heat detectors.

.6 Open-area smoke detectors.

.7 Duct smoke detectors.

.8 Alarm bells.

.9 Wiring.

.10 Ground rods.

.11 Conduit.

.12 Outlet boxes.

.13 Fittings for conduit and outlet boxes.

.14 Mark data which describe more than one type of item to indicate which type will be provided.

.15 Submit 1original for each item and clear, legible, first-generation photocopies for remainder of specified copies.

.2 System wiring diagrams:

.1 Submit complete wiring diagrams of system showing points of connection and terminals used for electrical connections in the system.

.2 Show modules, relays, switches and lamps in control panel.

.3 Design data: Power Calculations:

.1 Submit design calculations for existing system to substantiate that battery capacity exceeds supervisory and alarm power requirements.

.4 Schedules:

.1 Conductor wire marker schedule.

.5 Test Reports:

.1 Open-area 2-wire smoke detectors.

.2 Preliminary testing:

.1 Final acceptance testing.

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: company or person specializing in fire alarm system installations approved by manufacturer.

.2 Provide services of representative or technician from manufacturer of system, experienced in installation and operation of type of system being provided, to supervise installation, adjustment, preliminary testing, and final testing of system and to provide instruction to project personnel.

.3 Extra Materials:

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

Part 2 Products

2.1 MATERIALS

.1 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.

.2 Power supply: to CAN/ULC-S524.

.3 Audible signal devices: to CAN/ULC-S525.

.4 Manual pull stations: to CAN/ULC-S528.

.5 Thermal detectors: to CAN/ULC-S530.

.6 Smoke detectors: to CAN/ULC-S529.

2.2 SYSTEM OPERATION

.1 The existing system is single stage and conventional systeme. Operation to actuation following:

.1 Manual station.

.2 Heat detector.

.3 Smoke detector.

.2 Actuation of single operation device to initiate following:

.1 Building evacuation alarm devices to operate continuously.

.2 Transmit signal as per existing condition.

.3 Zone of alarm device to be indicated on control panel.

.4 Operations to remain in alarm mode (except alarm notification appliances if manually silenced) until system is manually restored to normal.

2.3 POWER SUPPLY

.1 120 V, ac, 60 Hz input, 24 V dc output from rectifier to operate alarm and signal circuits, with standby power of gell cell batteries minimum expected life of 4 years, sized in accordance with NBC.

2.4 MANUAL ALARM STATIONS

.1 Provide non-coded single action type with mechanical reset features.

.1 Non-coded single pole normally open contact for single stage.

.2 Stations:[semi-flush mounted type as indicated.

.1 For surface mounting provide station manufacturer's approved back box.

.2 Back box finish to match station finish.

.3 Equip each station with terminal strip with contacts of proper number and type to perform functions required.

.4 Stations: type not subject to operation by jarring or vibration.

.1 Break-glass-front stations are not permitted; [pull-lever break-rod type is acceptable provided presence of rod is not required to reset station].

.5 Station colour: red.

.6 Provide station with visible indication of operation.

.7 Restoration to require use of key.

.1 Keys: identical throughout system for stations and control panel(s).

.8 Mount stations with operating lever not more than [1.2] m above finished floor.

2.5 AUTOMATIC ALARM INITIATING DEVICES

.1 Heat detectors: provide heat detectors designed for detection of fire by combination fixed temperature rate-of-rise principle.

.2 Open-Area Smoke Detectors: provide detectors designed for detection of abnormal smoke densities by photoelectric principle.

.1 Detectors: as per existing.

.2 Provide necessary control and power modules required for operation integral with control panel.

.3 Detectors and associated modules: compatible with control panel and suitable for use in supervised circuit.

.4 Malfunction of electrical circuits to detector or its control or power units to result in operation of system trouble signals.

.5 Equip each detector with visible indicator lamp that will flash when detector is in normal standby mode and glow continuously when detector is activated.

.6 Each detector: plug-in type with tab-lock or twist-lock, quick disconnect head and separate base in which detector base contains screw terminals for making wiring connections.

.7 Detector head: removable from its base without disconnecting wires. Removal of detector head from its base to cause activation of system trouble signals.

.8 Screen each detector to prevent entrance of insects into detection chamber(s).

.3 Locate detectors in accordance with their listing by ULC and the requirements of NFPA 72, except provide at least 2 detectors in rooms of 54 square meters or larger in area.

.4 Mount detectors at underside of ceiling or deck above unless otherwise indicated.

.1 For mounting heights greater than 3 m above floor level, reduce actual detector linear spacing from listed spacing as required by NFPA 72.

