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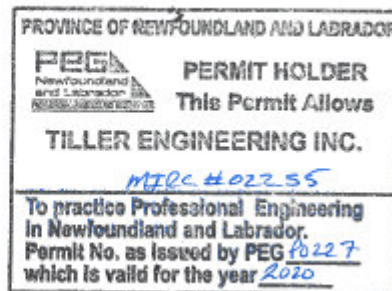
Pêches et Océans  
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**COLOMBIER ISLAND REFURBISHMENT SPECIFICATIONS  
COLOMBIER ISLAND, NL**

**JANUARY 2020  
ISSUED FOR TENDER**

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**CONSULTANT:**



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**END OF SECTION**

**PART 1**            **GENERAL**

**1.1**                **SECTION INCLUDES**

- .1            Title and description of Work.
- .2            Contractor use of premises.
- .3            Departmental Representative occupancy.

**1.2**                **WORK COVERED BY CONTRACT DOCUMENTS**

- .1            Work of this Contract comprises general construction renovation of Colombier Island Light station Site, located off the coast of Burnt Islands, NL; and further identified as Colombier Island.
- .2            The Work of the Project is defined by the Contract Documents and consists of the following:
  - .1            Supply, fabrications, installation, repairs/restoration, and other miscellaneous work identified herein and in Appendix A – Scope of Work and associated drawings.
  - .2            Work to be staged in Phases 1 & 2 as indicated in Appendix A – Scope of Work.
  - .3            Both Phases of work to be coordinated with Departmental Representative prior to work commencement.
- .3            Work not included in this contract comprises of decommissioning of electrical systems and associated equipment. Temporary requirements for light station electrical systems and associated equipment. Installing and commissioning of new electrical systems and associated equipment.
- .4            Work covered by the contract documents includes Commissioning of the facility as per Section 01 91 13 – Commissioning (Cx) Requirements including engagement of third-party structural engineer for verification of equipment structural support.

**1.3**                **CONTRACT METHOD**

- .1            Construct Work under stipulated price contract.

**1.4**                **WORK BY OTHERS**

- .1            DFO to coordinate decommissioning/reinstating and relocation of all services (electrical or other) prior to commencement of Work.
- .2            Co-operate with other Contractors in carrying out their respective works and carry out instructions from Departmental representative.
- .3            Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental representative, in writing, any defects which may interfere with proper execution of Work.

## **1.5 WORK SEQUENCE**

- .1 Construct Work in stages to accommodate Departmental Representative's continued use of premises during construction.
- .2 Maintain fire access/control.

## **1.6 CONTRACTOR USE OF PREMISES**

- .1 Contractor has limit use of premise for Work, storage and for access to allow continued operation of light station by Canadian Coast Guard.
- .2 Coordinate use of premises under direction of Departmental Representative.
- .3 Under this contract, DFO will provide helicopter services for Contractor mobilization activities. Services will only be provided between the work site and departure site of Burnt Islands, NL or nearby area determined by the Pilot and will be limited to 20 hours of helicopter time for transportation of materials and personnel. Mobilization is limited to one day of activities as determined by the Pilot. Helicopter time to include Pilots travel to and from Stephenville helicopter hangar (estimated 1:30 roundtrip). The maximum amount of weight during slinging operations for mobilizing equipment and materials is 1,200 pounds. During all mobilization activities DFO will not be held responsible for any lost or damaged equipment and materials. Contractor responsible to fully secure and contain all materials/equipment/fuels/etc. If in the opinion of the Departmental Representative (or the Coast Guard Pilot), the materials are not properly secured and contained, the chopper will not provide the services to the Contractor. Note that chopper services are variable due to inclement weather and other coast guard operations and in this regard, downtime is to be expected (there will be no additional contract costs if chopper services are unavailable when requested by the Contractor). Demobilization of site at the finish of the project will be the responsibility of the Contractor. Any additional time will be at the expense of the Contractor. Contractor required to complete the Coast Guard Helicopter Sling Training Course prior to flight.
- .4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .7 At completion of operations condition of existing work shall be equal to or better than that which existed before work started.

## **1.7 DEPARTMENTAL REPRESENTATIVE OCCUPANCY**

- .1 Departmental Representative will occupy premises during entire construction period for execution of normal operations.

- .2 Cooperate with Departmental Representative in scheduling operations to minimize conflict and to facilitate Departmental Representative usage.

## **1.8 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING STRUCTURES**

- .1 Execute work with least possible interference or disturbance to site operations. Arrange with Departmental Representative to facilitate execution of work.

## **1.9 EXISTING SERVICES**

- .1 Notify Departmental Representative of intended interruption of services and obtain permission as required.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours notice. Minimize duration of interruptions. Carryout work at times as directed by governing authorities with minimum disturbance.
- .3 Establish location and extent of service lines in area of work before commencing Work. Notify Departmental Representative of findings.
- .4 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
- .5 Provide temporary services when directed by Departmental Representative to maintain critical systems.
- .6 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .7 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .8 Record locations of maintained, rerouted and abandoned service lines.
- .9 Construct barriers in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

## **1.10 RELATED WORK**

- .1 The following specification sections are referenced to indicate work responsibilities as specified and carried in other versions.
  - .1 Section 21 05 00 – Common Work Results for Fire Suppression.
  - .2 Section 21 05 01 – Common Work Results for Mechanical.
  - .3 Section 22 05 00 – Common Work Results for Plumbing.
  - .4 Section 23 05 00 – Common Work Results for HVAC.
  - .5 Section 25 05 01 – EMCS – General Requirements.
  - .6 Section 26 05 00 – Common Work Results – Electrical.

**1.11 ON-SITE DOCUMENTS**

- .1 Maintain at job site documents as indicated in Section 01 31 00 – Project Management and Coordination.

**PART 2 PRODUCTS (NOT APPLICABLE)**

**PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

## **PART 1 GENERAL**

### **1.1 SECTION INCLUDES**

- .1 Coordination work with other contractors and subcontractors under administration of Departmental Representative.
- .2 Scheduled project meetings.

### **1.2 RELATED SECTIONS**

- .1 Section 01 11 00 - Summary of Work.
- .2 Section 01 91 13 – General Commissioning (Cx) Requirements.

### **1.3 DESCRIPTION**

- .1 Coordination of progress schedules, submittals, use of site, temporary utilities, construction facilities, and construction Work, with progress of Work of other contractors and subcontractors under instructions of Departmental Representative.

### **1.4 PROJECT MEETINGS**

- .1 Project meetings to be held at times and locations as determined by Departmental Representative.
- .2 Departmental Representative will arrange project meetings and record and distribute minutes.

### **1.5 CONSTRUCTION ORGANIZATION AND START-UP**

- .1 Within fifteen (15) working days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Establish time and location of meetings and notify parties concerned minimum 5 days before meeting.
- .3 Agenda to include following:
  - .1 Appointment of official representative of participants in Work.
  - .2 Schedule of Work, progress scheduling in accordance with Section 01 32 00 - Construction Progress Documentation.
  - .3 Schedule of submission of shop drawings, samples, colour chips in accordance with Section 01 33 00 - Submittal Procedures.
  - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 51 00 - Temporary Utilities.
  - .5 Delivery schedule of specified equipment in accordance with Section 01 32 00 - Construction Progress Documentation.
  - .6 Site security in accordance with Section 01 52 00 - Construction Facilities.



- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
- .8 Record drawings in accordance with Section 01 78 00 - Closeout Submittals.
- .9 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .10 Take-over procedures, acceptance, and warranties in accordance with Section 01 77 00 - Closeout Procedures and 01 78 00 - Closeout Submittals.
- .11 Monthly progress claims, administrative procedures, photographs, and holdbacks.
- .12 Appointment of inspection and testing agencies or firms in accordance with Section 01 45 00 - Quality Control.
- .13 Insurances and transcript of policies.
- .4 Comply with Departmental Representative's allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.
- .5 During construction coordinate use of site and facilities through Departmental Representative's procedures for intra-project communications: Submittals, reports and records, schedules, coordination of drawings, recommendations, and resolution of ambiguities and conflicts.
- .6 Comply with instructions of Departmental Representative for use of temporary utilities and construction facilities.
- .7 Work to be staged in Phases 1 & 2 as indicated in Appendix A – Scope of Work. Both Phases of work to be coordinated with Departmental Representative prior to work commencement.

## 1.6 ON-SITE DOCUMENTS

- .1 Maintain at job site, one copy each of the following:
  - .1 Contract drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Reviewed shop drawings.
  - .5 List of outstanding shop drawings.
  - .6 Change orders.
  - .7 Other modifications to Contract.
  - .8 Field test reports.
  - .9 Copy of approved Work schedule.
  - .10 Health and Safety Plan and other Safety related documents.
  - .11 Manufacturers' installation and application instructions.
  - .12 Labour conditions and wage schedules.
  - .13 Other documents as specified.

## 1.7 SCHEDULES

- .1 Submit preliminary construction progress schedule in accordance with Section 01 32 00 - Construction Progress Documents to Departmental Representative coordinated with Departmental

Representative project schedule. Schedule to show anticipated progress stages and final completion of work within time period required by contract documents.

- .2 After review, revise and resubmit schedule to comply with project schedule requirements.
- .3 During progress of Work revise and resubmit at project progress meetings or as directed by Departmental Representative.

## **1.8 SUBMITTALS**

- .1 Make submittal to Departmental Representative for review.
- .2 Submit preliminary shop drawings, product data and samples in accordance with Section 01 33 00 – Submittal Procedures for review for compliance with Contract Documents; for field dimensions and clearances, for relation to available space, and for relation to Work of other contracts. After review, revise and resubmit for transmittal to Departmental Representative.
- .3 Submit requests for payment for review to Departmental Representative.
- .4 Submit requests for interpretation of Contract Documents, and obtain instructions through Departmental Representative.
- .5 Process change orders through Departmental Representative.
- .6 Deliver closeout submittals for review by Departmental Representative.

## **1.9 COORDINATION**

- .1 Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work.
- .2 Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection and operation.
- .3 Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
- .4 Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair of all components, mechanical, electrical, and otherwise,
  - .1 Provide adequate clearances for installation and maintenance of equipment.
  - .2 Install work to permit removal of parts requiring periodic replacement or maintenance.
  - .3 Arrange pipes, ducts, raceways and equipment to permit ready access to valves, cocks, traps, starters, motors, and control components.
  - .4 Doors and access panels shall be kept clear.
  - .5 Utilize space efficiently so that adequate accessibility is retained for future maintenance, repairs, modifications and additions.

- .6 Check the locations selected for all sprinkler heads and check the Architectural reflected ceiling plans to prevent conflicts between the trades.
- .7 Contractor is cautioned that, where specific dimensions are not indicated or where Drawings are schematic in nature, as with most Electrical and Mechanical Drawings, Contractor shall have sole responsibility to coordinate the work to meet this requirement.
- .5 Make adequate provisions to accommodate items scheduled for later installation.
- .6 Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work and completion within the specified Contract duration. Such administrative activities include, but are not limited to, the following:
  - .1 Preparation of Contractor's Construction Schedule.
  - .2 Installation and removal of temporary facilities and controls.
  - .3 Delivery and processing of submittals.
  - .4 Progress meetings.
  - .5 Start-up, check-out, and final acceptance of systems.
  - .6 Project closeout activities.
  - .7 Protection of existing and new work.
- .7 Changes required in the Work of the Contract, caused by the Contractor's neglect to coordinate the work with others shall be made at the Contractor's own expense.

#### **1.10 COORDINATION DRAWINGS**

- .1 Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
- .2 Contractor to submit to the Departmental Representative, in AutoCAD format, coordination drawings, drawn accurately to a scale large enough to indicate and resolve conflicts.
- .3 Indicating the functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
- .4 Do not base coordination drawings on standard printed data.
- .5 Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
- .6 Show location and size of access doors required for access to concealed dampers, valves, and other controls.
- .7 Indicate required installation sequences.

- .8 Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements.
- .9 Minor dimension changes and difficult installations will not be considered changes to the Contract.
- .10 Departmental Representative will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination. If Departmental Representative determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Departmental Representative will so inform Contractor, who shall make changes as directed and resubmit.

**1.11 CLOSEOUT PROCEDURES**

- .1 Notify Departmental Representative when Work is considered ready for Substantial Performance.
- .2 Accompany Departmental Representative on preliminary inspection to determine items listed for completion or correction.
- .3 Comply with Departmental Representative instructions for correction of items of Work listed in executed certificate of Substantial Performance and for access to Owner-occupied areas.
- .4 Notify Departmental Representative of instructions of items of Work determined in Departmental Representative's final inspection.

**PART 2 PRODUCTS (NOT APPLICABLE)**

**PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

## **PART 1 GENERAL**

### **1.1 SECTIONS INCLUDE**

- .1 Shop drawings and product data.
- .2 Samples.
- .3 Certificates and transcripts.

### **1.2 RELATED SECTIONS**

- .1 Section 01 32 00 – Construction Progress Documentation.
- .2 Section 01 45 00 – Quality Control
- .3 Section 01 78 00 – Closeout Submittals

### **1.3 ADMINISTRATIVE**

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with work until relevant submissions are reviewed by Departmental Representative.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
- .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are coordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative review of submittals.

- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review of submission, unless Departmental Representative gives written acceptance of specific deviations.
- .10 Keep one reviewed copy of each submission on site.

#### **1.4 SUBMITTALS**

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow seven (7) days for Departmental Representative review of each submission.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change contract price. If adjustments affect value of Work, state such in writing to Departmental Representative immediately after receipt of approval of shop drawings. If value of work is to change a change order must be issued prior to proceeding with work.
- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .8 Submissions shall include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.

- .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.
- .9 After Departmental Representative review, distribute copies.
- .10 Submit 3 prints plus one electronic copy in PDF format of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .11 Submit electronic copy in PDF format of product data sheets or brochures for requirements requested in Specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Delete information not applicable to project.
- .13 Supplement standard information to provide details applicable to project.
- .14 Cross-reference product data information to applicable portions of Contract Documents.
- .15 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of work may proceed.
- .16 Samples: examples of materials, equipment, quality, finishes, workmanship. Label samples with origin and intended use.
- .17 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of contract documents.
- .18 Where colour, pattern or texture is criterion, submit full range of samples.

- .19 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .20 Make changes in samples, which Departmental Representative may require, consistent with Contract Documents.
- .21 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.
- .22 Submit drawings stamped and signed by Professional Engineer registered or licensed in the Province of Newfoundland and Labrador.

### **1.5 MOCK-UPS**

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

### **1.6 PROGRESS PHOTOGRAPHS**

- .1 Progress photograph to be electronically formatted and labelled as to location and view.

### **1.7 SHOP DRAWINGS REVIEW**

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

### **1.8 STRUCTURAL ATTACHMENTS**

- .1 Contractor to engage a third party Professional Structural Engineer, licensed to practice in the Province of Newfoundland and Labrador, for submission of stamped and signed shop drawings indicating acceptable mounting procedures for all equipment which is suspended, mounted or otherwise attached, as per Section 01 91 13 – Commissioning (Cx) Requirements. The Structural Engineer to also verify correct installation of the equipment.



**PART 2 PRODUCTS (NOT APPLICABLE)**

**PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

**PART 1**      **GENERAL**

**1.1**            **SUBMITTALS**

- .1      At least 10 (ten) working days prior to commencing any site work: submit to Departmental Representative copies of:
  - .1      A complete Site-Specific Health and Safety Plan.
  - .2      If work entails confined space, submit the following:
    - .1      Copies of current confined space entry training certificates acceptable to WHSCC, as well as copies of confined space entry programs, confined space assessment, safe work practices and rescue plans.
  - .2      Acceptance of the Site-Specific Health and Safety Plan and other submitted documents by the Departmental Representative's shall only be viewed as acknowledgement that the contractor has submitted the required documentation under this specification section.
  - .3      Departmental Representative makes no representation and provides no warranty for the accuracy, completeness and legislative compliance of the Site Specific Health and Safety Plan and other submitted documents by this acceptance.
  - .4      Responsibility for errors and omissions in the Site Specific Health and Safety Plan and other submitted documents is not relieved by acceptance by Departmental Representative.

**1.2**            **OCCUPATIONAL HEALTH AND SAFETY (SITE SPECIFIC HEALTH AND SAFETY PLANS)**

- .1      Prepare a detailed Site-Specific Health and Safety Plan that shall identify, evaluate and control job specific hazards and the necessary control measures to be implemented for managing hazards.
- .2      The written Site-Specific Health and Safety Plan shall incorporate the following:
  - .1      Hazard assessment results.
  - .2      Engineering and administrative demonstrative controls (work-practices and procedures) to be implemented for managing identified and potential hazards, and comply with applicable federal and provincial legislation and more stringent requirements that have been specified in these specifications.
  - .3      An organizational structure which shall establish the specific chain of command and specify the overall responsibilities of contractor's employees at the work site.
  - .4      A comprehensive work plan which shall:
    - .1      define work tasks and objectives of site activities/operations and the logistics and resources required to reach these tasks and objectives.
    - .2      establish personnel requirements for implementing the plan.
  - .5      A personal protected equipment (PPE) Program which shall detail PPE:
    - .1      Selection criteria based on site hazards.
    - .2      Use, maintenance, inspection and storage requirements and procedures.

- .3 Decontamination and disposal procedures.
- .4 Inspection procedures prior to, during and after use, and other appropriate medical considerations.
- .5 Limitations during temperature extremes, heat stress and other appropriate medical consideration.
- .6 An emergency response procedure, refer to Clause 1.5 Supervision and Emergency Response Procedure of this section for requirements.
- .7 A hazard communication program for informing workers, visitors and individuals outside of the work area as required. This will include but not be limited to a visitor safety and orientation policy and program that will include education on hazards, required PPE and accompaniment while on site.
- .8 A hearing conservation program in accordance with the OHS Regulations.
- .9 A recent (current year) inspection form for all powered mobile equipment that will be used in fulfilling the terms of the contract. The inspection form shall, at a minimum, state that the equipment is in a safe operating condition.
- .10 A complete listing of employee names, their driver's license classification, expiry date, endorsements and the type of equipment that they are qualified to operate for the complete scope of work for this project. The Driver's License Number should not be provided as this is confidential information. Provision of the License Number may breach *PIPEDA* - the Personal Information Protection and Electronic Documents Act. (Federal Act) or *ATIPPA* - *Access to Information and Protection of Privacy Act* - Part IV. (Provincial Act of Newfoundland and Labrador). This shall also include documentation where required of certification in power line hazards.
- .11 An acceptable parking policy for all powered mobile equipment to be used on this project. The policy shall, at a minimum, be based on a hazard assessment that considers factors such as equipment type, potential for roll over, load capacity of the parking area, pedestrian and vehicular traffic, and potential for equipment tampering, equipment energy, and equipment contact with power lines.
- .12 A diving program which shall contain standard operating procedures to be followed in the diving operation.
- .13 A health and safety training program which includes a safety training matrix.
- .14 General safety rules.
- .3 Periodically review and modify as required each component of the Site-Specific Health and Safety Plan when a new hazard is identified during completion of work and when an error or omission is identified in any part of the Site-Specific Health and Safety Plan.
- .4 Review the completeness of the hazard assessment immediately prior to commencing work, when a new hazard is identified during completion of work and when an error or omission is identified.
  - .1 Be solely responsible for investigating, evaluating and managing any report of actual or potential hazards.
  - .2 Clearly define accident incident investigation procedures.
  - .3 Clearly define policy and processes for early and safe return to work.

- .4 Retain copies of all completed hazard assessments at the project site and make available to the Departmental Representative immediately upon request.
- .5 Implement all requirements of the Site-Specific Health and Safety Plan.
  - .1 Ensure that every person entering the project site is informed of requirements under the Site-Specific Health and Safety Plan.
  - .2 Take all necessary measures to immediately implement any engineering controls, administrative controls, personal protective equipment required or termination of work procedures to ensure compliance with the Site-Specific Health and Safety Plan.

### 1.3

#### **SUPERVISION AND EMERGENCY RESCUE PROCEDURE**

- .1 Carry out work under the direct supervision of competent persons responsible for safety by ensuring the work complies with the appropriate section of OH&S Act and Regulations
- .2 Assign a sufficient number of supervisory personnel to the work site.
  - .1 Any person assigned to supervisory duties shall not conduct significant work in relation to the contract that inhibits them from the ability to properly supervise the work site.
- .3 Provide a suitable means of communications and check-in for workers required to work alone.
- .4 Develop an emergency rescue plan for the job site and ensure that supervisors and workers are trained in the emergency rescue plan.
- .5 The emergency response plan shall address, as a minimum:
  - .1 Pre-emergency planning.
  - .2 Personnel roles, lines of authority and communication.
  - .3 Emergency recognition and prevention.
  - .4 Safe distances and places of refuge.
  - .5 Site security and control
  - .6 Evacuation routes and procedures
  - .7 Decontamination procedures which are not covered by the site specific safety and health plan.
  - .8 Emergency medical treatment and first aid.
  - .9 Emergency alarm, notification and response procedures including procedures for reporting incidents to local, provincial and federal government departments.
  - .10 PPE and emergency equipment.
  - .11 Procedures for handling emergency incidents.
  - .12 Site specific emergency response training requirements and schedules.
  - .13 For diving operation, include procedures for:
    - .1 Managing deteriorating environmental conditions.
    - .2 Managing unexpected weather or sea-state condition.
    - .3 Evacuation of diver(s) under pressures greater than atmospheric pressure.
    - .4 In-water emergency transfers.

- .5 Managing failing of equipment below the surface that impairs the ability of a diver to complete a dive.
  - .6 Managing failure of any major component of diving plant or equipment.
  - .7 Emergency signalling between divers involved in the diving program and between the diver(s) and the attendants using umbilical, tethers or other suitable methods.
  - .8 Mobilizing stand-by divers.
  - .9 Mobilizing crafts, stand-by boats and any other devices to be used for rescue.
  - .10 Contacting evacuation, rescue, treatment facilities and medical services that will be used in the diving program.
  - .11 Operation of emergency power and lighting facilities.
- .6 The emergency response procedures shall be rehearsed regularly as part of the overall training program.
- .7 Provide adequate first aid facilities for the jobsite and ensure that a minimum number of workers are trained in first aid in accordance with the Occupational Health and Safety First Aid Regulations.