.5 Temperature rating of detectors: in accordance with NFPA 72.

.6 Locate detectors minimum 300 mm to lighting fixtures and not closer than 600 mm to air supply or return diffuser.

.7 Ensure detectors, located in areas subject to moisture or exterior atmospheric conditions or hazardous locations as defined by NFPA 70, are approved for such locations.

.8 Provide detectors with terminal screw type connections.

.9 Removal of detector head from its base to cause activation of system trouble signals if detectors are provided with separable heads and bases.

2.6 AUDIBLE SIGNAL DEVICES

.1 Audible device(s):

.1 Signal chimes: heavy duty, single stroke, 24 V dc, with solid striking plunger and resonating chamber, 95 db.

.2 Do not exceed 80 percent of listed rating in amperes of notification appliance circuit. Provide additional circuits above those shown if required to meet this requirement.

.3 Provide appliances specifically listed for outdoor use in locations exposed to weather.

.4 Finish appliances in red enamel.

.5 For surface mounting provide appliance manufacturer's approved back box. Back box finish to match appliance finish.

2.7 END-OF-LINE DEVICES

.1 End-of-line devices to control supervisory current in alarm circuits and signalling circuits, sized to ensure correct supervisory current for each circuit. Open [, short] or ground fault in any circuit will alter supervisory current in that circuit, producing audible and visible alarm at main control panel [and remotely as indicated].

2.8 CONDUIT

.1 Electrical Metallic Tubing (EMT).

2.9 WIRING

.1 Wire for 120 V circuits: No. 12 AWG minimum solid copper conductor.

.2 Wire for low voltage DC circuits: No. 14 AWG minimum solid copper conductor

.3 Insulation 75 degrees C minimum with nylon jacket.

.4 Colour code wiring.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install new components systems in accordance with CAN/ULC-S524.

.2 Locate and install manual alarm stations and connect to alarm circuit wiring.

.3 Locate and install detectors and connect to alarm circuit wiring. Do not mount detectors within 1 m of air outlets. Maintain at least 600 mm radius clear space on ceiling, below and around detectors. Locate duct type detectors in straight portions of ducts.

.4 Connect alarm circuits to main control panel.

.5 Locate and install bells and connect to signalling circuits.

.6 Connect signalling circuits to main control panel.

.7 Install end-of-line devices [at end of alarm and signalling circuits].

3.3 FIELD QUALITY CONTROL

.1 Site Tests:

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical and CAN/ULC-S537.

.2 Fire alarm system:

.1 Test each device and alarm circuit to ensure manual stations, thermal and smoke detectors transmit alarm to control panel and actuate general alarm.

.2 Check annunciator panels to ensure zones are shown correctly.

.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.

3.4 TRAINING

.1 Arrange and pay for on-site lectures and demonstrations by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system.

3.5 CLEANING

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

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 33 11 16.01 Incoming site water utility distribution piping.

.2 Section 33 31 13 Public sanitary utility sewerage piping.

.3 Section 32 92 23 Sodding.

1.2 MEASUREMENT PROCEDURES

.1 See Appendix A.

1.3 REFERENCES

.1 Construction work – General technical clauses – Aggregates NQ1809-114.

.2 BNQ standards, series 2560 on aggregates.

.3 Latest edition of the Cahier des charges et devis généraux (CCDG) (General Drawings and Specifications Workbook) of the Quebec Department of Transport

.4 Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General Technical Clauses – Drinking water and sewer pipe

1.4 DEFINITIONS

.1 Excavation classes: (2) classes of excavation will be recognized; common excavation and rock excavation.

.1 Rock: solid material in excess of 1.00 m³ and which cannot be removed by means of heavy duty mechanical excavating equipment. Frozen material not classified as rock.

.2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

.2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.

.3 Topsoil:

.1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.

.4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.6 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

.7 Unsuitable materials:

.1 Weak, chemically unstable, and compressible materials.

.2 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D 4318, and gradation within limits specified when tested to ASTM D 422 and ASTM C 136: Sieve sizes to BNQ 1530-060 standards.

.2 Table:

Sieve Designation	% Passing
2.00 mm	[100]
0.10 mm	[45 - 100]
0.02 mm	[10 - 80]
0.005 mm	[0 - 45]

.3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 N/A.

1.6 QUALITY ASSURANCE

.1 N/A.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 N/A.

1.8 EXISTING CONDITIONS

.1 Buried services:

.1 Before commencing work establish location of buried services on and adjacent to site.

.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

.3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.

.4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.5 Prior to beginning excavation Work, notify applicable Parks Canada representative establishes location and states of use of buried utilities and structures. Parks Canada representative to clearly mark such locations to prevent disturbance during Work.