#### 1.4 CONTRACTORS SAFETY REPRESENTATIVE

- .1 The contractor shall employ a Contractor's Safety Representative (CSR) who shall have as a minimum successfully completed the following training, and must have current credentials for those that have expiration dates:

**Editorial Note**

***Replace sentence 1.6.1 with the following if the Design Manager specifies a requirement for a site dedicated full time Contractor's Safety Representative (CSR). Delete this editorial note if a full time site dedicated Contractor's Safety Representative (CSR) is not specifically required.***

The contractor shall employ a site dedicated full time Contractor's Safety Representative (CSR) who must be on site during execution of the Work. Periodic absences during the workday of short duration for project related activities are acceptable provided they have been pre-arranged with TW's construction manager. In unusual situations absences of one full day or longer will require a replacement. The replacement will be required to have prior familiarization with the site and the Site-Specific Health and Safety Plan. The CSR and any temporary replacement shall have as a minimum successfully completed the following training, and must have current credentials for those that have expiration dates:

- .1 Training in hazardous materials management and response/protocols.
  - .2 Training in the use, maintenance of fall protection systems certified by WHSCC at a minimum.
  - .3 Training in confined space entry protocols, techniques and rescue plans, certified by WHSCC at a minimum.
  - .4 Supervisory training.
  - .5 Training in records and statistics.
  - .6 Training in hazard identification, inspections, analysis and control.
  - .7 Training in WHMIS.
  - .8 Training in health and safety program content.
  - .9 Training in investigations and reporting.
  - .10 Training in occupational health/hygiene.
  - .11 Training in employee training and communication.
  - .12 Training in Emergency Preparedness and First Aid.
  - .13 A working knowledge of, and experience satisfactory to the Departmental Representative.
  - .14 Experience, satisfactory to the Departmental Representative, with the safe work practices required for execution of the work and operation of equipment specific to the project.
  - .15 Experience, satisfactory to the Departmental Representative, in developing and monitoring site safety and housekeeping policies.
  - .16 Experience, satisfactory to the Departmental Representative, in developing and monitoring a preventative maintenance and inspection program for Construction Site Equipment.
- .2 The CSR shall:

- .1 Be responsible for developing, implementing, daily enforcement, monitoring and updating of the Site-Specific Health and Safety Plan.
- .2 Be responsible for the delivery of the site safety orientation and ensure that the personnel who have not been orientated are not permitted to enter the site. This applies to workers, inspectors and visitors.
- .3 Report directly to and be under direction of the Site Superintendent or Contractor's Project Manager.
- .4 Prior to mobilization on-site, hold an orientation meeting with the contractors, subcontractors and Departmental Representative to review project occupational health and safety. Include but not limit meeting to a review of:
  - .1 Site Specific Health and Safety Plan.
  - .2 Construction Safety Measures.
  - .3 Supervision and Emergency Rescue Procedures.
  - .4 Hazard Assessments
- .5 Maintain a daily log of inspections, meetings, infractions and mitigating measures. Log is to be filed daily and copies to be provided to the Site Superintendent and Departmental Representative.
- .6 The CSR may have the designation of National Construction Safety Officer (NCSO), Construction Safety Officer (CSO), Canadian Registered Safety Professional (CRSP), or Certified Health and Safety Consultant (CHSC), or other similar designation.

## **1.5 HEALTH AND SAFETY COMMITTEE**

- .1 Establish an Occupational Health and Safety Committee where ten or more workers are employed on the job site as per the OH&S Act and Regulations.

## **1.6 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with Site Specific Health and Safety Plan.
- .3 Where safety risks exist, the contractor must stop the work until such time as the risk can be mitigated to a safe level.
- .4 Take appropriate steps to ensure that the hazards are mitigated to a safe level, workers are notified of the hazards and how to protect themselves. As well, workers must be provided with any new safe work practices or information regarding mitigation of the risk.

## **1.7 UNFORSEEN HAZARDS**

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, follow procedures in place for Employee's Right to Refuse Work in

accordance with Acts and Regulations of Province having jurisdiction. Advise Departmental Representative verbally and in writing.

## 1.8 INSTRUCTION AND TRAINING

- .1 Workers shall not participate in or supervise any activity on the work site until they have been trained to a level required by this job function and responsibility. Training shall as a minimum thoroughly cover the following:
  - .1 Federal and Provincial Health and Safety Legislation requirements including roles and responsibilities of workers and person(s) responsible for implementing, monitoring and enforcing health and safety requirements.
  - .2 Safety and health hazards associated with working on a contaminated site including recognition of symptoms and signs which might indicate over exposure to hazards.
  - .3 Limitations, use, maintenance and disinfection-decontamination of personal protective equipment associated with completing work.
  - .4 Limitations, use, maintenance and care of engineering controls and equipment.
  - .5 Limitations and use of emergency notifications and response equipment including emergency response protocol.
  - .6 Work practices and procedures to minimize the risk of an accident and hazardous occurrence from exposure to a hazard.
- .2 Provide and maintain training of workers, as required, by Federal and Provincial legislation.
- .3 Provide copies of all training certificates to Departmental Representative for review, before a worker is to enter the work site.
- .4 Authorized visitors shall not access the work site until they have been:
  - .1 Notified of the names of persons responsible for implementing, monitoring and enforcing the Site-Specific Health and Safety Plan.
  - .2 Briefed on safety and health hazards present on the site.
  - .3 Instructed in the proper use and limitations of personal protective equipment.
  - .4 Briefed as the emergency response protocol including notification and evacuation process.
  - .5 Informed of practices and procedures to minimize risks from hazards and applicable to activities performed by visitors.
  - .6 Accompanied while on site, and provided with the appropriate PPE.
- .5 All workers will be instructed and trained on the hazards associated with work they will perform and how to protect themselves. This will include a review of all safe work practices, the reporting and documentation of hazards, reporting accidents and injuries as well as, formal training in areas of high risk (i.e. fall protection, power line hazards, traffic control persons training).
- .6 The work site shall have the appropriate number of persons trained in emergency and Standard First Aid according to the First Aid Regulations.



## **1.9 CONSTRUCTION SAFETY MEASURES**

- .1 Observe construction safety measures of National Building Code, latest edition, Provincial Government, OH&S Act and Regulations, Workplace Health and Safety Compensation Commission and Municipal Authority provided that in any case of conflict or discrepancy more stringent requirements shall apply.
- .2 Administer the project in a manner that will ensure, at all times, full compliance with Federal and Provincial Acts, regulations and applicable safety codes and the Site Specific Health and Safety Plan.
- .3 Provide Departmental Representative with copies of all orders, directions and any other documentation, issued by OHS immediately after receipt.

## **1.10 POSTING OF DOCUMENTS**

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

## **1.11 HEALTH AND SAFETY MONITORING**

- .1 Periodic inspections of the contractor's work may be carried out by the Departmental Representative to maintain compliance with the Health and Safety Program. Inspections will include visual inspections as well as testing and sampling as required.
- .2 The contractor shall be responsible for any and all costs associated with delays as a result of contractor's failure to comply with the requirements outlined in this section.

## **1.12 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified within ten (10) working days.
- .3 Departmental Representative may stop work if non-compliance of health and safety regulations is not corrected.

## **1.13 WHMIS**

- .1 Ensure that all controlled products are in accordance with the Workplace Hazardous Materials Information System (WHMIS) Regulations and Chemical Substances of the OH&S Act and Regulations regarding use, handling, labelling, storage, and disposal of hazardous materials.
- .2 Deliver copies of relevant Material Safety Data Sheets (MSDS) to job site and the Departmental Representative. The MSDS must be acceptable to Labour Canada and Health and Welfare Canada for all controlled products that will be used in the performance of this work. All MSDS

should be located in accessible locations for all workers and visitors throughout the site, bound and organized in binders.

- .3 Train workers required to use or work in close proximity to controlled products as per OH&S Act and Regulations.
- .4 Label controlled products at jobsite as per OH&S and Regulations and WHMIS.
- .5 Provide appropriate emergency facilities as specified in the MSDS where workers might be exposed to contact with chemicals, e.g. eye-wash facilities, emergency shower.
  - .1 Workers to be trained in use of such emergency equipment.
- .6 Contractor shall provide appropriate personal protective equipment as specified in the MSDS where workers are required to use controlled products.
  - .1 Properly fit workers for personal protective equipment
  - .2 Train workers in care, use and maintenance of personal protective equipment.
- .7 No controlled products are to be brought on-site without prior approved MSDS.
- .8 The MSDS are to remain on site at all times.

#### **1.14 OVERLOADING**

- .1 The Contractor's Full Time CSO and/or Site Superintendent shall ensure no part of work or associated equipment is subjected to loading that will endanger its safety or will cause permanent deformation.

#### **1.15 FALSEWORK**

- .1 Design and construct falsework in accordance with CSA S269.1.

#### **1.16 SCAFFOLDING**

- .1 Design, erect, inspect, operate, modify, and dismantle scaffolding in accordance with CSA Z797, the OH&S Act and Regulations, and the scaffold manufacturer's written instructions.
- .2 Provide trained and certified Competent Scaffold Erectors for all scaffold erection, modification and dismantling. Training certification must be valid at time of erection, modification and dismantling of scaffold.
- .3 Conduct and document daily inspections of scaffolding by trained and certified Competent Scaffold Inspectors or Erectors. Training certification must be valid at the time of inspection.
- .4 Provide a scaffold tagging system as described in CSA Z797.
- .5 Ensure that all industry best practices for safe scaffold usage, including fall protection, proper loading, safe access, electrical hazards, exit door management and other concerns are strictly adhered to.

### 1.17 WORKING AT HEIGHTS

- .1 Ensure that fall restraint or fall arrest devices are used by all workers working at elevations greater than 3.05 meters above grade or floor level in accordance with CSA Z259, where alternate fall protection systems are not provided in accordance with Occupational Health and Safety Act and Regulations.
- .2 All workers performing work at height and who will be required to utilize a fall arrest system must be trained in a fall protection program certified by the WHSCC. Training must be current and valid at the time of use.
- .3 Prior to working at height workers shall be instructed in a Contractor Safe Work Practice for working at height and associated Rescue Plan for working at heights, developed specific to the work to be performed, locations and risks.

### 1.18 PERSONAL PROTECTIVE EQUIPMENT

- .1 Ensure workers on the jobsite use personal protective equipment appropriate to the hazards identified in the Site Specific Health and Safety Plan and those workers are trained in the proper care, use, and maintenance of such equipment.
- .2 PPE selections shall be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the site, task-specific conditions, duration and hazards and potential hazards identified on site. PPE must also be fitted for the worker.
- .3 Provide workers and visitors to the site with proper respiratory protection equipment.
  - .1 No work shall be performed in an area where an airborne contaminant exceeds recommendations of the ACGIH, do not meet the appropriate standards for the specific contaminants or are not in accordance with the OHS regulations..
  - .2 Respiratory protection shall be provided in accordance with the requirements of the OHS regulations.
  - .3 Establish, implement and maintain a respirator inspection and maintenance program in accordance with the CSA standard identified in the OHS Regulations.
  - .4 Copies of all owners' maintenance manuals shall be kept at all times at the contractor's site office.
- .4 Provide and maintain a supply of dermal protection equipment to allow visitors and all workers proper dermal protection.
  - .1 Dermal protection shall be sufficient to act as a protective barrier between the skin and an airborne contaminant or hazardous material. Dermal protection shall also be provided for all physical hazards.
  - .2 Dermal protection equipment shall not be used after exceeding 75% of the break through time. The break through time shall be based on the contaminant which requires the least amount of time to break through the protective equipment
  - .3 Copies of all dermal protection user specifications, owners and maintenance manuals shall be kept at all times at the contractor's site office.

- .4 Establish, implement and maintain air inspection program to ensure proper dermal protection in accordance with CSA, NIOSH, U.S. EPA and manufacturer's requirements.
- .5 Provide all workers and up to five (5) visitors to the site with proper hearing protection. Workers and visitors shall not be exposed to noise levels greater than 85 dB (A) over an eight hour shift without proper hearing protection, in accordance with the Hearing Conservation Program.
- .6 Provide all workers and up to five (5) visitors to the site with CSA approved eye protection sufficient to act as a protective barrier between the eye and airborne contaminants, hazardous materials and physical hazard.
- .7 Provide workers and up to five (5) visitors to the site with CSA approved hard hats meeting the CSA Z94.1.
- .8 Provide high visibility apparel as defined in Occupational Health and Safety Regulations.
- .9 Provide CSA approved safety boots meeting CSA Z195.
- .10 Provide other personal protective equipment, as may be required by the owner, depending on duties being performed.

## 1.19

### EXCAVATION SAFETY

- .1 Protect excavations more than 1.25 metres deep against cave-ins or wall collapse by side wall sloping to the appropriate angle of repose, an engineered shoring/sheathing system or an approved trench box.
  - .1 Provide a ladder which can extend from the bottom of the excavation to at least 0.91 metres above the top of the excavation.
- .2 Ensure that all excavations less than 1.25 metres deep are effectively protected when hazardous ground movement may be expected.
- .3 Design trench boxes, certified by a registered Professional Engineer, and fabricated by a reputable manufacturer. Provide the manufacturer's Depth Certificate Statement permanently affixed. Use trench boxes in strict accordance with manufacturer's instructions and depth certification data.
- .4 For excavations deeper than six (6) metres, provide a certificate from a registered Professional Engineer stating that the protection methods proposed have been properly designed in accordance with accepted engineering practice. The engineer's certificate shall verify that the trench boxes, if used, are properly designed and constructed to suit the depth and soil conditions.
- .5 Ensure that the superintendent and every crew chief, foreperson and lead hand engaged in trenching operations or working in trenches have in his/her possession a copy of Occupational Health and Safety Regulations: Part XVII: Construction, Excavation and Demolition and Part XVIII: Excavation, Underground Work and Rock Crushing.

## 1.20 CONFINED SPACE WORK

- .1 Comply with the Newfoundland and Labrador Occupational Health and Safety Regulations.
- .2 Ensure a hazard assessment has been conducted related to the confined space and the work to be performed within the space.
- .3 Provide approved air monitoring equipment where workers are working in confined spaces and ensure any test equipment to be used is calibrated, in good working order and used by trained persons.
- .4 Ensure all required PPE is provided to the workers and workers are trained in its use, care and selection.
- .5 Develop a confined space entry (CSE) program specific to the nature of work performed and in accordance with OH&S Act and Regulations and ensure supervisors and workers are trained in the confined space entry program. This shall include training on the CSE permit system, rescue plan, testing, communication equipment and all equipment and safe work procedures conducted in and around the confined space.
  - .1 Ensure that personal protective equipment and emergency rescue equipment appropriate to the nature of the work being performed is provided and used.
- .6 Provide and maintain training of workers through a provider certified by the WHSCC.
- .7 Provide Departmental Representative with a copy of an "Entry Permit" for each entry into the confined space to ensure compliance Provincial Legislation.

## 1.21 HAZARDOUS MATERIALS

- .1 Should material resembling hazardous materials (e.g. asbestos/mould) not previously identified/documentated be encountered during the execution of work, stop work and notify Departmental Representative. Do not proceed until written instructions have been received from Departmental Representative.
- .2 Unless otherwise noted the services of a recognized Environmental Consultant to provide all air monitoring and testing services required by regulatory requirements for hazardous materials abatement and repair.

## 1.22 HEAVY EQUIPMENT

- .1 Ensure mobile equipment used on jobsite is of the type specified in OH&S Act and Regulations fitted with a Roll Over Protective (ROP) Structure and Falling Object Protective (FOP) Structure.
- .2 Provide certificate of training in Power Line Hazards for operators of heavy equipment.
- .3 Obtain written clearance from the power utility where equipment is used in close proximity to (within 5.5 metres) overhead or underground power lines.
- .4 Equip cranes with:

- .1 A mechanism which will effectively prevent the hook assembly from running into the top boom pulley.
- .2 A legible load chart.
- .3 A maintenance log book.

### **1.23 TREE AND BRUSH CLEARING**

- .1 Ensure workers using chain saws wear the following safety equipment:
  - .1 CSA safety hat.
  - .2 Hearing protection, e.g. ear muffs.
  - .3 CSA approved chain saw pants.
  - .4 CSA approved chain saw boots.
  - .5 CSA approved eye protection.
- .2 Ensure that all workers using brush saws wear the following safety equipment:
  - .1 CSA approved safety hat fitted with face screen or shield or approved safety glasses.
  - .2 Hearing protection, e.g. ear muffs.
  - .3 CSA approved safety footwear.
- .3 Equip chain saws with a safety chain break.
- .4 A safe work practice (SWP) must be developed, implemented and all workers trained in the SWP prior to undertaking such tasks and utilizing tree and brush clearing equipment.

### **1.24 DIVING OPERATIONS**

- .1 Ensure diving operations conform to CSA Z275.2 - Occupational Safety Code for Diving Operations and CSA Z275.4 - Competency Standard for Diving Operations.
- .2 Sampling:
  - .1 Prior to commencing diving activities, sample water and analyze sample(s) for:
    - .1 Fecal Coliforms (Escherichia coli).
    - .2 Total Coliforms.
    - .3 Any health hazard identified during the site specific hazard assessment.
    - .4 Any parameter as directed by the Service NL, Government of Newfoundland and Labrador.
  - .2 Water will be designated a contaminant if the chemical concentration of a contaminant exceeds:
    - .1 200 fecal Coliforms (Escherichia coli) per 1000 milliliter of water.
    - .2 100 times the guidelines concentration established in the most recent Guidelines of Canadian Drinking Water Quality.
    - .3 Any other criteria established by the Service NL, Government of Newfoundland and Labrador.

- .3 Sample analysis is to be completed by a laboratory that is accredited by the Canadian Associates of Environmental and Analytical Laboratories (CAEAL) or other national equivalent.
- .4 Dive personnel must meet the minimum competency requirements of CSA 275.4.
  - .1 The Dive supervisor(s) shall as a minimum:
    - .1 Possess a Valid Category 1 Diving Certificate, or equivalent, for a minimum of three (3) years for the type of diving to be performed.
    - .2 Have completed one hundred and fifty (150) hours of logged diving time for the type of diving to be performed.
    - .3 Have completed fifty (50) hours of dive supervision for the type of diving to be performed.
  - .2 Diver(s) shall as a minimum:
    - .1 Possess a valid Category 1 Diving Certificate or equivalent, for the type of diving to be performed.
    - .2 Have completed fifty (50) hours of logged dive time for the type of diving to be performed.
- .5 A diving operation shall be interrupted or discontinued or not commenced when:
  - .1 Continuation of the diving operation would or is likely to compromise the safety of any person involved in the diving operation.
  - .2 The water currents at the underwater work site are likely to compromise the safety of any person involved in the diving operation.
  - .3 Combustible material is stored too close for safety to any diving plant and equipment used in the diving operation.
- .6 A diving operation shall:
  - .1 Not be conducted in the vicinity for any other activity that might pose a danger to any person involved in the diving operation.
  - .2 Not use any craft that has insufficient power or stability for the safe continuity of the diving operation.
  - .3 Provide measures for making work area boundary and stopping unauthorized entry into the work area.
  - .4 Provide adequate illumination of the dive site and the underwater work site of the diving operation.
- .7 Provide, at the worksite while completing diving operations, a diving operations log book that is permanently bound and has numbered pages.
  - .1 Produce on request, any log books, records or other documentation associated with the diving operation, for inspection by Departmental Representative.
  - .2 As a minimum, for each diving operation enter into the diving operation logbook:
    - .1 date and time the diving operation commenced and terminated including any time the diving operation was interrupted
    - .2 name of supervisor; names of all other persons involved
    - .3 the procedures followed
    - .4 the decompression table and the schedule in that the decompression table was used

- .5 the maximum depth, bottom time, dive time and total dive time for each dive
- .6 the type of diving plant and equipment and the type of breathing mixture used
- .7 the type of discomfort, injury or illness including decompression sickness, suffered by any person involved
- .8 any environmental conditions that affected or might have affected the diving operation
- .9 any other factors relevant to the safety to health of any person involved
- .8 Diving in free swim mode is not permitted at the work site.
- .9 Provide separate first aid supplies for dive operation. All dive team personnel shall be trained in first aid and cardiopulmonary resuscitation (CPR).
- .10 Provide medical oxygen for emergency response at work site. The dive supervisor shall be trained in administering medical oxygen.

**1.25 WORK STOPPAGE**

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

**PART 2      PART 2      PRODUCTS (NOT APPLICABLE)**

**PART 3      PART 3      EXECUTION (NOT APPLICABLE)**

**END OF SECTION**



**PART 1**

**GENERAL**

**1.1**

**FIRES**

- .1 Fires and burning of rubbish on site not permitted.

**1.2**

**DISPOSAL OF WASTES**

- .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

**1.3**

**DRAINAGE**

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

**1.4**

**WORK ADJACENT TO WATERWAYS**

- .1 Do not operate construction equipment in waterways.
- .2 Do not use waterway beds for borrow material.
- .3 Do not dump excavated fill, waste material or debris in waterways.
- .4 Design and construct temporary crossings to minimize erosion to waterways.
- .5 Do not skid logs or construction materials across waterways.
- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .7 Do not blast under water or within 100 m of indicated spawning beds.

**1.5**

**POLLUTION CONTROL**

- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.

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

**1.6 NOTIFICATION**

- .1 Departmental Representative will notify Contractor in writing of observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of environmental protection. Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action as approved by Departmental Representative.
- .2 Departmental Representative may issue stop order of work until satisfactory corrective action has been taken.
- .3 No time extensions will be granted or equitable adjustments allowed to Contractor for such suspensions.

**PART 2 PRODUCTS (NOT APPLICABLE)**

**PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

**PART 1**      **GENERAL**

**1.1**            **RELATED SECTIONS**

- .1            Section 02 82 00.02 – Asbestos Abatement

**1.2**            **REFERENCES AND CODES**

- .1            Perform Work in accordance with National Building Code of Canada (NBC) including all amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2            Meet or exceed requirements of:
  - .1            Contract documents.
  - .2            Specified standards, codes and referenced documents.

**1.3**            **HAZARDOUS MATERIAL DISCOVERY**

- .1            Asbestos: stop work immediately should materials believed to contain asbestos be encountered in during the execution of the work and notify Departmental Representative. Do not proceed until written instructions have been received from Departmental Representative. Perform asbestos abatement and repair in accordance with Newfoundland and Labrador Asbestos Abatement Regulations, Latest Edition.
- .2            Mould: stop work immediately should material resembling mould be encountered during the execution of work and notify Departmental Representative. Do not proceed until written instructions have been received from Departmental Representative.

**1.4**            **BUILDING SMOKING ENVIRONMENT**

- .1            Comply with smoking restrictions.

**PART 2**      **PRODUCTS (NOT APPLICABLE)**

**PART 3**      **EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

## **PART 1 GENERAL**

### **1.1 SECTIONS INCLUDE**

- .1 Inspection and testing, administrative and enforcement requirements.
- .2 Tests and mix designs.

### **1.2 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 78 00 – Closeout Submittals

### **1.3 INSPECTION**

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give 48 hours notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

### **1.4 INDEPENDENT INSPECTION AGENCIES**

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and reinspection.

### **1.5 ACCESS TO WORK**

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

### **1.6 PROCEDURES**

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

### **1.7 REJECTED WORK**

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative, it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Departmental Representative.

### **1.8 REPORTS**

- .1 Submit 3 copies of inspection and test reports to Departmental Representative, plus electronic copies in PDF format.
- .2 Provide copy to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.
- .3 Include copy of all inspection and test reports in Commissioning Manuals.

### **1.9 MOCK-UPS**

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.
- .2 Construct in all locations acceptable to Departmental Representative as specified in specific Section.

- .3 Prepare mock-ups for Departmental Representative review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Remove mock-up at conclusion of Work or when acceptable to Departmental Representative
- .6 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.
- .7 Reviewed and accepted mock-ups will become standards of workmanship and material against which installed work will be verified.
- .8 Mock-ups may remain as part of Work.

**1.10 EQUIPMENT AND SYSTEMS**

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

**PART 2 PRODUCTS (NOT APPLICABLE)**

**PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

**PART 1**

**GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 01 52 00 - Construction Facilities.
- .2 Section 01 56 00 - Temporary Barriers and Enclosures.

**1.2 INSTALLATION AND REMOVAL**

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.

**1.3 DEWATERING**

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

**1.4 WATER SUPPLY**

- .1 Provide continuous supply of potable water for construction use.
- .2 Arrange for connection with appropriate utility company and pay all costs for installation, maintenance and removal.

**1.5 TEMPORARY HEATING AND VENTILATION**

- .1 Pay for costs of temporary heat and ventilation used during construction, including costs of installation, fuel operation, maintenance and removal of equipment. Use of direct, fired heaters discharging waste products into work will not be permitted unless prior approval is given by Departmental Representative Representative.
- .2 Provide temporary heat and ventilation in enclosed areas as required to:
  - .1 Facilitate progress of Work.
  - .2 Protect Work and products against dampness and cold.
  - .3 Prevent moisture condensation on surfaces.
  - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
  - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .3 Maintain temperatures of minimum 10°C and relative humidity less than 60% in areas where construction is in progress.
  - .1 Maintain minimum temperature of 10°C or higher where specified as soon as finished work is commenced. Maintain until acceptance of structure by Departmental Representative.

- .2 Maintain ambient temperature and humidity levels as required for comfort of office personnel.
- .4 Ventilating:
  - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
  - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
  - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
  - .4 Ventilate storage spaces containing hazardous or volatile materials.
  - .5 Ventilate temporary sanitary facilities.
  - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .5 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
  - .1 Conform with applicable codes and standards.
  - .2 Enforce safe practices.
  - .3 Prevent abuse of services.
  - .4 Prevent damage to finishes.
  - .5 Vent direct-fired combustion units to outside.
- .6 Be responsible for damage to Work due to failure in providing adequate heat, humidity and protection during construction.
- .7 Use of new or existing systems for temporary heating, ventilating or air conditioning will not be permitted.

## **1.6 TEMPORARY POWER AND LIGHT**

- .1 Provide and pay for temporary power during constructing for temporary lighting, heating, site construction trailers and operating of power tools in accordance with governing regulations and the Canadian Electrical Code, latest edition.
- .2 Arrange for connection with Utility company. Pay all costs for installation, maintenance and removal of cables, distribution and branch panel boards, poles, lighting, heating and general power receptacles as required.
- .3 Temporary power for electric cranes and other equipment requiring in excess of above is responsibility of Contractor.
- .4 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx. Temporary lighting to consist of wiring, pig tail sockets and 75 watt shatterproof incandescent lamps to provide a minimum light level of 162 lux.
- .5 Electrical power and lighting systems installed under this contract may be used for construction requirements only with prior approval of Departmental Representative provided that guarantees are



not affected. Make good damage to electrical system caused by use under this contract. Replace lamps which have been used for more than 3 months.

- .6 General contractor responsible for payment of all electrical energy charges associated with temporary power up to date of substantial completion.

### **1.7 FIRE PROTECTION**

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

### **1.8 SANITARY FACILITIES**

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.
- .3 When permanent water and drain connections are completed, provide temporary water closets and urinals complete with temporary enclosures, inside building. Permanent facilities may be used on approval of Departmental Representative.

### **1.9 TEMPORARY COMMUNICATION FACILITIES**

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

### **1.10 REMOVAL OF TEMPORARY FACILITIES**

- .1 Remove temporary facilities from site when directed by Departmental Representative.
- .2 When project is closed down at end of construction season keep temporary facilities operational until close down or removal is approved by Departmental Representative.

### **PART 2 PRODUCTS (NOT APPLICABLE)**

### **PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

**PART 1**

**GENERAL**

**1.1 SECTION INCLUDES**

- .1 Construction aids.
- .2 Office and sheds.
- .3 Project identification.

**1.2 RELATED SECTIONS**

- .1 Section 01 35 29.06 – Health and Safety Requirements
- .2 Section 01 51 00 - Temporary Utilities.
- .3 Section 01 56 00 - Temporary Barriers and Enclosures.

**1.3 INSTALLATION AND REMOVAL**

- .1 Provide construction facilities in order to execute work expeditiously.
- .2 Remove from site all such work after use.

**1.4 SCAFFOLDING**

- .1 Provide and maintain scaffolding in rigid, secure and safe manner.
- .2 Erect scaffolding independent of walls. Remove promptly when no longer required. Refer to Section 01 35 29.06 – Health and Safety Requirements.

**1.5 HOISTING**

- .1 Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Hoists cranes shall be operated by certified operator.

**1.6 SITE STORAGE/LOADING**

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

**1.7 CONTRACTOR'S SITE OFFICES**

- .1 Provide office heated to 22 °C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table, fax machine, telephone, file cabinet and chair. Provide an accessible washroom within the contractor's site office.
- .2 Accessible washroom, meeting space and entrance to contractor's site office to meet the accessibility requirements of the NL Accessibility Act and Regulations, and CSA B651, Accessible Design for the Built Environment.
- .3 Provide a clearly marked and fully stocked first-aid case in a readily available location.
- .4 Subcontractors may provide their own offices as necessary. Direct location of these offices.

**1.8 EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

**1.9 SANITARY FACILITIES**

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

**PART 2 PRODUCTS (NOT APPLICABLE)**

**PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

**PART 1**

**GENERAL**

**1.1 SECTION INCLUDES**

- .1 Barriers.
- .2 Environmental Controls.
- .3 Fire Routes.

**1.2 RELATED SECTIONS**

- .1 Section 01 51 00 – Temporary Utilities.
- .2 Section 01 52 00 – Construction Facilities.

**1.3 INSTALLATION AND REMOVAL**

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

**1.4 GUARD RAILS AND BARRICADES**

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.
- .2 Provide as required by governing authorities.

**1.5 WEATHER ENCLOSURES**

- .1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
- .2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
- .3 Erect enclosures to allow access for installation of materials and working inside enclosure.
- .4 Design enclosures to withstand wind pressure and snow loading.

**1.6 DUST TIGHT SCREENS**

- .1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such work is complete.

**1.7 ACCESS TO SITE**

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.
- .2 Build and maintain temporary roads where indicated or directed and provide snow removal during period on work.
- .3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads.

**1.8 FIRE ROUTES**

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

**1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

**1.10 PROTECTION OF BUILDING FINISHES**

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

**PART 2 PRODUCTS (NOT APPLICABLE)**

**PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

## **PART 1 GENERAL**

### **1.1 SECTION INCLUDES**

- .1 Product quality, availability, storage, handling, protection, and transportation.
- .2 Manufacturer's instructions.
- .3 Quality of Work, coordination and fastenings.

### **1.2 RELATED SECTIONS**

- .1 Section 01 45 00 – Quality Control.
- .2 Section 01 73 00 – Execution.

### **1.3 REFERENCES**

- .1 Within text of each specifications section, reference may be made to reference standards. Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .2 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

### **1.4 QUALITY**

- .1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .4 Use products of one manufacturer for material and equipment of same type or classification unless otherwise specified.

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

## **1.5 AVAILABILITY**

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of work.
- .2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

## **1.6 STORAGE, HANDLING AND PROTECTION**

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative satisfaction. Use touch-up materials to match original. Do not paint over name plates.

## **1.7 TRANSPORTATION**

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

### **1.8 MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

### **1.9 QUALITY OF WORK**

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

### **1.10 CO-ORDINATION**

- .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

### **1.11 CONCEALMENT**

- .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation, inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

### **1.12 REMEDIAL WORK**

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.



### **1.13 LOCATION OF FIXTURES**

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Departmental Representative of conflicting installation. Install as directed.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

### **1.14 FASTENINGS GENERAL**

- .1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work, unless stainless steel or other material is specifically requested in affected specification section.
- .2 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood plugs are not acceptable.
- .3 Conceal fasteners where indicated. Space evenly and lay out neatly.
- .4 Fastenings which cause Spalding or cracking are not acceptable.
- .5 Obtain Departmental Representative approval before using explosive actuated fastening devices. If approval is obtained comply with CSA Z166.

### **1.15 FASTENINGS - EQUIPMENT**

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

### **1.16 PROTECTION OF WORK IN PROGRESS**

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

### **1.17 EXISTING UTILITIES**

- .1 When breaking into or connecting to existing services or utilities, execute work at times directed by local governing authorities, with minimum of disturbance to work.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.
- .3 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active services or facility. Adhere to approved schedule and provide notice to affected parties.
- .4 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .5 Remove abandoned services lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

### **1.18 SELECTION OF MATERIAL AND EQUIPMENT**

- .1 Material and equipment will be specified in the tender documents, and selected by Contractor, by one or more of the following methods:
  - .1 Specification by reference to a relevant Standard, such as CSA, ASTM, ULC, etc., select any material or equipment that meets or exceeds the specified.
  - .2 Specification by reference to an accepted product evaluation publication, such as the CGSB "Qualified Products List", or CCMC Registry of Product Evaluations", - select any manufacturer's product so listed.
  - .3 Specification by Prescriptive or Performance specification – select any material or equipment meeting or exceeding specification.
  - .4 Specification by identification of one or more Manufacturer's specific product(s) as an "Acceptable Product", along with a listing of other manufacturers who may offer equivalent products – select any product so named, or select from equivalent product(s) of other listed manufacturers.
- .2 "Acceptable Product" is deemed to be a complete and working commodity as described by a manufacturer's name, catalogue number, trade name, or any combination thereof, and will constitute the minimum standard of acceptance.
- .3 Departmental Representative will determine acceptability of Contractor's selection of material and equipment at time of Shop Drawing review.
- .4 When material or equipment is specified by a Standard, Prescriptive or Performance specification, upon request of the Departmental Representative, obtain from manufacturer an independent laboratory reporting, showing that material or equipment meets or exceeds the specified requirements.

**PART 2 PRODUCTS (NOT APPLICABLE)**

**PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

**PART 1**

**GENERAL**

**1.1 SECTION INCLUDES**

- .1 Requirements and limitations for cutting and patching the Work.

**1.2 RELATED SECTIONS**

- .1 Section 01 11 00 - Summary of Work.
- .2 Section 01 33 00 - Submittal Procedures.

**1.3 SUBMITTALS**

- .1 Submit written request in advance of cutting or alteration which affects:
  - .1 Structural integrity of any element of Project.
  - .2 Integrity of weather-exposed or moisture-resistant elements.
  - .3 Efficiency, maintenance, or safety of any operational element.
  - .4 Visual qualities of sight-exposed elements.
  - .5 Work of Owner or separate contractor.
- .2 Include in request:
  - .1 Identification of Project.
  - .2 Location and description of affected Work.
  - .3 Statement on necessity for cutting or alteration.
  - .4 Description of proposed Work, and products to be used.
  - .5 Alternatives to cutting and patching.
  - .6 Effect on Work of Owner or separate contractor.
  - .7 Written permission of affected separate contractor.
  - .8 Date and time work will be executed.

**1.4 PREPARATION**

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

- .6 Obtain Departmental Representative's approval before cutting, boring or sleeving load-bearing members.

## **1.5 EXECUTION**

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .9 Restore work with new products in accordance with requirements of Contract Documents.
- .10 Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material in accordance with Section 07 84 00 - Firestopping, full thickness of the construction element.
- .12 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.
- .13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.
- .14 Make cuts with clean, true, smooth edges.
- .15 Where new work connects with existing, and where existing work is altered, cut, patch and make good to match existing work.

## **1.6 WASTE MANAGEMENT AND DISPOSAL**

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

**PART 2**      **PRODUCTS (NOT APPLICABLE)**

**PART 3**      **EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

**PART 1**      **GENERAL**

**1.1**            **GENERAL**

- .1      Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- .2      Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .3      Provide adequate ventilation during use of volatile or noxious substances. Use for building ventilation systems is not permitted for this purpose.

**1.2**            **RELATED SECTION**

- .1      Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2      Section 01 77 00 - Closeout Procedures.

**1.3**            **PROJECT CLEANLINESS**

- .1      Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.
- .2      Remove waste materials and debris from site at the end of each working day. Do not burn waste materials on site.
- .3      Clear snow and ice from access to building.
- .4      Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5      Provide on-site containers for collection of waste materials and debris.
- .6      Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.
- .7      Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .8      Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .9      Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .10     Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

- .11 Provide and use marked separate bins for recycling. Refer to Section 01 74 19 - Waste Management and Disposal.

#### **1.4 FINAL CLEANING**

- .1 Refer to General Conditions.
- .2 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .3 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .4 When the Work is Totally Performed, remove surplus products, tools, construction machinery and equipment. Remove waste products and debris other than that caused by the Owner or other Contractors.
- .5 Remove waste materials from the site at regularly scheduled times or dispose of as directed by the Departmental Representative. Do not burn waste materials on site.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Leave the work broom clean before the inspection process commences.
- .8 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .9 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors and ceilings.
- .10 Clean lighting reflectors, lenses, and other lighting surfaces.
- .11 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .12 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .13 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .14 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .15 Remove dirt and other disfiguration from exterior surfaces.
- .16 Clean roofs, gutters, downspouts and drainage systems. Clean areaways and sunken wells.
- .17 Sweep and wash clean paved areas.



- .18 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.
- .19 Remove snow and ice from access to building.
- .20 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

**1.5 WASTE MANAGEMENT AND DISPOSAL**

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

**PART 2 PRODUCTS (NOT APPLICABLE)**

**PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

## **PART 1**

### **GENERAL**

#### **1.1 DEFINITIONS**

- .1 Demolition Waste Audit (DWA): Relates to actual waste generated from project.
- .2 Materials Source Separation Program (MSSP): Consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .3 Recyclable: Ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse by others.
- .4 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .5 Recycling: Process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .6 Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes:
  - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
  - .2 Returning reusable items including pallets or unused products to vendors.
- .7 Salvage: Removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .8 Separate Condition: Refers to waste sorted into individual types.
- .9 Source Separation: Acts of keeping different types of waste materials separate beginning from first time they became waste.

#### **1.2 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)**

- .1 Prepare MSSP and have ready for use prior to project start-up.
- .2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by authorities having jurisdiction.
- .3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .4 Provide containers to deposit reusable and recyclable materials.
- .5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.

- .6 Locate separated materials in areas which minimize material damage.
- .7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.
  - .1 Transport to recycling facility.

### **1.3 STORAGE, HANDLING AND PROTECTION**

- .1 Unless specified otherwise, materials for removal become Contractor's property.
- .2 Protect, stockpile, store and catalogue salvaged items.
- .3 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to approved local facility.
- .4 Protect structural components not removed for demolition from movement or damage.
- .5 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative having jurisdiction.
- .6 Protect surface drainage, mechanical and electrical from damage and blockage.
- .7 Separate and store materials produced during dismantling of structures in designated areas.
- .8 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
  - .1 On-site source separation is recommended.

### **1.4 DISPOSAL OF WASTES**

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of any waste into waterways, storm, or sanitary sewers.
- .3 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
- .4 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

### **1.5 USE OF SITE AND FACILITIES**

- .1 Execute work with least possible interference or disturbance to normal use of premises.
- .2 Provide security measures approved by Departmental Representative.

### **1.6 SCHEDULING**

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

**PART 2**      **PRODUCTS (NOT APPLICABLE)**

**PART 3**      **EXECUTION**

**3.1**          **APPLICATION**

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

**3.2**          **CLEANING**

- .1          Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2          Clean-up work area as work progresses.
- .3          Source separate materials to be reused/recycled into specified sort areas.

**3.3**          **DIVERSION OF MATERIALS**

- .1          From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative and consistent with applicable fire regulations.
  - .1          Mark containers or stockpile areas.
  - .2          Provide instruction on disposal practices.
- .2          On-site sale or distribution of salvaged materials to third parties is not permitted.

**END OF SECTION**

**PART 1**            **GENERAL**

**1.1**                **RELATED SECTIONS**

- .1            Section 01 74 00 - Cleaning.
- .2            Section 01 78 00 - Closeout Submittals.
- .3            Section 01 91 13.13 - General Commissioning (Cx) Requirements.

**1.2**                **FINAL INSPECTION AND DECLARATION PROCEDURES**

- .1            Contractor's Inspection: The Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects; repair as required. Notify the Departmental Representative in writing of satisfactory completion of the Contractor's Inspection and that corrections have been made. Request an Departmental Representative's Inspection.
- .2            Departmental Representative Inspection: Departmental Representative and the Contractor will perform an inspection of the Work to identify obvious defects or deficiencies. The contractor shall correct Work accordingly.
- .3            Completion: submit written certificate that the following have been performed:
  - .1            Work has been completed and inspected for compliance with Contract Documents.
  - .2            Defects have been corrected and deficiencies have been completed.
  - .3            Equipment and systems have been tested, adjusted and balanced and are fully operational.
  - .4            Certificates required by Fire Commissioner; Utility companies have been submitted.
  - .5            Operation of systems have been demonstrated to Departmental Representative personnel.
  - .6            Commissioning of building systems: completed in accordance with section 01 91 13 – Commissioning (Cx) Requirements and copies of final Commissioning Report submitted to Departmental Representative.
  - .7            Work is complete and ready for Final Inspection.
- .4            Final Inspection: When items noted above are completed, request final inspection of Work by the Departmental Representative, representative of DTW and the Contractor. If Work is deemed incomplete by the Departmental Representative, complete outstanding items and request a reinspection.
- .5            Declaration of Substantial Performance: When the Departmental Representative considers deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for Certificate of Substantial Performance. Refer to General Conditions for specifics to application.

- .6 Commencement of Lien and Warranty Periods: The date of DTW acceptance of the submitted declaration of Substantial Performance shall be the date for commencement for the warranty period and commencement of the lien period.
- .7 Declaration of Total Performance: When the Departmental Representative considers final deficiencies and defects have been corrected and it appears requirements of the Contract have been totally performed, make application for certificate of Total Performance. Refer to General Conditions for specifics to application. If Work is deemed incomplete by the Consultant, complete the outstanding items and request a reinspection.

**1.3 REINSPECTION**

- .1 Should status of work require reinspection by Departmental Representative due to failure of work to comply with Contractor's claims for inspection, Owner will deduct amount of compensation for reinspection services from payment to Contractor.

**PART 2 PRODUCTS (NOT APPLICABLE)**

**PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

## **PART 1 GENERAL**

### **1.1 SUMMARY**

- .1 Section includes descriptions for demolishing, salvaging, recycling and removing site work items identified for removal in whole or in part, and for backfilling trenches and excavations resulting from site demolition activities.

### **1.2 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 35 29.06 - Health and Safety Requirements
- .3 Section 01 35 43 - Environmental Procedures
- .4 Section 01 45 00 - Quality Control
- .5 Section 01 74 19 – Construction/Demolition Waste Management and Disposal.
- .6 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

### **1.3 SUBMITTALS**

- .1 Shop drawings
  - .1 Submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning, where required by authorities having jurisdiction.
  - .2 Submit drawings stamped and signed by qualified professional engineer licensed in Province of Newfoundland and Labrador, Canada.
- .2 Hazardous Materials: provide description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of Work as required.
- .3 Submit plan indicating:
  - .1 Descriptions of and anticipated quantities of materials to be salvaged, reused, recycled and landfilled.
  - .2 Detailed sequence of selective site demolition and removal work, with starting and ending dates for each activity.
  - .3 Number and location of dumpsters.
  - .4 Anticipated frequency of tippage.
  - .5 Interruption of utility services.
  - .6 Coordination for shutoff, capping, and continuation of utility services.
  - .7 Locations of temporary partitions and means of egress.

- .4 Submit copies of certified weigh bills, bills of landing from authorized disposal sites and reuse and recycling facilities for material removed from upon request from Departmental Representative.
- .5 Proposed Dust Control and Noise Control:
  - .1 Submit statement or drawing that indicates measures proposed for use, proposed locations, and proposed time frame for their operation.
- .6 Qualification Data:
  - .1 Submit information for companies and personnel indicating their capabilities and experience to perform work of this Section including; but not limited to, lists of completed projects with project names and addresses, for work of similar complexity and extent.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordinate with Departmental Representative for the material ownership including the following:
  - .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property. Demolished materials shall become Contractor's property and shall be removed from Project site.
  - .2 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during demolition remain Owner's property:
    - .1 Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Departmental Representative.
    - .2 Coordinate with Departmental Representative, who will establish special procedures for removal and salvage operations.
- .2 Convene pre-installation meeting one week prior to beginning work of this section to:
  - .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Verify existing site conditions adjacent to demolition work.
  - .4 Coordinate with other construction sub trades.
  - .5 Arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work, prior to start of Work.
- .3 Hold project meetings every month.
  - .1 Ensure key personnel, site supervisor, project manager, subcontractor representatives attend.
- .4 Scheduling:
  - .1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.
  - .2 Notify Departmental Representative in writing when unforeseen delays occur.



## 1.5 DELIVERY, STORAGE AND HANDLING

- .1 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Departmental Representative and at no cost to Departmental Representative.
- .2 Remove and store materials to be salvaged, in manner to prevent damage.
- .3 Store and protect in accordance with requirements for maximum preservation of material.

## 1.6 SITE CONDITIONS

- .1 In all circumstances ensure that demolition work does not adversely affect adjacent water courses groundwater and wildlife, or contribute to excess air and noise pollution.
- .2 Do not dispose, of waste or volatile materials such as mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.
- .3 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.
- .5 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .6 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
- .7 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.
- .8 Conduct selective site demolition so Owner's operations will not be disrupted.
  - .1 Provide not less than three (3) working days' notice to Departmental Representative of activities that will affect operations.
  - .2 Maintain access to existing walkways, exits, and other adjacent occupied or used facilities. Closing or obstructing walkways, exits, or other occupied or used facilities without written permission from Departmental Representative is not permitted.
- .9 Departmental Representative assumes no responsibility for Selective Site elements being demolished.
  - .1 Conditions existing at time of inspection for bidding purpose will be maintained by Departmental Representative as far as practical.
  - .2 Before selective site demolition, remove, protect and store salvaged items as directed by Departmental Representative.

## **1.7 EXISTING CONDITIONS**

- .1 Prior to start of any demolition work remove contaminated or hazardous materials as defined by authorities having jurisdiction from site and dispose of at designated disposal facilities.
- .2 Site elements that will be demolished are based on their condition on date that tender is accepted.

## **PART 2 PRODUCTS (NOT APPLICABLE)**

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of selective site demolition required.
- .2 Departmental Representative does not guarantee that existing conditions are the same as those indicated in Project Record Documents.
- .3 Inventory and record the condition of items being removed and salvaged.
- .4 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to Departmental Representative.
- .5 Perform an engineering survey of condition of adjacent buildings to determine whether removing any site element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective site demolition operations.
- .6 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .7 Notify and obtain approval of utility companies before starting demolition.