.6 Confirm locations of buried utilities by careful test excavations.

.7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.

.8 Where utility lines or structures exist in area of excavation, obtain direction of Parks Canada representative before removing. Costs for such Work to be paid by Parks Canada representative.

.9 Record location of maintained, re-routed and abandoned underground lines.

.10 Confirm locations of recent excavations adjacent to area of excavation.

.2 Existing buildings and surface features:

.1 Conduct, with Parks Canada representative condition, survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Parks Canada representative.

Part 2 Products

2.1 MATERIALS

.1 Fill materials must be compliant with the following requirements.

.1 Stone, gravel, bank-run sand, screened or crushed stone

.2 Granulometry within the limits set during testing as per BNQ 2560.

Part 3 Execution

3.1 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 construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.3 PREPARATION/PROTECTION

.1 Keep excavations clean, free of standing water, and loose soil.

.2 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Parks Canada Representative.

.3 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.

.4 Protect buried services that are required to remain undisturbed.

3.4 STRIPPING OF TOPSOIL

.1 Begin topsoil stripping of areas as indicated by Parks Canada Representative.

.2 Strip topsoil to depths as indicated by Parks Canada Representative.

.1 Do not mix topsoil with subsoil.

.3 Stockpile in locations as indicated by Parks Canada Representative.

.1 Stockpile height not to exceed 2 m and should be protected from erosion.

.4 Dispose of unused topsoil to location as indicated off site as directed by Parks Canada Representative.

3.5 STOCKPILING

.1 Stockpile fill materials in areas designated by Parks Canada Representative.

.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

.3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.6 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Provide for [arks Canada Representative approval details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.

.1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures runoff areas and in manner not detrimental to public and private property, or portion of Work completed or under construction.

.1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

3.7 EXCAVATION

.1 Advise Parks Canada Representative at least 3 days in advance of excavation operations for initial cross sections to be taken.

.2 Excavate to lines, grades, elevations and dimensions as indicated.

.3 During excavation work, remove all obstructions impeding the work.

.4 Excavation must not interfere with bearing capacity of adjacent foundations.

.5 Do not disturb soil within branch spread of trees or shrubs that are to remain.

.1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.6 For trench excavation, unless otherwise authorized by Parks Canada Representative 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.

.7 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Parks Canada Representative.

.8 Restrict vehicle operations directly adjacent to open trenches.

.9 Dispose of surplus and unsuitable excavated material off site.

.10 Do not obstruct flow of surface drainage or natural watercourses.

.11 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.12 Notify Parks Canada Representative when bottom of excavation is reached.

.13 Obtain Parks Canada Representative approval of completed excavation.

.14 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Parks Canada Representative.

3.8 FILL TYPES AND COMPACTION

.1 Use types of fill as indicated or specified below.

.1 Under concrete slabs: fill up to the level of the bedding with MG-20-type fill and compact to 95% of the corrected maximum dry volume mass.

.2 Place unshrinkable fill in areas as indicated.

.2 Do not begin filling before the waterproofing and drainage work and before the Parks Canada representative has inspected the area and given his approval.

.3 The surfaces to be filled must be free of debris, snow, ice, water or frozen soil. The fill most not contain frozen elements, ice, snow or debris.

.4 Do not place fill materials around or over cast-in-place concrete structures within 24 hours of the formwork being removed.

3.9 BEDDING AND SURROUND OF UNDERGROUND SERVICES

.1 Place and compact granular material for bedding and surround of underground services [s indicated in section 9 – Excavation and fill Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General Technical Clauses – Drinking water and sewer pipe.

.2 Place bedding and surround material in unfrozen condition.

3.10 BACKFILLING

.1 Do not proceed with backfilling operations until completion of following:

.1 Parks Canada representative has inspected and approved installations.

.2 Parks Canada representative has inspected and approved of construction below finish grade.

.3 Inspection, testing, approval, and recording location of underground utilities.

.4 Removal of concrete formwork.

.5 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.5 Backfilling around installations:

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

.3 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:

.4 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Parks Canada representative.

.6 If approved by Parks Canada representative erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Parks Canada representative

3.11 RESTORATION

.1 Upon completion of Work, remove waste materials and debris. Trim slopes, and correct defects as directed by Parks Canada Representative.

.2 Replace topsoil as indicated or as directed by Parks Canada Representative.

.3 Reinstate lawns to elevation which existed before excavation.

.4 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.

.5 Clean and reinstate areas affected by Work as directed by Parks Canada Representative.

.6 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 Excavating, trenching and backfilling

.2 BNQ series 2560 standards concerning aggregates.