### **3.2 PREPARATION**

- .1 Temporary Erosion and Sedimentation Control:
  - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
  - .2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
  - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.
- .2 Protection of in-place conditions:

- .1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades properties, parts of existing building to remain.
  - .1 Provide bracing, shoring and underpinning as required.
  - .2 Repair damage caused by demolition as directed by Departmental Representative.
- .2 Support affected site elements and, if safety of site element being demolished, adjacent structures, or services appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.
- .3 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.
- .3 Surface Preparation:
  - .1 Disconnect electrical and service lines within the site to be demolished.
  - .2 Disconnect and cap designated mechanical services.
  - .3 Septic Tanks:
    - .1 Pump out buried septic tanks, left in place. Fill with sand.
    - .2 Remove tanks within area of new construction or under paved areas and slabs.

### **3.3 REMOVAL OF HAZARDOUS WASTES**

- .1 Remove contaminated or dangerous materials defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

### **3.4 REMOVAL OPERATIONS**

- .1 Remove items as indicated.
- .2 Do not disturb items designated to remain in place.
- .3 Removal of Pavements, Curbs and Gutters
  - .1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.
  - .2 Protect adjacent joints and load transfer devices.
  - .3 Protect underlying and adjacent granular material.
- .4 When removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving, prevent contamination with base coarse aggregates.
- .5 When removing pipes under existing or future pavement area, excavate at least 300mm below pipe invert.
- .6 Decommission water wells and monitoring wells in accordance with Provincial guidelines and regulations.
- .7 Removal from site

.1 Interim removal of stockpiled material will be required by Departmental Representative, if it is deemed to interfere with operations of Departmental Representative, Owner or other contractors.

.8 Sealing

.1 Seal pipe ends and walls of manholes or catch basins as indicated. Securely plug to form watertight seal.

.9 Backfill

.1 Backfill in areas as indicated

### **3.5 RESTORATION**

.1 Restore areas and existing works outside areas of demolition to match conditions of adjacent, undisturbed areas.

.2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

### **3.6 CLEAN UP**

.1 Upon completion of work, remove debris, trim surfaces and leave work site clean.

.2 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

**END OF SECTION**

## **PART 1 GENERAL**

### **1.1 SUMMARY**

- .1 This Section includes requirements for the following:
  - .1 Demolition and removal of buildings and structures.
  - .2 Demolition and removal of site improvements adjacent to a building or structure being demolished.
  - .3 Demolition and removal of concrete foundations and piles.
  - .4 Abandoning in place and removing below grade construction.
  - .5 Disconnecting, capping or sealing, and abandoning in place or removing site utilities.

### **1.2 RELATED SECTIONS**

- .1 Section 01 11 00 – Summary of Work
- .2 Section 01 35 29.06 - Health and Safety Requirements
- .3 Section 01 35 43 - Environmental Procedures
- .4 Section 01 52 00 – Construction Facilities
- .5 Section 01 56 00 - Temporary Barriers and Enclosures
- .6 Section 01 74 21 – Construction/Demolition Waste Management and Disposal
- .7 Section 02 41 13 – Selective Site Demolition
- .8 Section 02 41 19.16 – Selective Interior Demolition
- .9 Section 02 41 99 – Demolition for Minor Works

### **1.3 REFERENCES**

- .1 Canadian Standards Association (CSA).
  - .1 CSA S350, Code of Practice for Safety in Demolition of Structures
- .2 Department of justice Canada (Jus)
  - .1 Canadian Environmental Assessment Act (CEAA)
  - .2 Canadian Environmental Protection Act (CEPA)
- .3 National Fire Protection Association (NFPA)
  - .1 NFPA 241-13, Standard for Safeguarding Construction, Alteration, and Demolition Operations
- .4 National Research Council Canada (NRC)

- .1 National Building Code of Canada (NBC)

#### 1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Coordinate with Departmental Representative for the material ownership as follows:
  - .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property. Demolished materials shall become Contractor's property and shall be removed from Project site.
  - .2 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during demolition remain Owner's property:
    - .1 Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Departmental Representative.
    - .2 Coordinate with Departmental Representative, who will establish special procedures for removal and salvage operations.
- .2 Convene pre-installation meeting one week prior to beginning work of this section to:
  - .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Verify existing site conditions adjacent to demolition work.
  - .4 Coordinate with other construction sub trades.
  - .5 Arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work, prior to start of Work.
- .3 Hold project meetings every month.
  - .1 Ensure key personnel, site supervisor, project manager, subcontractor representatives attend.
- .4 Scheduling:
  - .1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.
  - .2 Notify Departmental Representative in writing when unforeseen delays occur.

#### 1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Provide the following submittals before starting any work of this Section.
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Newfoundland and Labrador as follows:
  - .2 Demolition drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning.
- .3 Submit schedule of demolition activities indicating:

- .1 Detailed sequence of demolition and removal work, with starting and ending dates for each activity.
- .2 Interruption of utility services.
- .3 Coordination for shutoff, capping, and continuation of utility services.
- .4 Locations of temporary partitions and means of egress.
- .4 Submit a plan of demolition area indicating extent of temporary facilities and supports, methods of removal and demolition prepared by a professional engineer in accordance with requirements of Authority Having Jurisdiction.
- .5 Submit information for companies and personnel indicating their capabilities and experience to perform work of this Section including; but not limited to, lists of completed projects with project names and addresses, for work of similar complexity and extent.

## **1.6 WASTE MANAGEMENT AND DISPOSAL**

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

## **1.7 EXISTING CONDITIONS**

- .1 Hazardous building materials assessment to be conducted on site building to verify potential asbestos containing building materials as well as potential lead, mercury and/or PCB containing paints.
- .2 Should material resembling spray or trowel applied asbestos or any other designated substance be encountered in course of demolition, stop work, take preventative measures, and notify Departmental Representative immediately. Do not proceed until written instructions have been received.
- .3 Structures to be demolished to be based on their condition on date that tender is accepted.
- .4 Salvage items identified by Departmental Representative. Remove, protect and store salvaged items as directed by Departmental Representative. Deliver to Owner as directed.

## **1.8 ENVIRONMENTAL PROTECTION**

- .1 Ensure work is done in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades parts of existing building to remain.
- .3 Support affected structures and, if safety of structure being demolished or adjacent structures or services appears to be endangered cease operations and notify Departmental Representative.
- .4 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

- .5 Ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
- .6 Fires and burning of waste or materials is not permitted on site.
- .7 Do not bury waste or materials on site.
- .8 Do not dispose of waste or volatile materials such as mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.
- .9 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
- .10 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities' requirements.
- .11 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .12 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
- .13 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.
- .14 Conduct structure demolition so Owner's operations will not be disrupted.
  - .1 Provide not less than three (3) days' notice to Departmental Representative of activities that will affect operations.
  - .2 Maintain access to existing walkways, exits, and other adjacent occupied or used facilities:
    - .1 Do not close or obstruct walkways, exits, or other occupied or used facilities without written permission from Departmental Representative.

## **PART 2 PRODUCTS (NOT APPLICABLE)**

## **PART 3 EXECUTION**

### **3.1**

#### **EXAMINATION**

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of structure demolition required.
- .2 Inventory and record the condition of items being removed and salvaged.
- .3 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element.



- .4 Perform engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during structure demolition operations.

### **3.2 PREPARATION**

- .1 Do work in accordance with 01 35 29.06 – Health and Safety Requirements.
- .2 Disconnect electrical and telephone service lines entering buildings to be demolished. Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.
- .3 Disconnect and cap designated mechanical services.
  - .1 Sewer and water lines: remove to property line.
  - .2 Other underground services: remove and dispose of as directed by Departmental Representative.
- .4 Do not disrupt active or energized utilities designated to remain undisturbed.
- .5 Remove rodent and vermin as required by Departmental Representative.

### **3.3 SAFETY CODE**

- .1 Do demolition work in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.
- .2 Blasting operations not permitted during demolition.

### **3.4 DEMOLITION**

- .1 Demolish foundation walls to minimum of 300mm below finished grade.
- .2 Demolish foundation walls and footings, and concrete floors below or on grade.
- .3 Break 100mm holes per 10m<sup>2</sup> area in concrete slabs which are not to be removed, to prevent accumulation of water. Keep floor drains open if permanent drainage still connected.
- .4 Pieces of concrete and masonry not larger than 200 mm broken from demolition work may be used as backfill in open basements on excavations provided voids are filled. Keep demolition fill 300 mm below finished grade level. Do not backfill basement areas until inspected by Departmental Representative.
- .5 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
- .6 At end of each day's work, leave Work in safe and stable condition. Protect interiors of parts not to be demolished from exterior elements at all times.
- .7 Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.

- .8 Remove structural framing.
- .9 Contain all fibrous materials (e.g. Insulation) to minimize release of airborne fiber while being transported to waste disposal site or alternative disposal location.
- .10 Only dispose of material specified by selected alternative disposal option as directed by Departmental Representative.
- .11 Ensure that these materials will not be disposed of in landfill or waste stream destined for landfill.
- .12 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.
- .13 Environmental:
  - .1 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimized danger at site or during disposal.
  - .2 Septic Tanks:
    - .1 Pump out buried septic tanks, left in place. Fill with sand.
    - .2 Remove tanks within area of new construction or under paved areas and slabs.
- .14 Prior to the start of any demolition work remove contaminated or hazardous materials as defined by authorities having jurisdiction, from site and dispose of at designated disposal facilities.
- .15 Prior to the start of any demolition work remove underground storage tanks and piping as directed.
- .16 Use natural lighting to work by wherever possible. Shut off all lighting except those required for security purposes at the end of each day.

### 3.5 STOCKPILING

- .1 Stockpile materials in a location as directed by Departmental Representative.
- .2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.
- .3 Separate from general waste stream each of the following materials. Stockpile materials in neat and orderly fashion in location and as directed by Departmental Representative for alternate disposal. Stockpile materials in accordance with applicable fire regulations.
  - .1 Glass fiber ceiling tiles.
  - .2 Wood fiber ceiling tiles.
  - .3 Power source poles deemed unfit for reuse by Departmental Representative.
  - .4 Wiring and conduit.
  - .5 Outlets/Switches
  - .6 Floor receptacles.
  - .7 Metal duct work, baffles, HVAC equipment.

- .8 Demountable partitions.
  - .9 Drapes.
  - .10 Tracks and blinds.
  - .11 Insulation batts.
  - .12 Miscellaneous metals.
  - .13 Carpet.
- 4 Supply separate, clearly-marked disposal bins for all categories of waste material. Do not remove bins from site until inspected and approved by Departmental Representative.
- 5 Provide collection areas for collection of miscellaneous metals in the area of demolition.

### **3.6 REMOVAL FROM SITE**

- .1 Notify Departmental Representative in writing of any materials identified as not suitable for alternate disposal. Provide reasons prior to approval for disposal.
- .2 Dispose of materials as directed by Departmental Representative.
- .3 Remove stockpiled material as directed by Departmental Representative when it interferes with operations of project construction.
- .4 Remove stockpiles of like materials by an alternate disposal option once collection of materials is complete.
- .5 Transport material designated for alternate disposal in accordance with applicable regulations.
- .6 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

### **3.7 REPORTING**

- .1 Record off-site removal of debris and materials and provide following information regarding removed materials to Departmental Representative within two (2) working days.
  - .1 Time and date of Removal
  - .2 Description of Material
  - .3 Weight and Quantity of Materials.
  - .4 Breakdown of reuse, recycling and landfill quantities.
  - .5 End Demolition of Materials.

### **3.8 COORDINATION**

- .1 Coordinate alternative disposal activities with Departmental Representative on site waste diversion representative.

**3.9 PEST CONTROL**

- .1 Engage the services of a professional Pest Control Firm to survey the building and immediate areas to ascertain the presence of any pests that would be impacted by demolition and removal activities.
- .2 Pest Control Firm to take measures to properly abate any such noted pests in accordance with regulatory requirements and provide certification that the building areas are free and clear prior to commencement of building abatement and removal activities.

**END OF SECTION**

**PART 1        GENERAL**

**1.1            RELATED WORK**

- .1        Division 1 - General Requirements.
- .2        Comply with Asbestos Abatement Regulations, Latest Edition.

**1.2            SECTION INCLUDES**

- .1        Removal as specified of all spray or trowel-applied asbestos-containing material located as indicated.
- .2        Encapsulation as specified of all spray or trowel-applied asbestos-containing material located as indicated.
- .3        Encapsulation of areas where asphaltic adhesive coating under spray or trowel-applied asbestos-containing material prevents complete removal of spray or trowel-applied asbestos-containing material.
- .4        Enclosure as specified of all spray or trowel-applied asbestos-containing material located as indicated.
- .5        Removal (other than defined minor amounts) of friable materials containing asbestos.
- .6        Use of power tools that are fitted with dust collectors equipped with a HEPA filter to cut, shape, grind, drill, scrape, or abrade manufactured products containing asbestos.
- .7        Cleaning, maintaining, or removal of air-handling equipment in buildings where sprayed fireproofing materials containing asbestos have been applied.

**1.3            REFERENCES**

- .1        Codes and standards referenced in this section refer to the latest edition thereof.
- .2        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-1.205, Sealer for Application to Asbestos-Fibre-Releasing Materials.

**1.4            DEFINITIONS**

- .1        HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2        Amended Water: Water with a non-ionic surfactant wetting agent added to reduce water tension to allow wetting of fibres.

- .3 Asbestos-Containing Materials (ACMs): Materials identified under Existing Conditions (Article 1.7), including fallen materials and settled dust.
- .4 Asbestos Work Area: Area where actual removal, sealing and enclosure of spray or trowel-applied asbestos-containing materials takes place.
- .5 Authorized Visitors: Building Owner, Asbestos Abatement Consultant or designated representative, and persons representing regulatory agencies.
- .6 Friable Material: Material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.
- .7 Occupied Area: Any area of the building or work site that is outside the Asbestos Work Area.
- .8 Polyethylene sheeting sealed with tape: Polyethylene sheeting of type and thickness specified sealed with tape along all edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from water damage or damage by sealants, and to prevent escape of asbestos fibres through the sheeting into a clean area.
- .9 Glove Bag: Prefabricated glove bag as follows:
  - .1 Minimum thickness 0.25 mm (10 mil) polyvinyl-chloride bag.
  - .2 Integral 0.25 mm (10 mil) thick polyvinyl-chloride gloves and elastic ports.
  - .3 Equipped with reversible double-pull double throw zipper on top.
  - .4 Straps for sealing ends around pipe.
  - .5 Must incorporate internal closure strip if it is to be moved or used in more than one specific location.
- .10 DOP Test: A testing method used to determine the integrity of the Negative Pressure unit using dioctyl phthalate (DOP) HEPA-filter leak test.
- .11 Sprayer: Garden reservoir type sprayer or airless spray equipment capable of producing a mist or fine spray. Must be appropriate capacity for scope of work.
- .12 Negative pressure: A system that extracts air directly from work area, filters such extracted air through a High Efficiency Particulate Air filtering system, and discharges this air directly outside work area to exterior of building. This system shall maintain a minimum pressure differential of 5 Pa relative to adjacent areas outside of work areas, be equipped with an alarm to warn of system breakdown, and be equipped with an instrument to continuously monitor and automatically record pressure differences.
- .13 Airlock: A system for permitting ingress or egress without permitting air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways at least 2 m apart.
- .14 Curtained doorway: An arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed as follows:

Place two overlapping sheets of polyethylene over an existing or temporarily framed doorway, secure each along the top of the doorway, secure the vertical edge of one sheet along one vertical side of the doorway, and secure the vertical edge of the other sheet along the opposite vertical side of the doorway. Reinforce free edges of polyethylene with duct tape and weight the bottom edge to ensure proper closing. Each polyethylene sheet shall overlap openings not less than 1.5 m on each side.

- .15 Competent person: in relation to specific work, means a worker who:
  - .1 Is qualified because of knowledge, training and experience to perform the work.
  - .2 Is familiar with the provincial and federal laws and with the provisions of the regulations that apply to the work.
  - .3 Has knowledge of all potential or actual danger to health or safety in the work.
- .16 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.

## 1.5 SUBMITTALS

- .1 Before commencing work:
  - .1 Obtain from the appropriate agency and submit to Departmental Representative all necessary permits for transportation and disposal of asbestos waste. Ensure that dump operator is fully aware of hazardous nature of material being dumped, and proper methods of disposal. Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to receive and properly dispose of asbestos waste.
  - .2 Submit proof satisfactory to Departmental Representative that all employees have had instruction on the hazards of asbestos exposure, respirator use, dress, use of showers, entry and exit from work areas, and all aspects of work procedures and protective measures. Supervisory personnel shall have attended an asbestos abatement course, of not less than two days duration, approved by the Departmental Representative. Submit proof of attendance in the form of a certificate. Minimum of one Supervisor for every five workers.
  - .3 Submit layout of proposed enclosures and decontamination facilities to Departmental Representative for review.
  - .4 Submit documentation including test results for sealer proposed for use.
  - .5 Submit Provincial and/or local requirements for Notice of Project Form.
  - .6 Submit proof of Contractor's Asbestos Liability Insurance.
  - .7 Submit proof satisfactory to the Departmental Representative that all employees have respirator fitting and testing. Workers must be fit-tested with the respirator that is personally issued.
  - .8 Submit Workplace Health, Safety and Compensation Commission status and transcription of insurance.
  - .9 Submit documentation including test results, fire and flammability data, and Material Safety Data Sheets for chemicals or materials including but not limited to the following:
    - .1 encapsulants;

- .2 amended water;
- .3 slow-drying sealer.

## **1.6 REGULATORY REQUIREMENTS**

- .1 Comply with Federal, Provincial, and local requirements pertaining to asbestos, provided that in case of conflict among those requirements or with these specifications the more stringent requirement applies. Comply with regulations in effect at the time the work is performed.
- .2 Follow Newfoundland Regulation of the Occupation Health and Safety Act, Asbestos Abatement Regulations, Latest Edition. All work as defined under this section must be completed by a "Qualified Asbestos Abatement Contractor" (registered with the Government of Newfoundland and Labrador)
- .3 Follow regulations for the transport of asbestos waste, specifically the Transportation of Dangerous Goods Act, latest edition.
- .4 Follow regulations for the disposal of asbestos waste, specifically Waste Management Regulations and Waste Material Disposal Areas Regulations.

## **1.7 EXISTING CONDITIONS**

- .1 Prior to commencing of work, verify with Departmental Representative, and review whether an asbestos audit and/or Asbestos Management Plan are in place for the building.
- .2 Information contained in audits and plans are for general information only and are not necessarily representative of all asbestos containing materials covered within the scope of this project.
- .3 Notify Departmental Representative of materials believed to contain asbestos encountered during the execution of work that is not contained in the audits and plans. Do not disturb such materials until instructed by Departmental Representative.

## **1.8 INSTRUCTION AND TRAINING**

- .1 Before commencing work, provide to the Departmental Representative satisfactory proof that every worker has had instruction and training in the hazards of asbestos exposure, in personal hygiene including dress and showers, in entry and exit from the Asbestos Work Area, in all aspects of work procedures including glove bag procedures, and in the use, cleaning, and disposal of respirators and protective clothing.
- .2 Instruction and training related to respirators includes, at a minimum:
  - .1 Proper fitting of the equipment.
  - .2 Inspection and maintenance of the equipment.
  - .3 Disinfecting of the equipment.
  - .4 Limitations of the equipment.
- .3 Instruction and training must be provided by a competent, qualified person.



- .4 Supervisory personnel to complete required training.

## 1.9 WORKER PROTECTION

- .1 Protective equipment and clothing to be worn by workers while in the Asbestos Work Area includes:
  - .1 Respirator equipped with HEPA filter cartridges, personally issued to the worker and marked as to efficiency and purpose, and acceptable to the Provincial Authority having jurisdiction as suitable for the type of asbestos and the level of asbestos exposure in the Asbestos Work Area. If disposable type filters are used, provide sufficient filters so that workers can install new filters following disposal of used filters and before re-entering contaminated areas.
  - .2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres, consisting of full-body covering including head covering with snug-fitting cuffs at wrists, ankles, and neck.
- .2 Each worker shall:
  - .1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters that have been tested as satisfactory, clean coveralls and head covers before entering Equipment and Access Rooms or Asbestos Work Area . All street clothes, uncontaminated footwear, towels, and similar uncontaminated articles shall be stored in clean change room.
  - .2 Remove gross contamination from clothing before leaving work area then proceed to Equipment and Access Room. Place contaminated worksuits in receptacles for disposal with other asbestos - contaminated materials Clean outside of respirator with soap and water. Remove respirator; remove filters and wet them and dispose of filters in the container provided for the purpose; and wash and rinse the inside of the respirator. When not in use in the work area, store work footwear in Equipment and Access Room. Upon completion of asbestos abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from work area or from Equipment and Access Room.
  - .3 Provide facilities for washing and/or showering when leaving Asbestos Work Area, which shall be used by every worker. Hot and cold water supply is to be provided in such a manner to allow workers to adjust water temperature during decontamination.
  - .4 Enter the unloading room from outside dressed in clean coveralls to remove waste containers and equipment from the Holding Room of the Container and Equipment Decontamination Enclosure system. No worker shall use this system as a means to leave or enter the work area.
- .3 Workers shall not eat, drink, smoke or chew gum or tobacco at the work site except in established clean room.
- .4 Workers shall be fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual asbestos abatement.
- .5 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in 1.9 of this section, in both official languages.

- .6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects the seal between the respirator and the face.

## **1.10 VISITOR PROTECTION**

- .1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.
- .2 Instruct Authorized Visitors in the use of protective clothing and respirators.
- .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from work areas.

## **1.11 NOTIFICATION**

- .1 Not later than ten (10) working days before commencing work on this project notify the Occupational Health and Safety Division in writing as per Regulation 194/91, Section 34 Sub-Section (7). Provide telephone notification immediately prior to start of work.
- .2 Notify Sanitary Landfill site.
- .3 Inform all sub-trades of the presence of friable asbestos-containing materials identified in the Existing Conditions.
- .4 Submit to the Departmental Representative a copy of all notifications prior to the start of work.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- .1 All materials and equipment brought to work site must be in good condition and free of asbestos, asbestos debris, and fibrous materials. Disposable items must be of new materials only.
- .2 Polyethylene: Minimum 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.
- .3 Tape: Fibreglass reinforced duct tape suitable for sealing polyethylene under both dry conditions and wet conditions using amended water.
- .4 Wetting agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether, or other material approved by Departmental Representative, mixed with water in a concentration to provide adequate penetration and wetting of asbestos-containing material.
- .5 Asbestos waste containers: Metal or fibre - type acceptable to dump operator with tightly fitting covers and 0.15 mm minimum thickness sealable polyethylene liners. Labelling requirements: Affix a pre-printed cautionary asbestos warning, in both official languages, that is clearly visible when ready for removal to disposal site.
- .6 Encapsulants : Type 2 surface film forming type Class A water based conforming to CAN/CGSB-1.205, ULC listed.

- .7 Glove bag: Acceptable materials include safe-T-strip products in configuration suitable for work, or alternative material approved by addendum during the tendering period in accordance with the Instructions to Tenderers. Glove bags intended for use in more than one location must be equipped with a reversible, double-pull, double-throw zipper on the top and at approximately the mid-section of the bag.
- .8 Slow drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for the purpose of trapping residual asbestos fibres. Sealer shall have flame spread and smoke developed rating less than 50

### **PART 3      EXECUTION**

#### **3.1          PREPARATION**

- .1 Work Areas:
  - .1 Shut off and isolate air handling and ventilation systems to prevent fibre dispersal to other areas of the building during work phase. Conduct smoke tests to ensure that duct work is airtight. Active return air ducts within the Asbestos Work Area shall have all joints and seams rigid seal and caulked.
  - .2 Clean proposed work area using, where practicable, HEPA vacuum cleaning equipment. If not practicable, use a wet cleaning method. Do not use methods that raise dust, such as dry sweeping, or vacuuming using other than HEPA vacuum equipment.
  - .3 Put negative pressure system in operation and operate continuously from the time the first polyethylene is installed to seal openings until final completion of the work including final cleanup. Provide continuous monitoring of pressure difference using an automatic recording instrument.
  - .4 Seal off all openings such as corridors, doorways, windows, skylights, ducts, grilles, and diffusers, with polyethylene sheeting sealed with tape.
  - .5 Cover floor and wall surfaces with polyethylene sheeting sealed with tape. Cover floors first so that polyethylene extends at least 300 mm up walls then cover walls to overlap floor sheeting.
  - .6 Build airlocks at all entrances to and exits from work area so that work area is always closed off by one curtained doorway when workers enter or exit.
  - .7 At each access to work areas install warning signs in both official languages in upper case "Helvetica Medium" letters reading as follows where the number in parentheses indicates the font size to be used : "CAUTION ASBESTOS HAZARD AREA (25 mm) NO UNAUTHORIZED ENTRY (19 mm) WEAR ASSIGNED PROTECTIVE EQUIPMENT (19 mm) BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM (7 mm)".
  - .8 After work area isolation , remove heating, ventilating, and air conditioning filters, pack in sealed plastic bags 0.15 mm minimum thick and treat as contaminated asbestos waste. Remove ceiling - mounted objects such as lights, partitions, other fixtures not previously sealed off, and other objects that interfere with asbestos removal, as directed by Departmental Representative. Use localized water spraying during fixture removal to reduce fibre dispersal.

- .9 Maintain emergency and fire exits from work area, or establish alternative exits satisfactory to Provincial Fire Commissioner.
  - .10 Where application of water is required for wetting asbestos-containing materials, shut off electrical power, provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical lines and equipment.
  - .11 After preparation of work area and Decontamination Enclosure Systems remove plaster ceilings, including lath, furring, channels, hangers, wires, clips, and dispose of as contaminated waste in specified containers. Spray ceiling debris and immediate work area with amended water (see definition in Section 1.4.2) to reduce dust, as work progresses.
- .2 Worker Decontamination Enclosure System:
- .1 Worker Decontamination Enclosure System shall comprise an Equipment and Access Room, a Wash Area Room, and a Clean Room, as follows:
    - .1 Equipment and Access Room: Build an Equipment and Access Room between Wash Area Room and work area, with two curtained doorways, one to the Wash Area Room and one to work area. Install portable toilet, waste receptor, and storage facilities for workers' shoes and any protective clothing to be reworn in work area. The Equipment and Access Room shall be large enough to accommodate specified facilities, any other equipment needed, and at least one worker allowing him /her sufficient space to undress comfortably.
    - .2 Wash Area Room: Build a Wash Area Room between the Clean Room and Equipment and Access Room, with two curtained doorways, one to the Clean Room and one to Equipment and Access Room. Provide a constant supply of hot and cold or warm water. Provide piping and connect to water sources and drains. Pump waste water through a 5 micrometre filter system acceptable to Departmental Representative before directing into drains. Provide soap, clean towels, and appropriate containers for disposal of used respirator filters.
    - .3 Clean Room: Build a Clean Room between the Wash Area Room and clean areas outside of enclosures, with two curtained doorways, one to outside of enclosures and one to Wash Area Room. Provide lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install a mirror to permit workers to fit respiratory equipment properly.
- .3 Container and Equipment Decontamination Enclosure System:
- .1 Container and Equipment Decontamination Enclosure System consists of a Staging Area within the work area, a Holding Room, and an Unloading Room. The purpose of this system is to provide a means to decontaminate waste containers, scaffolding, waste and material containers, vacuum and spray equipment, and other tools and equipment for which the Worker Decontamination Enclosure System is not suitable.
    - .1 Staging Area: Designate a Staging Area in the work area for gross removal of dust and debris from waste containers and equipment, labelling and sealing of waste containers, and temporary storage pending removal to Washroom. Staging Area shall have a curtained doorway to the Washroom.

- .2 Holding Room: shall be of sufficient size to accommodate at least two waste containers and the largest item of equipment used.
- .3 Unloading Room: Build an Unloading Room between the Holding Room and outside, with two curtained doorways, one to the Holding Room and one to outside.
- .4 Construction of Decontamination Enclosures:
  - .1 Build suitable framing for enclosures or use existing rooms where convenient, and line with polyethylene sheeting sealed with tape.
  - .2 Build curtained doorways between enclosures so that when people move through or when waste containers and equipment are moved through a doorway, one of the two closures comprising the doorway always remains closed.
- .5 Separation of Work Areas from Occupied Areas:
  - .1 Separate parts of the building required to remain in use from parts of the building used for asbestos abatement by means of an airtight barrier system constructed as follows:
    - .1 Build suitable floor to ceiling lumber or metal stud framing, cover with polyethylene sheeting sealed with tape, and apply 9 mm minimum thick plywood. Seal all joints between plywood sheets and between plywood and adjacent materials with surface film forming type sealer, to create an airtight barrier.
    - .2 Cover plywood barrier with polyethylene sealed with tape, as specified for work areas.
- .6 Maintenance of Enclosures:
  - .1 Maintain enclosures in tidy condition.
  - .2 Ensure that barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.
  - .3 Visually inspect enclosures at the beginning of each working period.
  - .4 Use smoke methods to test effectiveness of barriers when directed by Departmental Representative.
- .7 Asbestos Abatement work shall not commence until:
  - .1 Arrangements have been made for disposal of waste.
  - .2 For wet stripping techniques, arrangements have been made for containing, filtering, and disposal of waste water.
  - .3 Work area and decontamination enclosures and parts of the building required to remain in use are effectively segregated.
  - .4 Tools, equipment, and materials waste containers are on hand.
  - .5 Arrangements have been made for building security.
  - .6 Warning signs specified in PART 3 are displayed where access to contaminated areas is possible.
  - .7 All notifications have been completed and other preparatory steps have been taken.

### 3.2 SUPERVISION

- .1 A minimum of one Supervisor for every five workers is required. Refer to Asbestos Abatement Regulations for definition and training of supervisor.
- .2 An approved Supervisor must remain within the Asbestos Work Area at all times during the disturbance, removal, or other handling of asbestos-containing materials.

### 3.3 ASBESTOS REMOVAL

- .1 Before removing asbestos:
  - .1 Prepare site.
  - .2 Spray asbestos material with water containing the specified wetting agent, using airless spray equipment capable of providing a "mist" application to prevent release of fibres. Saturate the asbestos material sufficiently to wet it to the substrate without causing excess dripping. Spray the asbestos material repeatedly during work process to maintain saturation and to minimize asbestos fibre dispersion.
- .2 Remove the saturated asbestos material in small sections. Do not allow saturated asbestos to dry out. As it is being removed pack the material in sealable plastic bags 0.15 mm minimum thick and place in labelled containers for transport.
- .3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to Staging Area. Clean external surfaces thoroughly again by wet sponging before moving containers to decontamination Washroom. Wash containers thoroughly in decontamination Washroom, and store in Holding Room pending removal to Unloading Room and outside. Ensure that containers are removed from the Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.
- .4 After completion of stripping work, all surfaces from which asbestos has been removed shall be wire brushed and wet-sponged to remove all visible material. During this work keep the surfaces wet.
- .5 Where Departmental Representative decides complete removal of asbestos-containing material is impossible due to obstructions such as structural members or major service elements, and provides a written direction, encapsulate the material as follows:
  - .1 Apply surface film forming type sealer to provide 0.635 mm minimum dry film thickness over sprayed asbestos surfaces. Apply using airless spray equipment to avoid blowing off fibres.
- .6 After wire brushing and wet sponging to remove visible asbestos, and after encapsulating asbestos-containing material impossible to remove, wet clean the entire work area including the Equipment and Access Room, and equipment used in the process. After a 24 hour period to allow for dust settling, wet clean these areas and objects again. During this settling period no entry, activity, or ventilation will be permitted.

### **3.4 PIPE INSULATION REMOVAL USING GLOVE BAG**

- .1 Place tools necessary to remove insulation in tool pouch. Wrap the bag around pipe and close zippers. Seal bag to pipe with cloth straps.
- .2 Place hands in gloves and use necessary tools to remove insulation. Arrange insulation in bag to obtain full capacity of bag.
- .3 Insert nozzle of a garden reservoir type sprayer into bag through valve and wash down pipe and interior of bag thoroughly. Wet surface of insulation in lower section of bag.
- .4 When glove bags are intended for use at more than one location: After wash-down and application of sealer, seal off waste in lower section of bag using zipper at mid-section of bag. Remove air from top section of bag through the elasticized valve using a HEPA vacuum. Remove bag from pipe, reinstall in new location, and reseal to pipe prior to opening the lower section of the bag. Repeat stripping operation.
- .5 If bag is to be moved along pipe, first remove air from top section through the elasticized valve using a HEPA vacuum. Next loosen straps, move bag, re-seal to pipe using double-pull zipper to pass hangers. Repeat stripping operation.
- .6 To remove bag after completion of stripping, wash top section and tools thoroughly. Remove air from top section through the elasticized valve using a HEPA vacuum. Pull polyethylene waste container over glove bag before removing from pipe. Release one strap and remove freshly washed tools. Place tools in water. Remove second strap and zipper. Fold over into waste container and seal.
- .7 After removal of bag ensure that pipe is free of all residue. Remove all residue using HEPA vacuum or wet cloths. Ensure that surfaces are free of sludge which after drying could release asbestos dust into atmosphere. Seal exposed surfaces of pipe and ends of insulation with slow-drying sealer to seal in any residual fibres.
- .8 Upon completion of work shift, cover exposed ends of remaining pipe insulation with polyethelene taped in place.

### **3.5 FINAL CLEANUP**

- .1 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum all visible asbestos-containing particles observed during cleanup, immediately, using HEPA vacuum equipment.
- .2 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .3 Work areas, Equipment and Access Room, Wash Area Room, and other enclosures that may be contaminated shall be included in the clean-up.

- .4 Sealed waste containers and all equipment used in the work shall be included in the cleanup and shall be removed from work areas, via the Container and Equipment Decontamination Enclosure System, at an appropriate time in the cleaning sequence.
- .5 A final check shall be carried out to ensure that no dust or debris remains on surfaces as a result of dismantling operations and air-monitoring shall be carried out again to ensure that asbestos levels in the building do not exceed 0.10 fibres/cc. Repeat cleaning using HEPA vacuum equipment, or wet cleaning methods where feasible, in conjunction with sampling until levels meet this criteria.
- .6 As work progresses, and to prevent exceeding available storage capacity on site, remove sealed and labelled containers containing asbestos waste and dispose of to authorized disposal area in accordance with requirements of disposal authority. Ensure that each shipment of containers transported to dump is accompanied by Contractor's representative who shall ensure that dumping is done in accordance with governing regulations.

### **3.6 AIR MONITORING**

- .1 From commencement of work until completion of cleaning operations , air samples will be taken on a daily basis both inside and outside of work area enclosure in accordance with Asbestos Abatement Regulations (personal, perimeter and clearance) and conforming to applicable NIOSH sampling protocol. (ie: NIOSH 7400)
- .2 Results of air monitoring inside the work area will be used to establish the type of respirators to be used. Workers may be required to wear sample pumps for up to full-shift periods. If fibre levels are above the safety factor of the respirators in use, the abatement will be stopped, means of dust suppression will be applied, and a higher safety factor in respiratory protection will be used by all persons inside the enclosure. If air monitoring shows that areas outside work area enclosures are contaminated, these areas shall be enclosed, maintained and cleaned, in the same manner as that applicable to work areas.
- .3 During the course of the work, fibre content of the air will be measured by a PCM test. If PCM measurements exceed 0.10 f/cc work will be stopped until procedures are corrected.
- .4 Conduct final air monitoring as follows: After the Asbestos Work Area has passed a visual inspection, an acceptable coat of lock-down agent has been applied to all surfaces of the enclosure, and an appropriate setting period has passed, perform air monitoring within the Asbestos Work Area. Final air monitoring results must show fibre levels of less than 0.10 f/cc. If air monitoring results show fibre levels in excess of 0.10 f/cc, re-clean the work area and apply another acceptable coat of lock-down agent to all surfaces. Repeat as necessary until fibre levels are less than 0.10 f/cc.

### **3.7 INSPECTION**

- .1 Inspection of the Asbestos Work Area will be performed to confirm compliance with the requirements of the specifications and governing authorities. Deviation from the Asbestos Abatement Regulations is not accepted without prior approval of the governing authority. Any deviation from these requirements that have not been approved in writing by the Departmental



Representative and the governing authority may result in a stoppage of work, at no cost to the Owner.

- .2 The Departmental Representative is empowered to inspect adherence to specific procedures and materials, and to inspect for final cleanliness and completion. Additional labour or materials expended by the Contractor to provide performance to the level specified shall be at no additional cost.
- .3 The Departmental Representative is empowered to order a shutdown of work when a leakage of asbestos from the Asbestos Work Area has occurred or is likely to occur. Additional labour or materials expended by the Contractor to provide performance to the level specified shall be at no additional cost.

**END OF SECTION**

## **PART 1        GENERAL**

### **1.1        DESCRIPTION**

- .1        Lead-containing coatings to remain on substrate except when deemed unfeasible.
- .2        Comply with requirements of this Section when performing following Work:
  - .1        Removal of lead-containing coatings with a chemical gel or paste or with non-powered hand tools (other than manual scraping and sanding) as deemed feasible by the Contractor and as approved by the Departmental Representative.

### **1.2        SECTION INCLUDES**

- .1        Requirements and procedures for abatement of lead-based paints.

### **1.3        RELATED SECTIONS**

- .1        Section 01 33 00 – Submittal Procedures.
- .2        Section 01 35 15 – Special Project Procedures for Contaminated Sites.
- .3        Section 01 35 32 – Site Specific Health and Safety Plan.
- .4        Section 01 35 43 – Environmental Procedures.
- .5        Section 02 41 16 – Structure Demolition.
- .6        Section 02 41 23 – Debris and Miscellaneous Removals.

### **1.4        REFERENCES**

- .1        Canada Labour Code (R.S.C., 1985, c.L-2)
  - .1        Canada Occupational Health and Safety Regulations (SOR/86-304).
    - .1        Part X – Hazardous Substances.
- .2        Department of Justice Canada
  - .1        Canadian Environmental Protection Act, 1999 (CEPA).
  - .2        Transportation of Dangerous Goods Act (TDGA), 1992 (SC1992, c.34)
    - .1        Transportation of Dangerous Goods Regulations (SOR/2001-286).
  - .3        Hazardous Products Act (R.S.C., 1985, c. H-3)
    - .1        Controlled Products Regulations (SOR/88-66).
    - .2        Workplace Hazardous Materials Information System
- .3        U.S. Environmental Protection Agency (EPA)

- .1 EPA 747-R-95-007-1995, Sampling House Dust for Lead.
- .4 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (NIOSH)
  - .1 NIOSH 94-113 - NIOSH Manual of Analytical Methods (NMAM), 4th Edition (1994).
- .5 U.S. Department of Labour - Occupational Safety and Health Administration(OSHA) - Toxic and Hazardous Substances
  - .1 Lead in Construction Regulation - 29 CFR 1926.62-2007.
- .6 Underwriters' Laboratories of

Canada (ULC)

## 1.5 DEFINITIONS

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Authorized Visitors: Departmental Representative or designated representative(s).
- .3 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects over cuts and tears, and elsewhere as required to provide protection and isolation. For protection of underlying surfaces from damage and to prevent lead dust entering in cleanarea.
- .4 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.
- .5 Action level: employee exposure, without regard to use of respirators, to airborne concentration of lead of 50 micrograms per cubic meter of air (50 ug/m<sup>3</sup>) calculated as 8-hour time-weighted average (TWA). Minimum precautions for lead abatement are based on airborne lead concentrations less than 0.05 milligrams per cubic meter of air for removal of lead-based paint by methods noted in paragraph 1.1.
- .6 Competent person: Departmental Representative capable of identifying existing lead hazards in workplace taking corrective measures to eliminate them.
- .7 Lead dust: when wipe sampling on vertical surfaces and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.
- .8 Occupied Area: Areas of building or work site that is outside Work Area.

## 1.6 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written proof satisfactory to Departmental Representative that suitable arrangements

have been made to dispose of lead-based paint waste in accordance with requirements of Authority Having Jurisdiction.

- .3 Submit Territorial/Provincial and/or local requirements for Notice of Project Form.
- .4 Provide proof of Contractor's General and Environmental Liability Insurance.
- .5 Quality Control:
  - .1 Provide Departmental Representative necessary permits for transportation and disposal of lead-based paint waste and proof that lead based paint waste has been received and properly disposed.
  - .2 Provide proof satisfactory to Departmental Representative that employees have had instruction on hazards of lead exposure, respirator use, dress, and aspects of work procedures and protective measures.

## 1.7 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead paint, provided that in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Health and Safety:
  - .1 Do construction occupational health and safety in accordance with Section 01 35 32 - Health and Safety Plan.
  - .2 Safety Requirements: worker and visitor protection.
    - .1 Protective equipment and clothing to be worn by workers and visitors in workArea include:
      - .1 Respirator NIOSH approved and equipped with replaceable HEPA filter cartridges with an assigned protection factor of (10), acceptable to Authority Having Jurisdiction. Suitable for type of lead and level of lead dustexposure. Provide sufficient amount of filters.
      - .2 Half mask respirator: half-mask particulate respirator with N,R or P-series filter, and 100 % efficiency could be provided.
    - .2 Eating, drinking, chewing, and smoking are not permitted in work area.
    - .3 Ensure workers wash hands and face when leaving work area.
    - .4 Visitor Protection:
      - .1 Provide approved respirators to Authorized Visitors to work areas.
      - .2 Instruct Authorized Visitors procedures to be followed in entering and exiting work area.

## 1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Territorial/Provincial and municipal regulations.
- .2 Disposal of lead waste generated by removal activities must comply with federal, territorial and

municipal regulations. Dispose of lead waste in sealed double thickness 6 ml bags or leak proof drums. Label containers with appropriate warning labels.

- .3 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

## 1.9 EXISTING CONDITIONS

- .1 Lead-base painted materials to be abated and disposed of using minimum precautions apply to materials not currently identified in Drawings encountered during work and as identified to the Departmental Representative and as assigned minimum precaution requirements.
- .2 Notify Departmental Representative of lead based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

## 1.10 SCHEDULING

- .1 Not later than two days before beginning Work on this Project notify following in writing:
  - .1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
  - .2 Territorial department responsible for labor.
  - .3 Disposal Authority.
- .2 Inform sub trades of presence of lead-containing materials identified in Existing Conditions.
- .3 Provide Departmental Representative copy of notifications prior to start of Work.

## 1.11 MEASUREMENT FOR PAYMENT

- .1 The abatement, separation, packaging, transport and disposal of lead based paint from buildings and structures to be demolished and debris areas are included in the price for demolition of the structures as described in Section 02 41 16 - Structure Demolition, Section 02 41 23 – Debris and Miscellaneous Removals and in Section 02 81 01 – Hazardous Materials including, but not limited to the following:
  - .1 Supply of all materials, labour, and equipment necessary to perform the work in accordance with these specifications, including the supply and transport to the site of lead waste containers.
  - .2 Construction of temporary enclosures and drop sheets when necessary.
  - .3 Handling, separation and disposal of lead based painted materials from other debris and miscellaneous materials.
  - .4 Preparation of lead-based paint waste inventory.
  - .5 Transport and off-site disposal of lead-based paint waste and on-site landfilling of the unpainted substrate.
- .2 Except as otherwise indicated herein, Work under this section will not be measured. Include all costs in Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 -

Construction Progress Schedules – Bar (GANTT) Chart.

**PART 2**        **PRODUCTS**

**2.1**        **MATERIALS**

- .1        Polyethylene 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.
- .2        Tape: fiberglass - reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.
- .3        Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual lead paint residue.
- .4        Lead waste containers: metal or fibre type acceptable to dump operator with tightly fitting covers and 0.15 mm thickness sealable polyethylene liners.
  - .1        Label containers with pre-printed bilingual cautionary Warning Lead clearly visible (in English and French) when ready for removal to disposal site.

**PART 3**        **EXECUTION**

**3.1**        **SUPERVISION**

- .1        Approved Supervisor must remain within work area during disturbance, removal, or handling of lead-based paints.

**3.2**        **PREPARATION**

- .1        Work Area:
  - .1        Shut off and isolate HVAC system to prevent dust dispersal into other building areas. Conduct smoke tests to ensure duct work is airtight.
  - .2        Pre-clean fixed casework and equipment within work area, using HEPA vacuum and cover and seal with polyethylene sheeting and tape.
  - .3        Clean work area using HEPA vacuum. If not practicable, use wet cleaning method. Do not raise airborne dust level.
  - .4        Seal off openings with polyethylene sheeting and seal with tape.
  - .5        Protect floor surfaces covered from wall to wall with polyethylene sheets.
  - .6        Maintain emergency fire exits or establish alternatives satisfactory to Authority Having Jurisdiction.
  - .7        Where water application is required for wetting lead containing materials, provide temporary water supply appropriately sized for application of water as required.
  - .8        Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter (GCFI) circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical cables and equipment.

- .2 Do not start work until:
  - .1 Arrangements have been made for disposal of waste.
  - .2 Tools, equipment, and materials waste containers are on site.
  - .3 Arrangements have been made for building security.
  - .4 Notifications have been completed and preparatory steps have been taken.