.3 Latest edition of the Cahier des charges et devis généraux (CCDG) (General Drawings and Specifications Workbook).

1.2 SUMMARY

.1 This section sets out the requirements that apply to the installation of granular materials to rehabilitate a stone road.

.2 The work in this section consist of and are not limited to the following:

.1 Supply and installation of crushed stone and fine aggregate stone to rehabilitate a stone road.

1.3 MEASUREMENT AND PAYMENT

.1 See Appendix A.

1.4 REFERENCES

.1 BNQ series 2560 standards concerning aggregates.

.2 Latest edition of the Cahier des charges et devis généraux (CCDG) (General Drawings and Specifications Workbook).

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit the technical data sheets of suppliers, including the granulometric sheets and granulate components to the laboratory and to the Parks Canada representative two (2) weeks before the work is done.

Part 2 Products

2.1 MATERIALS

.1 Granular materials are specified in the plans and must comply with BNQ series 2560.

.2 Aggregate characteristics: good quality, hard, resistant, free of flat particles, needles, soft or laminate particles, organic materials, clumps of clay, minerals or other substances that could interfere with the intended use.

.1

Part 3 Execution

3.1 EXAMINATION

.1 Examination of conditions: prior to installing the granular foundation layer and ensuring that the condition of the surfaces.

.1 Perform a visual inspection of surfaces/supports in the presence of a Parks Canada representative.

.2 Inform the Parks Canada representative immediately of any unacceptable condition that is discovered.

3.2 PREPARATION

.1 Stockpiling

.1 Aggregates must be stockpiled on level and well-drained ground with load-bearing capability and stability sufficient to support the stockpiled materials and the handling equipment.

.2 Unless the materials are stockpiled on an acceptable stabilized surface, the base of the stockpile must consist of compacted sand at least 300 mm thick to prevent contamination of the aggregates. Stockpile the aggregates on the ground but do not incorporate into the work the layer of materials 300 mm thick at the base of the stockpile.

.3 To avoid mixing the aggregates, allow sufficient space between different stockpiles of aggregates or separate them using sturdy, full-height partitions.

.4 Mixed or contaminated materials must not be used. Remove and eliminate rejected materials within 48 hours of refusal, according to the directives from the Parks Canada representative.

.5 Stockpile the materials in uniform layers of no more than 1.5 m high.

.6 Unload aggregates brought to the piles by truck into uniform piles and shape the piles in accordance with instructions.

.7 Do not make cone-shaped piles or have materials tumble down each side of the piles.

.8 Do not use stockpiling conveyors.

.9 For work in the winter time, prevent ice and snow from becoming mixed in with or taken out of the stockpiles.

3.3 PLACING

.1 Place granular sub-base after subgrade is inspected and approved by Parks Canada representative.

.2 Construct granular sub-base to depth and grade in areas indicated.

.3 Ensure no frozen material is placed.

.4 Place material only on clean unfrozen surface, free from snow or ice.

.5 Place granular sub-base materials using methods which do not lead to segregation or degradation.

.6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.

.1 Parks Canada representative may authorize thicker lifts if specified compaction can be achieved.

.7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.8 Remove and replace portion of layer in which material has become segregated during spreading.

3.4 COMPACTION

.1 Perform rolling in accordance with the section 11.9 du Cahier des charges et devis généraux d(General Drawings and Specifications Workbook) of the Quebec Department of Transport, last edition.

3.5 PROOF ROLLING

.1 N/A

.1 Replace sub-base material and compact.

3.6 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.

3.7 SITE TOLERANCES

.1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 Excavating, trenching and backfilling

.2 Latest edition of the Cahier des charges and devis généraux (CCDG) (General Drawings and Specifications Workbook).

.3 Standardized technical specifications NQ 0605-100/2001 Aménagement paysagé à l'aide de végétaux (plant landscaping method).

1.2 SUMMARY

.1 Sodding and topsoil application requirements are described in this section.

.2 The work in this section includes but is not limited to the following:

.1 Supply and installation of sod and topsoil to completely restore the grassy surfaces affected by the work.

1.3 MEASUREMENT AND PAYMENT

.1 See Appendix A.

1.4 REFERENCES

.1 Latest edition of the Cahier des charges et devis généraux (CCDG) (General Drawings and Specifications Workbook).

.2 Standardized technical specifications NQ 0605-100/2001 Aménagement paysagé à l'aide de végétaux (plant landscaping method).

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Scheduling:

.1 Schedule sod laying to coincide with preparation of soil surface.

.2 Schedule sod installation when frost is not present in ground.