### 3.3 LEAD ABATEMENT

- .1 Removal of lead-containing coatings with a chemical gel or paste and fibrous laminated cloth wrap; or removal equipped with HEPA filters; or removal with using power tools non-powered hand tool, other than manual scraping and sanding.
- .2 Remove lead-based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.
- .3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside. Ensure containers are removed by workers who have entered from uncontaminated areas dressed in clean coveralls.
- .4 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.
- .5 After wire brushing and wet sponging to remove visible lead based paint, and after encapsulating lead containing material impossible to remove, wet clean entire work area, and equipment used in process. After inspection by Departmental Representative apply continuous coat of slow drying sealer to surfaces of work area. Do not disturb work area for eight (8) hours (no entry), activity, ventilation, or disturbance during this period.

### 3.4 INSPECTION

- .1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from these requirements not approved in writing by Departmental Representative will result in work stoppage, at no cost to Owner.
- .2 Departmental Representative will inspect work for:
  - .1 Adherence to specific procedures and materials.
  - .2 Final cleanliness and completion.
  - .3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

### 3.5 LEAD SURFACE SAMPLING - WORK AREAS

- .1 Final lead surface sampling to be conducted as follows:
  - .1 After work area has passed a visual inspection for cleanliness approved and accepted by Departmental Representative. Apply coat of lock-down agent to surfaces within enclosure, and appropriate setting period of eight (8) hours has passed, Departmental

Representative will perform lead wipe sampling.

- .1 Final lead wipe sampling results from horizontal and vertical surfaces must show lead levels of less than 40 micrograms of lead in dust per square foot. Samples collected and analyzed in accordance with EPA 747-R-95-007.
- .2 If wipe sampling results show levels of lead in excess of 40 micrograms per square foot, re-clean work area at contractor's expense and apply another acceptable coat of lock-down agent to surfaces.
- .3 Repeat as necessary until fibre levels are less than 40 micrograms per square foot.

### **3.6 FINAL CLEANUP**

- .1 Following cleaning and when lead wipe surfaces sampling are below acceptable concentrations, proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .4 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

**END OF SECTION**



**PART 1**            **GENERAL**

**1.1**                    **RELATED SECTIONS**

- .1            Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2            Section 03 20 00 - Concrete Reinforcing.
- .3            Section 03 30 00 - Cast-in-place Concrete.

**1.2**                    **REFERENCES**

- .1            Canadian Standards Association (CSA)
  - .1            CAN/CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2            CAN/CSA-O86, Engineering Design in Wood.
  - .3            CSA O121, Douglas Fir PlyGOV
  - .4            CSA O151, Canadian Softwood Plywood.
  - .5            CAN/CSA-S269.3, Concrete Formwork.

**1.3**                    **SUBMITTALS**

- .1            Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings. Comply with CAN/CSA-S269.3, for formwork drawings.
- .2            Indicate formwork design data, such as permissible rate of concrete placement, and temperature of concrete, in forms.
- .3            Indicate sequence of erection and removal of formwork/falsework as directed by Owner's Representative.
- .4            Each shop drawing submission shall bear stamp and signature of qualified professional engineer licensed in Province of Newfoundland and Labrador, Canada.

**PART 2**            **PRODUCTS**

**2.1**                    **MATERIALS**

- .1            Formwork materials:
  - .1            For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121.
  - .2            For concrete with special architectural features, use formwork materials to CSA-A23.1/A23.2.

- .2 Tubular column forms: round, spirally wound laminated fiber forms, internally treated with release material. Spiral pattern to show in hardened concrete.
- .3 Form ties:
  - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface.
  - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.
- .4 Form liner:
  - .1 Plywood: medium density overlay Douglas Fir to CSA O121, Canadian Softwood Plywood to CSA O151, T and G thickness as indicated.
- .5 Form release agent: Proprietary, non volatile material not to stain concrete or impair subsequent application of finishes or coatings to surface of concrete, derived from agricultural sources, non petroleum containing, non-toxic, biodegradable, low VOC.
- .6 Falsework materials: to CSA-S269.1.
- .7 Sealant: to Section 07 92 00 - Joint Sealing.

### **PART 3**      **EXECUTION**

#### **3.1**      **FABRICATION AND ERECTION**

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1.
- .3 Refer to architectural drawings for concrete members requiring architectural exposed finishes.
- .4 Do not place shores and mud sills on frozen ground.
- .5 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .6 Fabricate and erect formwork in accordance with CAN/CSA-S269.3, to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .7 Align form joints and make watertight. Keep form joints to minimum.
- .8 Locate horizontal form joints for exposed columns 2400 mm above finished floor elevation.
- .9 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.

- .10 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .11 Construct forms for architectural concrete, and place ties as indicated and/or as directed. Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.
- .12 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections. Ensure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .13 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

### **3.2 REMOVAL AND RESHORING**

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
  - .1 3 days for walls and sides of beams.
  - .2 5 days for columns.
  - .3 1 day for footings and abutments.
- .2 Provide all necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
- .3 Space reshoring in each principal direction at not more than 3000 mm apart.
- .4 Re-use formwork and falsework subject to requirements of CSA-A23.1A23.2.

**END OF SECTION**

**PART 1**      **GENERAL**

**1.1**            **RELATED SECTIONS**

- .1      Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2      Section 03 10 00 – Concrete Forming and Accessories.
- .3      Section 03 30 00 - Cast-in-Place Concrete.

**1.2**            **REFERENCES**

- .1      American Concrete Institute (ACI)
  - .1      SP-66, ACI Detailing Manual, 2004.
- .2      American Society for Testing and Materials International (ASTM)
  - .1      ASTM A185/A185M, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
  - .2      ASTM A497/A497M, Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
  - .3      ASTM A1022/A1022M, Standard Specification for Deformed and Plain Stainless Steel Wire and Welded Wire for Concrete Reinforcement.
- .3      Canadian Standards Association (CSA)
  - .1      CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of test and Standard Practices for Concrete.
  - .2      CSA-A23.3, Design of Concrete Structures.
  - .3      CSA-G30.18, Carbon Steel Bars for Concrete Reinforcement.
  - .4      CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel /Structural Quality Steel.
  - .5      CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .6      CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4      Reinforcing Steel Institute of Canada (RSIC)
  - .1      RSIC, Reinforcing Steel Manual of Standard Practice.

**1.3**            **SUBMITTALS**

- .1      Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada . SP-66, ACI Detailing Manual, 2004, American Concrete Institute.

- .2 Detail lap lengths and bar development lengths to CSA-A23.3, unless otherwise indicated.
- .3 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Newfoundland and Labrador.

## **PART 2**      **PRODUCTS**

### **2.1**            **MATERIALS**

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
- .3 Cold-drawn annealed steel wire ties: to ASTM A497/A497M.
- .4 Welded steel wire fabric: to ASTM A185/A185M. Provide in flat sheets only.
- .5 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .6 Mechanical splices: subject to approval of Departmental Representative.
- .7 Plain round bars: to CSA-G40.20/G40.21.

### **2.2**            **FABRICATION**

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1A23.2, SP-66, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

### **2.3**            **SOURCE QUALITY CONTROL**

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to commencing reinforcing work.
- .2 Upon request inform Departmental Representative of proposed source of material to be supplied.

**PART 3**      **EXECUTION**

**3.1**            **FIELD BENDING**

- .1      Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
- .2      When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3      Replace bars which develop cracks or splits.

**3.2**            **PLACING REINFORCEMENT**

- .1      Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CSA-A23.1/A23.2.
- .2      Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.
- .3      Prior to placing concrete, obtain Departmental Representative approval of reinforcing material and placement.
- .4      Ensure cover to reinforcement is maintained during concrete pour.

**END OF SECTION**

**PART 1**

**GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Section 03 10 00 - Concrete Forming and Accessories.
- .3 Section 03 20 00 - Concrete Reinforcing.
- .4 Section 03 35 00 - Concrete Finishing.
- .5 Section 03 35 05 - Concrete Floor Hardening.

**1.2 MEASUREMENT PROCEDURES**

- .1 Cast-in-place concrete will not be measured but will be paid for as a fixed price item.

**1.3 REFERENCES**

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM C260/C260M, Standard Specification for Air-Entraining Admixtures for Concrete.
  - .2 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
  - .3 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
  - .4 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
  - .5 ASTM D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
  - .6 ASTM D1751, Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 Canadian Standards Association (CSA)
  - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA A283, Qualification Code for Concrete Testing Laboratories.
  - .3 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
  - .4 CSA-A3001, Cementitious Materials for Use in Concrete.

#### 1.4 ACRONYMS AND TYPES

- .1 Cement: hydraulic cement or blended hydraulic cement (XXb - where b denotes blended).
  - .1 Type GU or GUb - General use cement.

#### 1.5 SUBMITTALS

- .1 At least 4 weeks prior to commencing work, inform Owner's Representative of proposed source of aggregates and provide access for sampling.
- .2 Submit testing results and reports for review by Owner's Representative and do not proceed without written approval when deviations from mix design or parameters are found.
- .3 Certificates:
  - .1 Minimum 4 weeks prior to starting concrete work submit to Owner's Representative manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:
    - .1 Portland cement.
    - .2 Blended hydraulic cement.
    - .3 Supplementary cementing materials.
    - .4 Grout.
    - .5 Admixtures.
    - .6 Aggregates.
    - .7 Water.
    - .8 Waterstops.
    - .9 Waterstop joints.
    - .10 Joint filler.
  - .2 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CSA-A23.1/A23.2.
  - .3 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1/A23.2.

#### 1.6 SOURCE QUALITY CONTROL

- .1 Have all concrete produced and delivered by a ready-mix plant that is a member of the Atlantic Provinces Ready Mixed Concrete Association (APRMCA) and holds a current "Certificate of Ready Mixed Concrete Production Facilities" issued by the Association. Submit a copy of this certificate to the Owner's Representative for approval.

#### 1.7 QUALITY ASSURANCE

- .1 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures in accordance with Section 01 45 00 - Quality Control for Owner's Representative approval for following items:



- .1 Falsework erection.
- .2 Hot weather concrete.
- .3 Cold weather concrete.
- .4 Curing.
- .5 Finishes.
- .6 Formwork removal.
- .7 Joints.

## **1.8 DELIVERY, STORAGE AND HANDLING**

- .1 Concrete hauling time: maximum allowable time for concrete to be delivered to site of Work and discharged not to exceed 120 minutes after batching.
  - .1 Modifications to maximum time limit must be agreed to Owner's Representative and concrete producer as described in CSA A23.1/A23.2.
  - .2 Deviations to be submitted for review by Owner's Representative.
- .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.
- .3 Waste Management and Disposal:
  - .1 Divert unused concrete materials from landfill to local facility approved by Owner's Representative.
  - .2 Provide an appropriate area on the job site where concrete trucks can be safely washed.
  - .3 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by the Owner's Representative.
  - .4 Unused admixtures and additive materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.
  - .5 Prevent admixtures and additive materials from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal. Dispose of waste in accordance with applicable local, Provincial and National regulations.

## **1.9 SITE CONDITIONS**

- .1 Placing concrete during rain or weather events that could damage concrete is prohibited.
- .2 Protect newly placed concrete from rain or weather events in accordance with CSA A23.1/A23.2.
- .3 Cold weather protection:
  - .1 Maintain protection equipment, in readiness on Site.
  - .2 Use such equipment when ambient temperature below 5°C, or when temperature may fall below 5°C before concrete cured.

- .3 Placing concrete upon or against surface at temperature below 5°C is prohibited.
- .4 Hot weather protection:
  - .1 Protect concrete from direct sunlight when ambient temperature above 27°C.
  - .2 Prevent forms of getting too hot before concrete placed. Apply accepted methods of cooling not to affect concrete adversely.
- .5 Protect from drying.

## **PART 2**

### **PRODUCTS**

#### **2.1**

#### **MATERIALS**

- .1 Portland cement: to CAN/CSA-A3001, Type GU.
- .2 Water: to CAN/CSA-A23.1.
- .3 Aggregates: to CSA-A23.1/A23.2.
- .4 Coarse aggregates to be normal density to CSA-A23.1/A23.2.
- .5 Admixtures:
  - .1 Air entraining admixture: to ASTM C260.
  - .2 Chemical admixtures: to ASTM C494, Owner's Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .6 Non premixed dry pack grout: composition of non metallic aggregate Portland cement with sufficient water for the mixture to retain its shape when made into a ball by hand and capable of developing compressive strength of 50 MPa at 28 days.
- .7 Ribbed waterstops: extruded PVC of sizes indicated shop welded corner and intersecting pieces.
  - .1 Tensile strength: to ASTM D412, method A, Die "C".
  - .2 Elongation: to ASTM D412, method A, Die "C", minimum 275%.
  - .3 Tear resistance: to ASTM D624, method A, Die "B".
- .8 Premoulded joint fillers:
  - .1 Bituminous impregnated fiber board: to ASTM D1751.
- .9 Polyethylene film: minimum 0.25 mm thickness to ASTM C171.
- .10 Bonding adhesive: as approved by Owner's Representative.

#### **2.2**

#### **MIXES**

- .1 Proportion normal density concrete in accordance with CSA-A23.1/A23.2, Alternative 1 to give following quality and yield for all concrete.

- .1 Cement:
  - .1 Type GU Portland cement.
- .2 Minimum compressive strength at 28 days: for structural design.
- .3 Minimum cement content: 300 kg/m<sup>3</sup> of concrete.
- .4 Class of exposure: N.
- .5 Nominal size of coarse aggregate: 20 mm.
- .6 Slump at time and point of discharge: 75 to 100 mm.
- .7 Air content: 5 to 8 %.
- .8 Chemical admixtures: admixtures in accordance with ASTM C494.

### **PART 3**      **EXECUTION**

#### **3.1**      **PREPARATION**

- .1 Obtain Owner's Representative approval before placing concrete. Provide two (2) working days notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
  - .1 Development of cold joints not allowed.
  - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Pumping of concrete is permitted only after approval of equipment and mix.
- .5 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .6 Prior to placing of concrete obtain Owner's Representative approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .7 Protect previous Work from staining.
- .8 Clean and remove stains prior to application for concrete finishes.
- .9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .10 Do not place load upon new concrete until authorized by Owner's Representative.

#### **3.2**      **CONSTRUCTION**

- .1 Do cast-in-place concrete work in accordance with CSA-A23.1/A23.2.
- .2 Sleeves and inserts.

- .1 No sleeves, ducts, pipes or other openings shall pass through joists, beams, column capitals or columns, except where indicated or approved by Owner's Representative.
  - .2 Where approved by Owner's Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100 mm not indicated, must be approved by Owner's Representative.
  - .3 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Owner's Representative before placing of concrete.
  - .4 Check locations and sizes of sleeves and openings shown on drawings.
  - .5 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts.
- .1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
  - .2 With approval of Owner's Representative, grout anchor bolts in preformed holes or holes drilled after concrete has set. Formed holes to be minimum 100 mm diameter. Drilled holes to be manufacturers's recommendations.
  - .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
  - .4 Set bolts and fill holes with shrinkage compensating grout.
  - .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .4 Grout under base plates using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.
- .5 Finishing.
- .1 Finish concrete in accordance with CSA-A23.1/A23.2.
  - .2 Use procedures acceptable to Owner's Representative or those noted in CSA-A23.1/A23.2, to remove excess bleed water. Ensure surface is not damaged.
  - .3 Wet cure using polyethylene sheets placed over sufficiently hardened concrete to prevent damage. Overlap adjacent edges 150 mm and tightly seal with sand on wood planks. Weigh sheets down to maintain close contact with concrete during the entire curing period.
  - .4 Where burlap is used for moist curing, place two prewetted layers on concrete surface and keep continuously wet during curing period.
  - .5 Finish concrete floor to meet requirements of CSA-A23.1/A23.2.
  - .6 Concrete floor to have finish hardness equal or greater than Mohs hardness in accordance with CSA-A23.1/A23.2.
  - .7 Provide swirl-trowelled finish for exterior walks, ramps, pads.
  - .8 Provide float finish for interior floor slabs.
  - .9 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.

- .6 Waterstops.
  - .1 Install waterstops to provide continuous water seal.
  - .2 Do not distort or pierce waterstop in such a way as to hamper performance.
  - .3 Do not displace reinforcement when installing waterstops.
  - .4 Use equipment to manufacturer's requirements to field splice waterstops.
  - .5 Tie waterstops rigidly in place.
  - .6 Use only straight heat sealed butt joints in field.
  - .7 Use factory welded corners and intersections unless otherwise approved by Owner's Representative.
- .7 Joint fillers.
  - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Owner's Representative.
  - .2 When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
  - .3 Locate and form, isolation, construction and expansion joints as indicated. Install joint filler.
  - .4 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.
- .8 Dampproof membrane.
  - .1 Install dampproof membrane under concrete slabs-on-grade inside building.
  - .2 Lap dampproof membrane minimum 150 mm at joints and seal.
  - .3 Seal punctures in dampproof membrane before placing concrete. Use patching material at least 150 mm larger than puncture and seal.

### 3.3 SITE TOLERANCE

- .1 Concrete slab tolerances in accordance with CSA-A23.1/A23.2, F-number Method,  $F_F = 25$ ,  $F_L = 20$ .
- .2 Finish all interior exposed concrete slabs to a tight consistent steel trowel appearance without burnishing the surface.

### 3.4 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Owner's Representative in accordance with CSA-A23.1/A23.2, and Section 01 45 00 - Quality Control.
- .2 For compressive strength testing of concrete a minimum of four (4) cylinders and three (3) field cured cylinders are required for:
  - .1 Each day's pour.

- .2 Each type of grade of concrete.
- .3 Each change of supplier.
- .4 Each 50 cubic meters or fraction thereof for footings and foundation walls, requirements of CAN/CSA A 23.1.
- .5 Conduct at least one (1) slump and one (1) air entrainment test with each compressive strength test.
- .3 Pay for costs of tests as specified from Cash Allowance. Costs of retesting due to deficient work will be paid for by contractor, by credit change order.
- .4 Take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .5 Non-destructive Methods for Testing Concrete shall be in accordance with CSA-A23.1/A23.2.
- .6 Provide Certificate of Field Quality Inspection and Testing to Owner's Representative for inclusion in Commissioning Manual.
- .7 Inspection or testing by Owner's Representative will not augment or replace Contractor quality control nor relieve the Contractor of his contractual responsibility.

### 3.5

#### DEFECTIVE WORK

- .1 Repairs and classification of unacceptable concrete to be in accordance with CAN/CSA-A23.1.
- .2 Remove defective concrete and embedded debris and repair as directed by Owner's Representative.
- .3 Remove to bare concrete curing compounds detrimental to application of specified finishes.
- .4 Concrete to be supplied at the minimum strength requirement at 28 days. Tests indicating strengths lower than specified will necessitate further testing as required by the Owner's Representative. Cost for such testing to be at the Contractor's expense. Should further tests confirm low values, the Owner's Representative has the right to require strengthening of the affected area or removal and replacing of the weak concrete all to the Contractor's expense.
- .5 Repair all shrinkage cracks in the completed slab-on-grade to remain exposed employing a suitable epoxy injection technique acceptable to Owner's Representative to completely seal all such cracks, all to the Contractor's expense.

**END OF SECTION**

**PART 1**

**GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Section 03 30 00 - Cast-in-Place Concrete.

**1.2 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-25.20, Surface Sealer for Floors.
- .2 Canadian Standards Association (CSA)
  - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

**1.3 PERFORMANCE REQUIREMENTS**

- .1 Product quality and quality of work in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Submit written declaration that components used are compatible and will not adversely affect finished flooring products and their installation adhesives.

**1.4 PRODUCT DATA**

- .1 Submit WHMIS MSDS - Material Safety Data Sheets. WHMIS MSDS acceptable to Labour Canada and Health and Welfare Canada for concrete floor treatment materials. Indicate VOC content.
- .2 Include application instructions for concrete floor treatment.

**1.5 ENVIRONMENTAL REQUIREMENTS**

- .1 Temporary lighting:
  - .1 Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 sq m of floor being treated.
- .2 Electrical power:
  - .1 Provide sufficient electrical power to operate equipment normally used during construction.
- .3 Work area:
  - .1 Make the work area water tight protected against rain and detrimental weather conditions.
- .4 Temperature:

- .1 Maintain ambient temperature of not less than 10°C from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.
- .5 Moisture:
  - .1 Ensure concrete substrate is within moisture limits prescribed by flooring manufacturer.
- .6 Safety:
  - .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.
- .7 Ventilation:
  - .1 Ventilate area of work as directed by Departmental Representative by use of approved portable supply and exhaust fans.
  - .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
  - .3 Provide continuous ventilation during and after coating application.

## **PART 2**      **PRODUCTS**

### **2.1**      **CHEMICAL HARDENERS**

- .1 Type 1- Sodium silicate.
- .2 Water: potable.

### **2.2**      **SEALING COMPOUNDS**

- .1 Surface sealer: to CAN/CGSB-25.20, Type 2 - water based.
- .2 Surface sealers may not be manufactured or formulated with aromatic solvents formaldehyde halogenated solvents mercury lead cadmium hexavalent chromium and their compounds.

### **2.3**      **WET CURE**

- .1 Clear polyethylene film to ASTM C171, minimum thickness 0.15 mm.

### **2.4**      **MIXES**

- .1 Mixing, ratios and application in accordance with manufacturer's instructions.

### **2.5**      **JOINT SEALANT**

- .1 Joint sealants to Section 07 92 00 – Joint Sealants.



**PART 3**      **EXECUTION**

**3.1**            **EXAMINATION**

- .1      Verify that slab surfaces are ready to receive work and elevations are as indicated on drawings by manufacturer.

**3.2**            **PREPARATION OF EXISTING SLAB**

- .1      Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges unless otherwise indicated.
- .2      Saw cut control joints to CSA-A23.1/A23.2, 24 hours maximum after placing of concrete.
- .3      Use mechanical stripping to remove chlorinated rubber or existing surface coatings.
- .4      Use protective clothing, eye protection, respiratory equipment during stripping of chlorinated rubber or existing surface coatings.

**3.3**            **APPLICATION**

- .1      After floor treatment is dry, seal control joints and joints at junction with vertical surfaces with sealant.
- .2      Apply floor treatment in accordance with Sealer manufacturer's written instructions.
- .3      Clean overspray. Clean sealant from adjacent surfaces.

**3.4**            **PROTECTION**

- .1      Protect finished installation in accordance with manufacturer's instructions.

**END OF SECTION**

**PART 1**            **GENERAL**

**1.1**                **RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal Procedures.
- .2        Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

**1.2**                **REFERENCES**

- .1        American Wood-Preservers' Association (AWPA)
  - .1        AWPA M2, Standard Inspection of Treated Wood Products.
  - .2        AWPA M4, Standard for the Care of Preservative-Treated Wood Products.
- .2        Canadian Standards Association (CSA)
  - .1        CSA O80 Series, Wood Preservation.
  - .2        CSA O80.20, Fire-Retardant Treatment of Lumbering Pressure Processes. This Standard applies to the fire-retardant treatment of lumber by pressure processes. Fire-Retardant Treatment of Lumber by Pressure Processes. This is not a stand alone specification.
  - .3        CSA O80.27, Fire-Retardant Treatment of Plywood by Pressure Processes. This Standard covers the fire-retardant treatment of Douglas Fir, hardwood, softwood, and Poplar plywood by pressure processes. Fire-Retardant Treatment of Plywood by Pressure Processes. This not a stand alone specification.
  - .4        CSA O80.201, Standard for Hydrocarbon Solvents for Preservatives. This Standard covers hydrocarbon solvents for preparing solutions of preservatives.- This is not stand alone specification
  - .5        CSA O322, Procedure for Certification of Pressure-Treated Wood Materials for Use in Preserved Wood Foundations.

**1.3**                **REGULATORY REQUIREMENTS**

- .1        Each board or bundle of fire-retardant treated material panel to bear ULC label indicating Flame Spread Classification (FSC), and smoke developed.

**1.4**                **CERTIFICATES**

- .1        For products treated with preservative, fire-retardant by pressure impregnation submit following information certified by authorized signing officer of treatment plant:
  - .1        Information listed in AWPA M2 and revisions specified in CSA O80 Series, Supplementary Requirement to AWPA M2 applicable to specified treatment.
  - .2        Moisture content after drying following treatment with water-borne preservative, fire-retardant.
  - .3        Acceptable types of paint, stain, and clear finishes that may be used over treated materials to be finished after treatment.

## **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Do not dispose of preservative treated wood through incineration.
- .2 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- .3 Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill approved by Departmental Representative.
- .4 Dispose of unused wood preservative material at official hazardous material collections site approved by Departmental Representative.
- .5 Do not dispose of unused preservative material into sewer system, into streams, lakes, onto ground or in other location where they will pose health or environmental hazard.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- .1 Preservative: to CAN/CSA-O80 Series, stained finish.
- .2 Fire-Retardant: to CAN/CSA O80.20.
- .3 Solvent: to CAN/CSA-O80.201.

## **PART 3 EXECUTION**

### **3.1 APPLICATION: PRESERVATIVE**

- .1 Treat lumber to CAN/CSA- O80 Series.
- .2 Following water-borne preservative treatment, dry material to maximum moisture content of 19%.

### **3.2 APPLICATION: FIRE-RETARDANT**

- .1 Treat lumber by pressure impregnation with fire-retardant chemicals in accordance with CAN/CSA - O80.20.
- .2 Following treatment, kiln-dry material to maximum moisture content of 19%.

### **3.3 APPLICATION: FIELD TREATMENT**

- .1 Comply with AWPA M4 and revisions specified in CAN/CSA-O80 Series, Supplementary Requirements to AWPA Standard M2.
- .2 Treat all field cuts with two (2) coats of clear copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.

- .3 Remove chemical deposits on treated wood to receive applied finish.

**END OF SECTION**

**PART 1**      **GENERAL**

**1.1**            **RELATED SECTIONS**

- .1      Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2      Section 06 05 73 - Wood Treatment.
- .3      Section 06 17 53 - Shop-Fabricated Wood Trusses.
- .4      Section 07 52 00 - Modified Bituminous Membrane Roofing
- .5      Section 07 91 00 - Joint Sealants.
- .6      Section 09 21 16 - Gypsum Board Assemblies.

**1.2**            **REFERENCES**

- .1      American Society for Testing and Materials (ASTM)
  - .1      ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2      ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .3      ASTM C578, Specification for Rigid, Cellular Polystyrene Thermal Insulation.
  - .4      ASTM C1396/C1396M, Standard Specification for Gypsum Board.
  - .5      ASTM D5055, Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.
  - .6      ASTM F1667, Standard Specification for Driven Fasteners: Nails, Spikes and Staples.
- .2      Canadian General Standards Board (CGSB)
  - .1      CAN/CGSB-71.26, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.
- .3      Canadian Wood Council
  - .1      Wood Design Manual.
  - .2      Engineering Guide for Wood Frame Construction.
- .4      Canadian Standards Association (CSA)
  - .1      CSA A123.2, Asphalt Coated Roofing Sheets.
  - .2      CSA B111, Wire Nails, Spikes and Staples.
  - .3      CSA 0112.9, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).
  - .4      CSA O121, Douglas Fir Plywood.
  - .5      CSA-O141, Softwood Lumber.
  - .6      CSA O151, Canadian Softwood Plywood.

- .7 CSA-O325.0, Construction Sheathing.
- .5 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber.
- .6 National Research Council Canada (NRC)
  - .1 National Building Code of Canada (NBC).

### 1.3 **QUALITY ASSURANCE**

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

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

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Submit proof of compatibility between Alkaline Copper Quaternary (ACQ) pressure treated lumber and fasteners to be utilized.
- .3 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for wood products and accessories and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Include manufacturer's pre-engineered floor, ceiling and roof joist span charts, and manufacturer's pre-engineered installation details.
  - .3 Submit certified test reports for prefabricated structural members from approved independent laboratory indicating compliance with specifications for specified performance characteristics and physical properties.
  - .4 Submit CCMC Product Evaluation Report for engineered wood products.
  - .5 Submit manufacturer's installation instructions.
- .4 Shop Drawings:
  - .1 For structural applications or conditions beyond the scope of the manufacturer's pre-engineered design information, submit drawings stamped and signed by professional engineer registered or licensed in the Province of Newfoundland and Labrador.
  - .2 Include on drawings:
    - .1 Design data in accordance with CAN/CSA-O86 and CWC Engineering Guide for Wood Frame Construction.
    - .2 Indicate configuration and spacing of joists, hanger and connector types, fasteners, locations and design values; bearing details.
    - .3 Submit stress diagrams or print out of computer design indicating design loads for members. Indicate allowable load and stress increase.

- .4 Indicate arrangement of webs or other members to accommodate ducts and other specialties

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
- .1 Store materials in dry location, off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store materials off ground with moisture barrier at both ground level and as a cover forming a well-ventilated enclosure, with drainage to prevent standing water.
  - .3 Store wood I-beams and I-joists on edge.
  - .4 Stack, lift, brace, cut and notch engineered lumber products in strict accordance with manufacturer's instructions and recommendations.
  - .5 Store and protect architecturally exposed lumber from[nicks, scratches, and blemishes.
  - .6 Replace defective or damaged materials with new.
  - .7 Store separated reusable wood waste convenient to cutting station and work areas.

**PART 2 PRODUCTS**

**2.1 STRUCTURAL FRAMING**

- .1 Lumber to be marine grade wood in accordance with following standards:
- .1 CAN/CSA-O141.
  - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Wood I-joists in accordance with Prefabricated Wood I-Joists ASTM D5055.
- .3 Framing and board lumber: in accordance with NBC.
- .4 Furring, blocking, nailing strips, grounds, rough bucks, fascia backing and sleepers:
- .1 Board sizes: "Standard" or better grade.
  - .2 Dimension sizes: "Standard" light framing or better grade.
  - .3 Post and timbers sizes: "Standard" or better grade.
- .5 Pressure treated material to be Alkaline Copper Quaternary (ACQ).
- .6 Where indicated, provide pressure treated materials for furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers in accordance with Section 06 05 73.

## **2.2 PANEL MATERIALS**

- .1 Plywood, OSB and wood based composite panels: to CAN/CSA-O325.0.
- .2 Douglas fir plywood (DFP): to CSA O121, standard construction.
- .3 Canadian softwood plywood (CSP): to CSA O151, standard construction.
- .4 Insulating fiberboard sheathing: to CAN/CSA-A247.
- .5 Expanded polystyrene sheathing: to Section 07 21 13 – Board Insulation.
- .6 Gypsum sheathing: to 09 21 16 – Gypsum Board Assemblies.

## **2.3 ACCESSORIES**

- .1 Exterior wall sheathing paper: to CAN/CGSB-51.32 single ply, spunbonded olefin type coated impregnated as indicated.
- .2 Polyethylene film: to Section 07 26 00 – Vapour Retarders.
- .3 Sill Gasket Air seal: closed cell polyurethane or polyethylene.
- .4 Sealants: Section 07 91 00 – Joint Sealants.
- .5 General purpose adhesive: to CSA O112.9.
- .6 Nails, spikes and staples: to CSA B111.
- .7 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .8 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.
- .9 Joist hangers: minimum 1 mm thick sheet steel, galvanized ZF001 coating designation.
- .10 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, type approved by Departmental Representative.

## **2.4 FASTENER FINISHES**

- .1 Galvanizing: to ASTM A123/A123M, ASTM A653, use galvanized fasteners for exterior work, interior highly humid areas and fire-retardant treated lumber.

## **2.5 WOOD PRESERVATIVE**

- .1 Surface-applied wood preservative: clear or copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.



**PART 3**      **EXECUTION**

**3.1**            **PREPARATION**

- .1      Treat surfaces of material with wood preservative, before installation.
- .2      Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3-minute soak on lumber and one-minute soak on plywood.
- .3      Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
- .4      Treat all material as indicated as follows:
  - .1      Wood fascia, backing, curbs, nailers.
  - .2      Wood furring for sheeting/siding on outside surface of exterior masonry concrete walls.
  - .3      Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

**3.2**            **SYSTEMS INTEGRATION**

- .1      Install air barrier and vapour retarder sheeting around framing members to ensure continuity of protection and to lap and seal to main sheets.
- .2      Install insulation in exterior wall framing cavities that will not be accessible after completion of framing.
- .3      Install sill plate gasket in continuous lengths between concrete surfaces and wood framing.

**3.3**            **INSTALLATION**

- .1      Comply with requirements of NBC latest edition, Part 9 supplemented by following paragraphs.
- .2      Install members true to line, levels and elevations, square and plumb.
- .3      Construct continuous members from pieces of longest practical length.
- .4      Install spanning members with "crown-edge" up.
- .5      Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.
- .6      Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .7      Countersink bolts where necessary to provide clearance for other work.
- .8      Install specified panel product for each application.

- .9 Install subflooring and combined subfloor and underlay with panel end-joints located on solid bearing, staggered at least 800 mm.
  - .1 In addition to mechanical fasteners, apply subflooring adhesive under panels installed on wood joints. Place continuous adhesive bead in accordance with manufacturer's instructions, single-bead on each joist and double-bead on joists where panel ends butt.
  - .2 Use decking screws for mechanical fasteners when weather conditions are unsuitable for subflooring adhesive.
- .10 Install wall sheathing in accordance with manufacturer's printed instructions.
- .11 Install roof sheathing in accordance with requirements of NBC.
- .12 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding electrical equipment mounting boards, and other work as required.
- .13 Install furring to support siding applied vertically where there is no blocking and where sheathing is not suitable for direct nailing.
  - .1 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .14 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .15 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners. Coordinate height of roof curbs with Section 07 52 00 – Modified Bituminous Membrane Roofing.
- .16 Install sleepers as indicated.
- .17 Use dust collectors and high-quality respirator masks when cutting or sanding wood panels.

### 3.4 SCHEDULES

- .1 Roof sheathing:
  - .1 Plywood, DFP or CSP sheathing grade (SHG) T&G edge, 16 mm thick, unless otherwise indicated.
- .2 Exterior wall sheathing:
  - .1 Plywood, DFP or CSP sheathing grade or (SHG) grade, T&G edge, 16 mm thick, unless otherwise indicated.
  - .2 Expanded polystyrene sheathing, Type 1, RSI indicated, shiplapped edges, thickness as indicated.
  - .3 Gypsum sheathing, Section 09 21 16 – Gypsum Board Assemblies.
- .3 Subflooring:

- .1 Plywood, DFP or CSP sheathing grade (SHG) T&G edge, 19 mm thick, unless otherwise indicated.
- .4 Electrical equipment mounting boards:
  - .1 Plywood, DFP or CSP grade, (G1S) select square edge 16 mm thick, unless otherwise indicated.
- .5 Underlay:
  - .1 Plywood, DFP or CSP sheathing grade (Select), square edge 6 mm thick, unless otherwise indicated.

**3.5 PROTECTION**

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

**END OF SECTION**

**PART 1**      **GENERAL**

**1.1**            **RELATED SECTIONS**

- .1      Section 01 29 83 - Payment Procedures for Testing Laboratory Services.
- .2      Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .3      Section 06 05 73 - Wood Treatment.
- .4      Section 06 10 53 – Miscellaneous Rough Carpentry.

**1.2**            **REFERENCES**

- .1      Canadian Standards Association (CSA)
  - .1      CSA B111, Wire Nails, Spikes and Staples.
  - .2      CAN/CSA O80 Series, Wood Preservation.
  - .3      CSA O86, Engineering Design in Wood.
- .2      National Lumber Grades Authority
  - .1      NLGA Standard Grading Rules for Canadian Lumber.

**1.3**            **QUALITY ASSURANCE**

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

**PART 2**      **PRODUCTS**

**2.1**            **MATERIALS**

- .1      Wood decking: to NLGA standard Grading Rules for Canadian Lumber Select grade Spruce 38 mm, predrilled at 750mm o.c. for lateral spiking, single tongue and groove and "Veed" one side. Kiln dry decking to 15% maximum moisture content.
- .2      Decking lengths: 1.8 to 6 m or longer with a minimum of 90% planks exceeding 3.0 m. square end trimmed. For single spans shorter than 3 m use decking of same length as span.
- .3      Nails: to CSA B111, hot dipped galvanized finish; sizes as recommended in CAN/CSA-O86. Supply 200 mm spiral spikes for lateral nailing.
- .4      Splines: galvanized metal, as recommended by decking manufacturer.
- .5      Wood preservative: water borne type to CAN/CSA O80.

**PART 3**      **EXECUTION**

**3.1**            **INSTALLATION**

- .1      Do wood deck work in accordance with CAN/CSA O86 except where specified otherwise.
- .2      Install decking in accordance with CAN/CSA O86, simple span pattern.
- .3      Provide minimum of one bearing support for each plank.
- .4      Stagger end joints in adjacent planks minimum of 0.5 m. Separate joints in same area by at least two intervening courses. Avoid joints in first fifth of end spans. Minimize joints in middle third of any span.
- .5      Touch up end cuts with preservative where pressure treated lumber is specified.

**3.2**            **FIELD QUALITY CONTROL**

- .1      Testing moisture content of delivered material will be performed by testing laboratory designated by Departmental Representative.
- .2      Departmental Representative will pay for costs of testing as specified in Section 01 29 83- Payment Procedure for Testing Laboratory Procedures.

**3.3**            **CLEANING**

- .1      Remove tool marks, bruises, and scratches.

**3.4**            **FINISH**

- .1      Refer to Exterior Painting Section 09 91 13.

**3.5**            **PROTECTION**

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

**END OF SECTION**

**PART 1**      **GENERAL**

**1.1**            **RELATED SECTIONS**

- .1      Section 01 33 00 - Submittal Procedures.
- .2      Section 01 61 00 - Common Product Requirements.
- .3      Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4      Section 06 40 00 - Architectural Woodwork.
- .5      Section 06 40 23.13 - Plastic Laminate for Interior Architectural Woodwork.
- .6      Section 06 41 93 - Cabinet and Miscellaneous Hardware.
- .7      Section 09 91 23 - Interior Painting.

**1.2**            **REFERENCES**

- .1      American National Standards Institute (ANSI)
  - .1      ANSI A208.1, Particleboard.
  - .2      ANSI A208.2, Medium Density Fibreboard (MDF).
  - .3      ANSI/HPVA HP-1, American National Standard for Hardwood and Decorative Plywood.
- .2      Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
  - .1      Architectural Woodwork Quality Standards, 1st edition.
- .3      Canadian General Standards Board (CGSB)
  - .1      CAN/CGSB-11.3, Hardboard.
- .4      Canadian Standards Association (CSA)
  - .1      CSA B111, Wire Nails, Spikes and Staples.
  - .2      CSA O121, Douglas Fir Plywood.
  - .3      CAN/CSA O141, Softwood Lumber.
  - .4      CSA O151, Canadian Softwood Plywood.
  - .5      CSA O153, Poplar Plywood.
- .5      National Lumber Grades Authority (NLGA)
  - .1      Standard Grading Rules for Canadian Lumber.

### **1.3 QUALITY ASSURANCE**

- .1 Lumber by grade stamp of agency certified by Canadian Lumber Standards Accreditation Board (CLSAB).
- .2 Plywood, particleboard, OSB and wood based composite panels to CSA and ANSI standards.
- .3 Wood fire rated frames and panels: listed and labelled by an organization accredited by Standards Council of Canada to CAN4-S104 and CAN/ULC-S105.

### **1.4 SUBMITTALS**

- .1 Indicate details of construction, profiles, jointing, fastening and other related details.
- .2 Indicate materials, thicknesses, finishes and hardware.

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

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Protect materials against dampness during and after delivery.
- .3 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

## **PART 2 PRODUCTS**

### **2.1 LUMBER MATERIAL**

- .1 Lumber to be marine grade wood in accordance with following standards:
  - .1 CAN/CSA-O141.
  - .2 NLGA Standard Grading Rules for Canadian Lumber.
  - .3 AWMAC custom premium grade, moisture content as specified.
- .2 Machine stress-rated lumber is acceptable.
- .3 Hardwood lumber: moisture content 10 % or less in accordance with following standards:
  - .1 National Hardwood Lumber Association (NHLA).
  - .2 AWMAC custom grade, moisture content as specified.

### **2.2 PANEL MATERIAL**

- .1 Panel materials to be urea-formaldehyde free.
- .2 Douglas fir plywood (DFP): to CSA O121, standard construction.
- .3 Canadian softwood plywood (CSP): to CSA O151, standard construction.

- .4 Hardwood plywood: to ANSI/HPVA HP-1.
- .5 Poplar plywood (PP): to CSA O153, standard construction.
- .6 Hardboard: to CAN/CGSB-11.3.
- .7 Medium density fibreboard (MDF): to ANSI A208.2, density 640-800 kg/m<sup>3</sup>.
- .8 Decorative overlaid composite panels.
  - .1 Decorative overlay, heat and pressure laminated with suitable resin to 12.7 mm thick particleboard MDF core.
  - .2 Overlay bonded to both faces where exposed two sides, and when panel material require surface on one side only, reverse side to be overlaid with a plain (buff) balancing sheet.
  - .3 Edge finishing: matching melamine and polyester overlay edge strip with self-adhesive.

### **2.3 ACCESSORIES**

- .1 Nails and staples: to CSA B111; galvanized to CAN/CSA-G164 for exterior work, interior humid areas and for treated lumber; plain finish elsewhere.
- .2 Wood screws: plain, type and size to suit application.
- .3 Splines: wood
- .4 Adhesive: recommended by manufacturer.
- .5 Use least toxic sealants, adhesives, sealers, and finishes necessary to comply with requirements of this section.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- .1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- .2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.
- .3 Form joints to conceal shrinkage.

### **3.2 CONSTRUCTION**

- .1 Fastening.



- .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
  - .2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
  - .3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round cleanly cut hole and plug with wood plug to match material being secured.
  - .4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.
- .2 Standing and running trim.
- .1 Butt and cope internal joints of baseboards to make snug, tight, joint. Cut right angle joints of casing and base with mitred joints.
  - .2 Fit backs of baseboards and casing snugly to wall surfaces to eliminate cracks at junction of base and casing with walls.
  - .3 Make joints in baseboard, where necessary using a 45° scarf type joint.
  - .4 Install door and window trim in single lengths without splicing.
- .3 Stairs.
- .1 Install stairs to location and details as indicated.
- .4 Hardware.
- .1 Install cabinet and miscellaneous hardware as indicated.
- .5 Panelling:
- .1 Secure panelling and perimeter trim using adhesive recommended for purpose by manufacturer. Fill nail holes caused by temporary fixing with filler matching wood in colour.
  - .2 Secure panelling and perimeter trim using concealed fasteners.
  - .3 Secure panelling and perimeter trim using counter sunk screws plugged with matching wood plugs.
- .6 Handrails, wall rails and bumper rails.
- .1 Install handrails, wall rails and bumper rails in locations indicated.
  - .2 Make joints hair line, dowelled and glued.
  - .3 Install support brackets as required.
  - .4 Install brackets at ends and at 600 mm on centre minimum at intermediate spacings.
  - .5 Install metal backing plates between studs at bracket locations to ensure proper support for brackets and bolts or self-tapping screws.
  - .6 Secure using counter sunk screws plugged with matching wood plugs.

**END OF SECTION**

## **PART 1 GENERAL**

### **1.1 GENERAL**

- .1 This Section covers items common to Sections of Division 26. This section supplements requirements of Division 1, Division 23, Division 27, Division 28, Division 33 and Division 34. Refer to Section 01 00 00 – Bid Depository Sections where applicable for bid depository.

### **1.2 REFERENCES**

- .1 Canadian Standards Association (CSA)
  - .1 CSA C22.1, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
  - .2 CAN/CSA-22.3 No. 1, Overhead Systems.
  - .3 CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

### **1.3 CARE, OPERATION AND START-UP**

- .1 Instruct Departmental Representative and operating personnel in the operation, care and maintenance of systems, system equipment and components.
- .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 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.
- .4 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

### **1.4 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. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

## 1.5 SUBMITTALS

- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.
- .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure coordinated installation.
- .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
- .4 Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment devices.
- .5 Quality Control: in accordance with Section 01 45 00 - Quality Control.
  - .1 Provide CSA certified equipment and material. Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for approval before delivery to site.
  - .2 Submit test results of installed electrical systems and instrumentation.
  - .3 Submit, upon completion of Work, load balance report as described in sentence 3.4.6.
  - .4 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.
- .6 Manufacturer's Field Reports: submit to Departmental Representative within seven (7) working days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in paragraph 3.6- FIELD QUALITY CONTROL.
- .7 Single Line Electrical Diagrams
  - .1 Provide single line electrical diagrams in glazed frames as follows:
    - .1 Electrical distribution system: locate in main electrical room.
    - .2 Electrical power generation and distribution systems: locate in power plant rooms.
  - .2 Provide fire alarm riser diagram, plan and zoning of building in glazed frame at fire alarm control panel and annunciator.
  - .3 Drawings: 600 x 600 mm minimum size.
- .8 The electrical contractor shall supply an arc-flash study of the building's entire distribution system, to be performed by the successful electrical equipment supplier. The contractor shall furnish the supplier with distances, wire lengths and transformer shop drawings as required. Supply also stick-on labels for all equipment, identifying the arc-flash hazard rating of each distribution board and panel board. Such labelling shall meet CSA Z462. Supply one full set of Personal Protective Equipment required for each identified hazard rating in the arc-flash study. The arc-flash study shall be submitted with the electrical distribution equipment shop drawings. The electrical distribution equipment shop drawings will not be reviewed until the arc-flash study is received.

## **1.6 PERMITS, FEES AND INSPECTION**

- .1 Submit to Electrical Inspection Division and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.
- .2 Pay associated fees.
- .3 Departmental Representative will provide drawings and specifications required by Electrical Inspection Division and Supply Authority at no cost.
- .4 Notify Departmental Representative of changes required by Electrical Inspection Division prior to making changes.
- .5 Furnish Certificates of Acceptance from Electrical Inspection Division or authorities having jurisdiction on completion of work to Departmental Representative.