1.6 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 sod, geotextile and fertilizer and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements of seed mix, seed purity, and sod quality.

.4 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties of seed mix, seed purity, and sod quality.

1.7 QUALITY ASSURANCE

Part 2 Products

2.1 MATERIALS

.1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.

.1 Turf Grass Nursery Sod types:

.1 Number One Kentucky Bluegrass Sod: Nursery Sod grown solely from seed of cultivars of Kentucky Bluegrass, containing not less than 50% Kentucky Bluegrass cultivars.

.2 Turf Grass Nursery Sod quality:

.1 Not more than 1 broadleaf weed and up to 1% native grasses per 40 square metres.

.2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.

.3 Mowing height limit: 35 to 65 mm.

.4 Soil portion of sod: 6 to 15 mm in thickness.

.2 Water:

.1 Water used to water the grass shall be taken from the Saint-Ours Canal with a pump provided by the contactor.

.3 Fertilizer:

.1 To Canada "Fertilizers Act" and Fertilizers Regulations.

.2 Complete, synthetic, slow release with 65 % of nitrogen content in water-insoluble form.

.4 Top soil for sodding: mixture of particles, microorganisms and organic matter that provide an environment conducive to the growth of the desired plants.

.1 Texture based on the Canadian Soil Classification System: soil made up of 20 to 70% sand, at least 7% clay and 2 to 10% of organic matter in weight.

.2 Must not contain any toxic elements or growth inhibitors.

.3 The finished surface provided must be free of debris and stones more than 50 mm in diameter.

.4 Coarse plant matter 10 cm in diameter and 100 mm in length and accounting for 2% of the soil volume.

.5 Consistency: friable soil when damp.

2.2 SOURCE QUALITY CONTROL

.1 Obtain written approval from Parks Canada Representative of sod at source.

.2 When proposed source of sod is approved, use no other source without written authorization from Parks Canada Representative.

Part 3 Execution

3.1 EXAMINATION

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

.1 Visually inspect substrate in presence of Parks Canada Representative.

.2 Inform Parks Canada 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 Parks Canada Representative.

3.2 PREPARATION

.1 Verify that grades are correct. If discrepancies occur, notify Parks Canada representative and commence work when instructed by Parks Canada representative.

.2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.

.3 Level the soil to eliminate unevenness and bumps and provide a slope that allows for proper runoff.

.4 Remove debris, roots, branches, stones more than 50 mm in diameter and other harmful substances. Also remove soil contaminated by calcium chloride, toxic matter and petroleum products, along with debris protruding more than 75 mm from the surface of the soil. Take all removed materials off site.

3.3 SOD PLACEMENT

.1 Once the Parks Canada representative has accepted the capping layer, spread the topsoil.

.2 Spread the topsoil in uniform layers not to exceed 150 mm thick.

.3 In areas to be sodded, increase the layer of topsoil to 15 mm of the final soil level.

.4 Spread the topsoil according to instructions in layers of minimum thickness after settlement:

.1 150 mm for areas to be sodded.

.5 Spread topsoil and humus by hand around trees, bushes and obstacles.

3.4 SOD PLACEMENT ON SLOPES AND PEGGING

.1 Ensure that sod is placed under the supervision of a certified planting supervisor.

.2 Place sod in parallel strips and stagger the joints. Ensure they are tightly abutted against one another, leaving no gaps but not overlapping. Trim narrow or irregularly shaped sod with cutting tools.

.3 Roll the sod according to the standardized technical specifications NQ 0605-100/2001 Aménagement paysager à l'aide de végétaux (Plant landscaping). Roll lightly to ensure the sod is in contact with the soil. Do not use a heavy roller to correct surface irregularities.

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 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.

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

.1 Clean and reinstate areas affected by Work.

3.6 PROTECTION BARRIERS

.1 Protect newly sodded areas from deterioration with snow fence on rigid frame as directed by Parks Canada Representative.

.2 Remove protection 2 weeks after installation as directed by Parks Canada Representative.

3.7 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following operations from time of installation until acceptance.

.1 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.

.2 Cut grass to 50 mm when or prior to it reaching height of 75 mm.

.3 Maintain sodded areas weed free 95%.

.4 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

.5 Temporary barriers or signage to be maintained where required to protect newly established sod.

3.8 ACCEPTANCE

.1 Turf Grass Nursery Sod areas will be accepted by Parks Canada Representative provided that:

.1 Sodded areas are properly established.

.2 Sod is free of bare and dead spots.

.3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.

.4 Sodded areas have been cut minimum 2 times prior to acceptance.

.2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

.3 When environmental conditions allow, all sodded areas showing shrinkage cracks shall be top-dressed and seeded with a seed mix matching the original.

.4 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.9 MAINTENANCE DURING WARRANTY PERIOD

.1 Perform following operations from time of acceptance until end of warranty period:

.1 Water sodded areas at weekly intervals to obtain optimum soil moisture conditions to depth of 100 mm.

.2 Repair and resod dead or bare spots to satisfaction of Parks Canada Representative.

.3 Cut grass and remove clippings that will smother grass to height as follows:

.1 Turf Grass Nursery Sod:

.1 50 mm during normal growing conditions.

.2 Commercial Grade Turf Grass Nursery Sod:

.1 60 mm during normal growing conditions.

.3 Cut grass at 2 week intervals, but at intervals so that approximately one third of growth is removed in single cut.

.4 Fertilize areas and spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

.5 Eliminate weeds by mechanical or chemical means to extent acceptable to Parks Canada Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 Excavating, trenching and backfilling

.2 Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe.

1.2 SUMMARY

.1 The aqueduct pipe installation requirements appear in this section (water supply of the projected shed).

.2 The work in this section includes but is not limited to the following:

.1 Supply and installation of a jointless K-type soft copper aqueduct pipe 19 mm in diameter.

.3 Connection of the new aqueduct pipe to the planned shed and to the superintendent's existing house.

1.3 REFERENCES

.1 Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe.

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 the aqueduct pipe, accessories, connectors, etc. and include product characteristics, performance criteria, physical size, finish and limitations.

1.5 CLOSEOUT SUBMITTALS

.1 N/A.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Transport, store and handle the materials and equipment in accordance with the manufacturer's written instructions.

.2 Delivery and acceptance : deliver the materials and equipment to the site in their original packaging, which must bear a sticker showing the manufacturer's name and address.

.3 Storage and handling

.1 Store the materials in accordance with the manufacturer's recommendations.

.2 Store the pipes in a way that protects them from damage.

.3 Replace damaged materials and equipment with new materials and equipment.

Part 2 Products

2.1 PIPE

.1 Service water pipe: K-type soft copper pipe 19 mm in diameter., from 1 m outside of building.

.1 Ductile iron: ANSI/AWWA C151/A21.51.

.2 Cement mortar lining for ductile iron pipe: ANSI/AWWA C104/A21.4.

.3 Polyethylene (PE) pipe: ANSI/AWWA C901.

2.2 CATHODIC PROTECTION

.1 N/A.

2.3 FITTINGS

.1 Connectors compliant with the Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe.

2.4 JOINTS

.1 The proposed aqueduct pipe must not have any joints. The new section of the copper aqueduct pipe shall run uninterrupted from the projected shed to the superintendant's existing building.

.2 Bolts, nuts, hex head with washers: to ASTM A307, heavy series.

2.5 CORPORATION DRAIN (WASTE VALVE)

.1 Corporation drain compliant with the articles in section 6.2.13 – Connection of drinking water in the Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for distribution piping installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Parks Canada Representative.

.2 Inform Parks Canada Representative of unacceptable conditions immediately upon discovery.

.3 Begin the installation work only after the unacceptable conditions cited by the Parks Canada representative have been rectified.

3.2 INSTALLATION

.1 Install in accordance with Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe.

.2 Minimum depth of bury: 1,8m.

3.3 DISINFECTION, CLEANING AND LEAK TESTS OF PIPES

.1 Disinfection, cleaning and leak tests compliant with the Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 Excavating, trenching and backfilling

.2 Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe

1.2 SUMMARY

.1 Sanitary sewer pipe installation requirements are described in this section (shed sanitary pipe connection).

.2 The work in this section includes but is not limited to the:

.1 Supply and installation of PVC DR-28 sanitary sewer pipes 100 mm in diameter

.3 Connection of new sanitary pipes to the main pipe.

1.3 MEASUREMENT AND PAYMENT

.1 See Appendix A.

1.4 REFERENCES

.1 Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Scheduling:

.1 Schedule Work to minimize interruptions to existing services and maintain existing sewage flows during construction.

.2 Submit schedule of expected interruptions for approval and adhere to approved schedule.

.3 Notify Parks Canada Representative 24 hours minimum in advance of any interruption in service.

1.6 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 sanitary pipes, accessories, sweep bends, connectors, etc. and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Product Data to submit 2 weeks prior to Work.

.2 Indicate on drawings proposed method for installing carrier pipe for undercrossings.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations.

.2 Store and protect pipes from damage.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 REVIEW

.1 Review of conditions: before installing the distribution piping, ensure that the surfaces/supports previously put in place as per other sections or contracts are acceptable and make it possible to do the work in accordance with the manufacturer's written instructions.

.1 Perform a visual inspection of the surfaces/supports in the presence of a Parks Canada representative.

.2 Inform the Parks Canada representative immediately of any unacceptable conditions that have been detected.

.3 Start the installation work only after the unacceptable conditions cited by the Parks Canada representative have been rectified.

2.2 PLASTIC PIPE

.1 Polyvinyl chloride (PVC) pipes: compliant with the instructions in the Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe

.2

2.3 SERVICE CONNECTIONS

.1 Sewer connection on the existing pipe compliant with the instructions in the Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe Plastic pipe: to CSA B182.1, with push-on joints.

Part 3 Execution

3.1 TRENCHING

.1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Protect trench from contents of sewer or sewer connection.

.3 Trench alignment and depth require approval of Parks Canada Representative.

3.2 INSTALLATION

.1 Installation of sanitary pipes as per section 10 – Installation in the Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe

3.3 PIPE SURROUND

.1 Place surround material in unfrozen condition.

.2 Surround material for the sanitary pipes compliant with the plans and the Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe

3.4 BACKFILL

.1 Place backfill material in unfrozen condition.

.2 Backfill of the sanitary pipes compliant with the plans and the Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe

3.5 SERVICE CONNECTIONS

.1 Install pipe to CSA B182.11, manufacturer's instructions and specifications and in compliance with the Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe

.2 Maintain a slope of 2% unless directed otherwise by Parks Canada Representative.

.3 Service connections to main sewer: with a tee if the pipe is made of PVC or with a tapping saddle Monobloc if the pipe is concrete

.1 Do not use break-in and mortar patch-type joints.

.4 Service connection pipe: not to extend into interior of main sewer.

.5 Make up required horizontal and vertical bends from 45 degrees bends or less, separated by straight section of pipe with minimum length of 4 pipe diameters.

.1 Use long sweep bends where applicable.

3.6 FIELD TESTING

.1 Repair or replace pipe, pipe joint or bedding found defective.

.2 When directed by Parks Canada Representative, draw tapered wooden plug with diameter of 50 mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction.

.3 Remove foreign material from sewers and related appurtenances by flushing with water.

.4 Perform infiltration and exfiltration testing as soon as practicable after jointing and bedding are complete, and service connections have been installed.

.5 Do leak tests (infiltrations and exfiltrations) as per the instructions of the Standardized technical specifications BNQ 1809-300/2004 (R2007) Construction work – General technical clauses – Drinking water and sewer pipe

.6 Television and photographic inspections:

.1 Carry out inspection of installed sewers by video camera, digital camera or by other related means and give two (2) copies in DVD format to the Parks Canada representative.

3.7 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.

END OF SECTION

DESCRIPTION OF ITEMS ON THE BID INFORMATION SHEET – CIVIL WORK

1) The quantities appearing for the various items on the sheet are for information purposes only. The contractor must personally calculate and validate the amounts of work by referring to the drawings and specifications. The contractor's lump sum must include all components appearing on the plans, even if they do not appear on the sheet, and all related work not explicitly indicated on the drawings and specifications but required to perform all of the work.

   The contractor shall use machinery adapted to work sites and constraints related to confined spaces.

2) The descriptions of the items on the bid information sheet supersede or complete those in standard NQ 1809-300/2004 (R 2007), BNQ 1809-500/2006 and in the Cahier des charges et devis généraux du Ministère des Transports du Québec (CCDG), (General Drawings and Specifications Workbook) of the Quebec Department of Transport) last edition.

In the item entitled, "**Exploratory excavation to locate the existing storm sewer pipe and inform the engineer of the location,"** the contractor must include but is not limited to the following in the overall price:

a) All items in article 12.2.22 of BNQ-1809-300;

b) A technical note sent to the engineer showing the exact elevations of the storm sewer pipe (the elevation of the top and bottom of the pipe in two different locations), including its position in x, y and z, according to the geodesic data system, its diameter and material;

c) All incidental expenses.

Everything as specified in the drawings and specifications.

In the item entitled, "**Measure the existing inverts in the sanitary manhole and inform the engineer of the location,"** the contractor must include but is not limited to the following in the overall price:

a) The measurement of the inverts in the existing sanitary sewer manhole;

b) A technical note sent to the engineer, describing the exact elevations of the inverts in the manhole in question, according the geodesic data system.

c) All incidental expenses.

Everything as specified in the drawings and specifications.

In the items entitled, "**Sanitary sewer…"** and "**Aqueduct…,"** the contractor must include the price per linear metre, based on the diameter and type indicated, but shall not be limited to:

a) Installation according to BNQ 1809-300/2004 (R2007);
b) Protection of trees, bushes, fences, etc.
c) Excavation;
d) Sanctioning of the trench, water control and support of surrounding structures (including foundation and electrical conduits);
e) Seat preparation;
f) Supply and installation of pipes based on the diameter and type indicated, including all special parts such as plugs and connector couplings;
g) Connection to pipes or to manholes (as the case may be);
h) Connection to the projected shed and to the superintendent's existing house (as the case may be);
i) Cover, fill and compaction;
j) Transportation and disposal of non-reusable materials, excavation surpluses and/or waste
k) All incidental expenses.

Everything as specified in the drawings and specifications.

In the item entitled, "**Connection to the existing sanitary sewer pipe,**" the contractor must include in the unit price, but is not limited to:

a) Coordination with public utilities;
b) Excavation;
c) Sanctioning, water control and support for surrounding structures, including but not limited to the waterworks pipe and storm water pipes;
d) Location of the existing pipe;
e) Cleaning of the pipes;
f) Connection to the existing pipe according to BNQ 1809-300/2004 (R2007);
g) Supply and installation of all other materials needed for the complete implementation of this structure;
h) Fill and compaction;
i) Transportation and disposal of excavation surpluses and/or waste;
j) All incidental expenses.

Everything as specified in the drawings and specifications.

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In the items entitled, "**Cleaning, leak tests and camera inspection of the pipes,"** the contractor must include in the price per linear metre but not be limited to:

a) Coordination with public utilities;
b) Cleaning;
c) Leak testing, including manholes, if applicable;
d) Infiltration tests;
e) Televised inspection, including copies of the report and DVDs;
f) Correction of defects and resumption of the aforementioned items in the event of non-compliance
g) All incidental expenses.

Everything as specified in the drawings and specifications.

In the item entitled, "**Waste valve 19mm in diameter,** the contractor must include in the unit price, according to the diameter indicated, but not be limited to:

a) Excavation;
b) Sanctioning of the trench, water control, pumping and support for surrounding structures;
c) Installation as per BNQ 1809-300/2004 (R2007);
d) Preparation and installation of the seat;
e) Supply and installation of the stop valve, gate valve box and all required accessories;
f) Fill and compaction with compactable excavation materials;
g) Transport and disposal of excavation surpluses and/or waste;
h) Levelling and final adjustment of the top of the box after the grass is installed;
i) All incidental expenses.

Everything as specified in the drawings and specifications.

In the item entitled, "**Well drain, including net stone 20 mm and geotextile**," the contractor must include but not be limited to in the overall price:

a) Excavation;
b) Sanctioning of the trench, water control, pumping and support for surrounding structures;
c) Supply and installation of geotextile;
d) Supply and installation of clean stone;
e) Fill and compaction with compactable excavation materials;
f) Transport and disposal of excavation surpluses and/or waste;
g) All incidental expenses.

Everything as specified in the drawings and specifications.

In the item entitled, "**Leak, cleaning, chlorination and disinfection tests**," the contractor must include in the linear metre price but not be limited to:

a) Items mentioned in article 12.2.15 of BNQ 1809-300;
b) Coordination with public utilities;
c) Chlorination plan and the collection of samples;
d) Supply, installation and removal of purges necessary for chlorination;
e) Correction of defects and resumption of aforementioned activities in the event of non-compliance;
f) Two copies of the report;
g) All incidental expenses.

Everything as specified in the drawings and specifications.

In the items entitled, "**Excavation, forming of the infrastructure and compaction,"** the contractor must include in the unit price but not be limited to:

a) Necessary excavation;
b) Preparation of the infrastructure;
c) Compaction;
d) Cuts and fills;
e) Disposal of waste and excavation surpluses;
f) All incidental expenses.

Everything as specified in the drawings and specifications.

In the items entitled, "**MG-20 crushed stone foundation**" and "**Fine aggregate stone 0.5 mm thick,**" the contractor must include in the square metre price but not be limited to:

a) Supply, transport, spreading, levelling and compaction of granular material, as specified;
b) All incidental expenses.

In the item entitled, "**Sod including a 150 mm thick layer of topsoil**," the contractor must include in the square metre price but not be limited to:

a) Sod, protection and maintenance;
b) Sifted and amended topsoil, 150 mm thick;
c) Installation of fertilizers and removal of all waste and stones 50 mm in diameter and over;
d) Watering and cutting according to the specifications in NQ 0605-100;
e) Supply of a pump to extract water from the St-Ours dam for watering;
f) Levelling and filling of surfaces before sod is installed, when required
g) All incidental expenses.

Everything as specified in the drawings and specifications.