## **1.7 CO-ORDINATION**

- .1 Co-ordinate work with work of other divisions to avoid conflict.
- .2 Locate distribution systems, equipment, and materials to provide minimum interference and maximum usable space.
- .3 Locate all existing underground services and make all parties aware of their existence and location.
- .4 Where interference occurs, Departmental Representative must approve relocation of equipment and materials regardless of installation order.
- .5 Notwithstanding the review of shop drawings, this division may be required to relocate electrical equipment which interferes with the equipment of other trades, due to lack of co-ordination by this Division. The cost of this relocation shall be the responsibility of this Division. The Departmental Representative shall decide the extent of relocation required.

## **1.8 CUTTING AND PATCHING**

- .1 Inform all other divisions in time, concerning required openings. Where this requirement is not met, bear the cost of all cutting. Openings of 200 mm or smaller shall be the responsibility of Division 26. Openings larger than 200 mm shall be the responsibility of Division 1. Obtain written approval of Structural engineer before drilling any beams or floors.

## **1.9 PROTECTION**

- .1 Protect exposed live equipment during construction for personnel safety.
- .2 Shield and mark all live parts "LIVE 120 VOLTS", or with appropriate voltage in English.
- .3 Arrange for installation of temporary doors for rooms containing electrical distribution equipment. Keep these doors locked except when under direct supervision of electrician.

### **1.10 RECORD DRAWINGS**

- .1 Obtain and pay for three sets of white prints. As the job progresses, mark these prints to accurately indicate installed work. Have the white prints available for inspection at the site at all times and present for scrutiny at each job meeting.
- .2 Show on the record drawings the installed inverts of all services entering and leaving the building and the property. Dimension underground services at key points of every run in relation to the structure and building.
- .3 Indicate exact location of all services for future work. Show and dimension all work embedded in the structure.
- .4 Submit record drawings within 30 days prior to start of commissioning.

### **1.11 INSPECTION OF WORK**

- .1 The Owner will make periodic visits to the site during construction to ascertain reasonable conformity to plans and specifications but will not execute quality control. The Contractor shall be responsible for the execution of his work in conformity with the construction documents and with the requirements of the inspection authority.

### **1.12 SCHEDULING OF WORK**

- .1 Work shall be scheduled in phases as per other divisions of the architectural specifications.
- .2 Become familiar with the phasing requirements for the work and comply with these conditions.
- .3 No additional monies will be paid for contractor's requirement to comply with work phasing conditions.

### **1.13 FIRE RATING OF PENETRATIONS**

- .1 Maintain fire ratings around conduits passing through floors, ceilings and fire rated walls.
- .2 Use 3M brand or equal fire barrier products at each penetration.
- .3 Acceptable products for fire barrier products shall be 3M #CP25 fire barrier caulk, #303 putty, #FS 195 wrap and #CS195 sheet.
- .4 Acceptable manufacturers: Nelson, Fire Stop Systems, 3M or approved equal. Material of same manufacturer to be used throughout project..

## **PART 2 Products**

### **2.1 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS**

- .1 Supplier and installer responsibility is indicated in Motor, Control and Equipment Schedule on electrical drawings and related mechanical responsibility is indicated on Mechanical Equipment Schedule on mechanical drawings, where applicable.
- .2 Control wiring and conduit is specified in Division 26 except for conduit, wiring and connections below 50 V which are related to control systems specified in Division 25 and shown on mechanical drawings. Division 25 – EMCS Controls Contractor is responsible for all conduit, wiring and connections below 50V which are related to control systems in Division 25 and shall comply with the requirements of Division 26 for standard of quality..

### **2.2 MATERIALS AND EQUIPMENT**

- .1 Provide materials and equipment in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Division.
- .3 Factory assemble control panels and component assemblies.

### **2.3 FINISHES**

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
  - .1 Paint outdoor electrical equipment "equipment green" finish to EEMAC Y1-1.
  - .2 Paint indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1.

### **2.4 WARNING SIGNS**

- .1 As specified and to meet requirements of Electrical Inspection Department and Departmental Representative.
- .2 Porcelain enamel decal signs, minimum size 175 x 250 mm.

### **2.5 WIRING TERMINATIONS**

- .1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

### **2.6 EQUIPMENT IDENTIFICATION**

- .1 Identify electrical equipment with nameplates and labels as follows:

- .1 Nameplates: Lamicoid 3 mm thick plastic engraving sheet, black white face, black white 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 Labels:
  - .1 Embossed plastic labels with 6 mm high letters unless specified otherwise.
- .3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.
- .4 Allow for average of twenty-five (25) letters per nameplate and label.
- .5 Identification to be English (and French where applicable).
- .6 Nameplates for terminal cabinets and junction boxes to indicate system name and voltage characteristics.
- .7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .8 Terminal cabinets and pull boxes: indicate system name and voltage.
- .9 Transformers: indicate capacity, primary and secondary voltages and transformer number.

## 2.7 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour code: to CSA C22.1, Canadian Electrical Code.
- .4 Use colour coded wires in communication cables, matched throughout system.

## 2.8 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

<u>Conduit System</u>	<u>Prime Color</u>	<u>Auxiliary Color</u>
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

### **PART 3 EXECUTION**

#### **3.1 NAMEPLATES AND LABELS**

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

#### **3.2 LOCATION OF OUTLETS**

- .1 Locate outlets in accordance with Section 26 27 26 – Wiring Devices.
- .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. Locate disconnect devices in mechanical and elevator machine rooms on latch side of door.

#### **3.3 CONDUIT AND CABLE INSTALLATION**

- .1 Install conduit and sleeves prior to pouring of concrete. 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 to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

#### **3.4 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 at following heights unless indicated otherwise.
  - .1 Local switches: 1200 mm.
  - .2 Wall receptacles:
    - .1 General: 300 mm.
    - .2 Above top of continuous baseboard heater: 200mm.
    - .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: 1400 mm.
  - .6 Fire alarm stations: 1200 mm.
  - .7 Fire alarm bells: 2400 mm.
  - .8 Television outlets: 300 mm.
  - .9 Wall mounted speakers: 2400 mm.
  - .10 Clocks: 2400 mm.
  - .11 Door bell pushbuttons: 1200 mm.
  - .12 Exit lights: 2400 mm.
  - .13 Emergency lighting heads: 2400 mm.

### **3.5 CO-ORDINATION OF PROTECTIVE DEVICES**

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

### **3.6 FIELD QUALITY CONTROL**

- .1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks – the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.
- .2 The work of this division to be carried out by a contractor who holds a valid Code 1 Electrical Contractor License as issued by the Province.
- .3 Perform tests in Accordance with this section as noted and Section 01 91 13 – Commissioning (Cx) Requirements.
- .4 Load Balance:

- .1 Measure phase current to panelboard 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 Submit, at completion of work, report listing phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.
- .5 Conduct and pay for following tests:
  - .1 Power generation and distribution system including phasing, voltage, grounding and load balancing.
  - .2 Circuits originating from branch distribution panels.
  - .3 Lighting and its control.
  - .4 Motors, heaters and associated control equipment including sequenced operations of systems where applicable.
  - .5 Systems: fire alarm system, communications.
- .6 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
- .7 Insulation resistance testing.
  - .1 Megger and record circuits, feeders and equipment up to 350 V with a 500 V instrument.
  - .2 Megger and record 350 – 600 V circuits, feeders and equipment with a 1000 V instrument.
  - .3 Check resistance to ground before energizing and record value.
- .8 Carry out tests in presence of Departmental Representative.
- .9 Provide instruments, meters, equipment and personnel required to conduct tests during and conclusion of project.
- .10 Submit test results for Departmental Representative's review and include in Commissioning Manuals specified in Section 01 91 13 – Commissioning (Cx) Requirements.

### **3.7 CLEANING**

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

**END OF SECTION**

**PART 1**            **GENERAL**

**1.1**                    **RELATED SECTIONS**

- .1            Section 01 91 13 – Commissioning (Cx) Requirements.
- .2            Section 26 05 00 - Common Work Results - Electrical.

**1.2**                    **REFERENCES**

- .1            American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE).
  - .1            ANSI/IEEE 837, Qualifying Permanent Connections Used in Substation Grounding.
- .2            Canadian Standards Association (CSA)
  - .1            CSA C22.2 No.0.4, Bonding and Grounding of Electrical Equipment (Protective Grounding).

**1.3**                    **SUBMITTALS**

- .1            Provided manufacturer's printed product literature, specifications, data sheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .2            Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

**1.4**                    **DELIVERY, STORAGE AND HANDLING**

- .1            Deliver, store and handle materials in accordance with manufacturer's written instructions.

**PART 2**            **PRODUCTS**

**2.1**                    **MATERIALS**

- .1            Rod electrodes: copper clad steel, 19 mm dia by 3 m long.
- .2            Plate electrode: copper surface area 2 m<sup>2</sup>, 2 mm thick.
- .3            Conductors: bare, stranded, un tinned soft annealed copper wire, size No 4/0 AWG and 2/0 AWG for ground bus, electrode interconnections, metal structures, gradient control mats, transformers, switchgear, motors, ground connections.
- .4            Conductors: pvc insulated coloured green, stranded un tinned soft annealed copper wire, size No. 4 AWG for grounding cable sheaths, raceways, pipe work, screen guards, switchboards, potential transformers.

- .5 Conductors: pvc insulated coloured green, stranded un tinned soft annealed copper wire No. 10 AWG for grounding meter and relay cases.
- .6 Conductors: No. 3/0 AWG extra flexible (425 strands) copper conductor for connection of switch mechanism operating rod to gradient control mat, fence gates, vault doors.
- .7 Bolted removable test links.
- .8 Gradient control mat: copper, size 1.5 x 1.5 m, 50 x 50 mm mesh and 2 mm thick.
- .9 Accessories: non-corroding, necessary for complete grounding system, type, size material as indicated, including:
  - .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.
- .10 Grounding resistance bank: in door, 3 phase, star connected liquid type, rating as indicated.
- .11 Zig-zag grounding transformer: in door, 3 phase, star connected, air cooled, iron core, KVA size and voltage as indicated.
- .12 Cable sheath isolating transformer or sleeves.
- .13 Wire connectors and terminations: as indicated.

### **PART 3**      **EXECUTION**

#### **3.1**      **GROUNDING INSTALLATION**

- .1 Install continuous grounding system including, electrodes, conductors, connectors and accessories in accordance with CSA C22.2 No.0.4 and requirements of local authority having jurisdiction.
- .2 Ground fences to grounding system independent of station ground.
- .3 Install connectors in accordance with manufacturer's instructions.
- .4 Protect exposed grounding conductors from mechanical injury.
- .5 Make buried connections, and connections to electrodes, structural steel work, using copper welding by thermit process.
- .6 Use mechanical connectors for grounding connections to equipment provided with lugs.

- .7 Use No. 4/0 AWG bare copper cable for main ground bus of substation and No. 2/0 AWG mhd bare copper cable for taps on risers from main ground bus to equipment.
- .8 Use tinned copper conductors for aluminum structures.
- .9 Do not use bare copper conductors near un-jacketed lead sheath cables.
- .10 Install grounding resistor bank, as indicated.
- .11 Install zig-zag grounding transformer, as indicated.

### **3.2 ELECTRODE INSTALLATION**

- .1 Install ground rod or plate electrodes, as indicated. Make grounding connections to station equipment.
- .2 Install ground rod electrodes at transformer and switchgear locations.
- .3 Install gradient control mats. Connect mats to station ground electrode and switch mechanism operating rods.
- .4 Make special provision for installing electrodes that will give acceptable resistance to ground value, where rock or sand terrain prevails.

### **3.3 EQUIPMENT GROUNDING**

- .1 Install grounding connections as indicated to typical station equipment including: metallic water main, line sky wire, neutral, gradient control mats. Non current carrying parts of: transformers, generators, motors, circuit breakers, reclosers, current transformers, frames of gang-operated switches and fuse cutout bases. Cable sheaths, raceways, pipe work, screen guards, switchboards, potential transformers. Meter and relay cases. Any exposed building metal, within or forming part of station enclosure. Sub-station fences, pothead bodies. Outdoor lighting.
- .2 Ground hinged doors to main frame of electrical equipment enclosure with flexible jumper.
- .3 Connect metallic piping (water, oil, air, etc.) inside station to main ground bus at several locations, including each service location within station. Make connections to metallic water pipes outside station to assist in reduction of station ground resistance value.

### **3.4 NEUTRAL GROUNDING**

- .1 Connect transformer neutral and distribution neutral together using 600 V insulated conductor to one side of ground test link, the other side of the test link being connected directly to main station ground. Ensure distribution neutral and neutrals of potential transformers and service banks are bonded directly to transformer neutral and not to main station ground.
- .2 Interconnect electrodes and neutrals at each grounding installation.

- .3 Connect neutral of station service transformer to main neutral bus with tap of same size as secondary neutral.
- .4 Ground transformer tank with continuous conductor from tank ground lug through connector on ground bus to primary neutral. Connect neutral bushing at transformer to primary neutral in same manner.

### **3.5 POLE MOUNTED SWITCHING DEVICE GROUNDING**

- .1 Drive four ground rods 3 m long at base of each pole on which group-operated line switching devices are mounted.
- .2 Arrange rods in square formation with 3 m sides, located so that operator must stand within square to operate switch.
- .3 Interconnect ground rods with No. 2/0 AWG stranded annealed copper conductor and join to switch operating handle ground wires.
- .4 Connect operating handle of switch to handle base with No. 3/0 AWG extra flexible copper conductor.

### **3.6 POLE MOUNTED TRANSFORMER GROUNDING**

- .1 Drive ground rods at base of each pole on which transformers are mounted and interconnect transformer, system neutral, lightning arresters and ground rods.

### **3.7 GROUNDING IN MANHOLES**

- .1 Install conveniently located grounding stud, electrode, size 3/0 stranded copper conductor in each manhole.
- .2 Install ground rod with lug for grounding connection in each manhole so that top projects through bottom of manhole.

### **3.8 GROUNDING IN PERMAFROST**

- .1 Install system and equipment grounding in permafrost area in accordance with Section 26 05 28 - Grounding - Secondary.

### **3.9 CABLE SHEATH GROUNDING**

- .1 Bond single conductor, metallic sheathed cables together at one end only. Break sheath continuity by inserting insulating sleeves in cables.
- .2 Use No. 6 AWG flexible copper wire soldered, not clamped, to cable sheath.
- .3 Connect bonded cables to ground with No. 2/0 AWG copper conductor.

**3.10 FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results - Electrical and Section 01 91 13 – Commissioning (Cx) Requirements.
- .2 Perform earth loop test and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction.
- .3 Perform test before energizing electrical system.
- .4 Engage testing agent to inspect grounding and perform resistance test before backfill.

**END OF SECTION**

## **PART 1 GENERAL (NOT APPLICABLE)**

## **PART 2 PRODUCTS**

### **2.1 SUPPORT CHANNELS**

- .1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted suspended or set in poured concrete walls and ceilings as required.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- .1 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .2 Fasten exposed conduit or cables to 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.
  - .4 Strap AC-90 cable at box location plus every 900 mm.
- .3 Suspended support systems.
  - .1 Support cables on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.
- .4 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .5 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .6 Do not use wire lashing, wood blocking, plastic strap or perforated strap to support or secure raceways or cables.
- .7 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Departmental Representative.
- .8 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

**END OF SECTION**



## **APPENDIX A – SCOPE OF WORK**

# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

PREPARED BY:



DATE: JANUARY 2020

REVISION: R0

*NOTE: Contractor to confirm all dimensions on site and produce construction in compliance with NBCC 2015. Contractor responsible for all applicable material disposal as a result of work activities.*

*Work to be completed in 2 phases, Phase 1 & Phase 2. Phase scheduling to be coordinated with Departmental Representative. Scope of Work Items for each phase are listed below with corresponding Item and Page Reference numbers for each.*

	SCOPE OF WORK	ITEM REFERENCE	PAGE REFERENCE
<b>PHASE 1:</b>	- Site Boardwalk Repairs	P1.1. – P1.5.	2 to 8
	- Helipad Safety Net Repairs	P1.6.	9
	- Light Station Tower Repairs	P1.7. – P1.11.	10 to 18
<b>PHASE 2:</b>	- Site Building Demolition - Building Foundation Decking + coordination of equipment removal/relocation	P2.1.	19
	- Removal of existing access ramp/landing to existing solar panel array	P2.2.	20

# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

PREPARED BY:



DATE: JANUARY 2020

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## PHASE 1

ITEM	DESCRIPTION	REPAIR PROCEDURE	REFERENCE PHOTOS
P1.1.	Joist hangers corroded throughout.	<p>CONTRACTOR to:</p> <ul style="list-style-type: none"> <li>• Remove decking as required</li> <li>• Remove existing joists (brace as required)</li> </ul> <p>CONTRACTOR to supply and install:</p> <ul style="list-style-type: none"> <li>• New joists (back to back 2"x6") to suit existing stringers complete with galvanized hangers and connections (StrongTie-HUTF or approved equivalent).</li> <li>• New 1"x6" decking.</li> <li>• All lumber PT SPF #2 or better.</li> </ul>	<p>The top photo shows a close-up of a wooden joist hanger that is severely rusted and has broken apart, with a large amount of brown rust residue on the wood. The bottom photo shows a similar view from a different angle, showing the extent of the corrosion and the surrounding wooden structure.</p>

# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

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## P1.2.

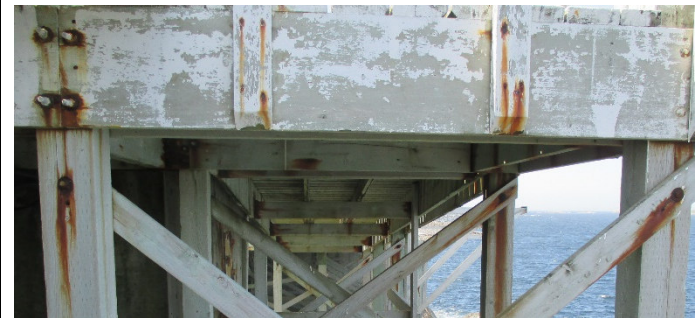
Several deck hardware connections corroded.

CONTRACTOR to:

- Remove corroded connections and applicable hardware (brace members as required).

CONTRACTOR to supply and install:

- New galvanized connections and applicable hardware to suit.



# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

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**P1.3.** Several deck post foundation shoes and anchor bolts/hardware are exhibiting moderate signs of surface corrosion.

CONTRACTOR to:

- Wire brush and cold galvanize corroded steel pockets for existing deck post.
- Minimum 2 coats of Crown Premium 7007 Compound or approved equivalent.

CONTRACTOR to:

- Supply/replace anchor bolts/hardware as required.





# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

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**P1.4.** Damaged deck post foundation.

CONTRACTOR to install new concrete foundation:

- Repair deck post foundation with new 12" sonotube foundation – complete with 4 x 10M bar doweled into bedrock with minimum embedment of 18" filled with non-shrink grout (SikaGrout-212 high quality, versatile non-shrink cementous grout or approved equivalent).



# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

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**P1.5.** Deck walkway to Light station tower damaged and inaccessible.

CONTRACTOR to supply, fabricate, install all materials to:

- Replace damaged deck bridge walkway to existing tower landing
- Sections of existing bridge may be reused (i.e. post foundations)
- Posts to be anchored to foundations with StrongTie anchor bracket or approved equivalent.
- Repair existing foundations as required.
- Width of bridge to be 4'.
- Provide handrail and staircase as per NBCC-15.
- All connections and applicable hardware to be galvanized.



# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

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P1.5.





# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

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P1.5.



# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

PREPARED BY:



DATE: JANUARY 2020

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## P1.6.

Helipad safety net insufficiently braced and steel mesh is broken free throughout.

CONTRACTOR to supply, fabricate and install:

- New safety netting braces and applicable hardware as per drawing specifications.

CONTRACTOR to repair and replace:

- Damaged safety netting as required around perimeter of helideck.



# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

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DATE: JANUARY 2020

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**P1.7.** Light station tower leg base plates exhibiting moderate surface corrosion.

CONTRACTOR to:

- Wire brush and cold galvanize corroded each tower leg base
- Minimum 2 coats of Crown Premium 7007 Compound or approved equivalent.





# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

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**P1.8.**

Dissimilar metal corrosion on tower members from ground cable connections, ground connection broken at top landing, and tower grounding missing lightning rod.

CONTRACTOR to:

- Wire brush and cold galvanize corroded spots
- Minimum 2 coats of Crown Premium 7007 Compound or approved equivalent.

CONTRACTOR to:

- Replace ground connection with proper ground clips and route cable appropriately to tower top complete with new lightning rod and mount as per drawing 1101002B007S08.
- Ensure complete tower grounding.



# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

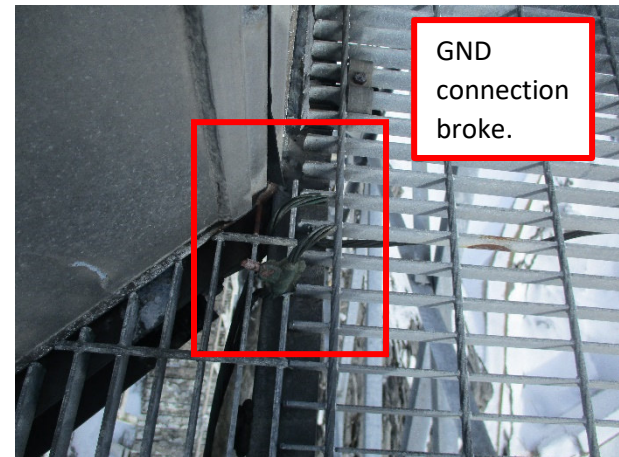
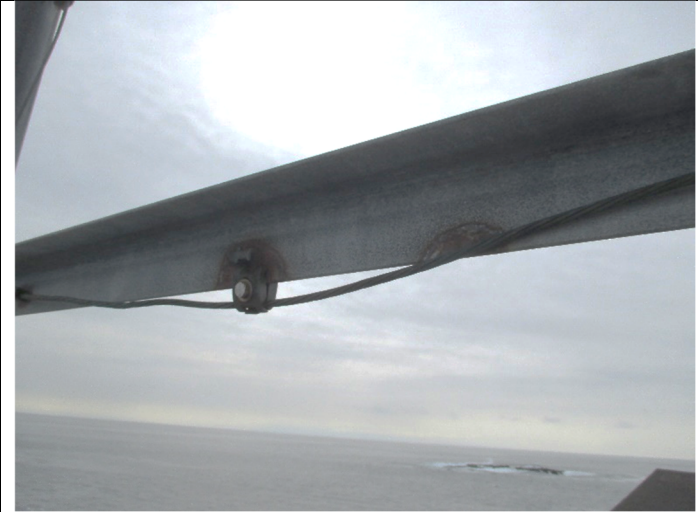
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P1.8.



# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

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**P1.9.**

Tower ladder extension is corroded at the base.

CONTRACTOR to:

- Wire brush and cold galvanize corroded ladder extension
- Minimum 2 coats of Crown Premium 7007 Compound or approved equivalent.



# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

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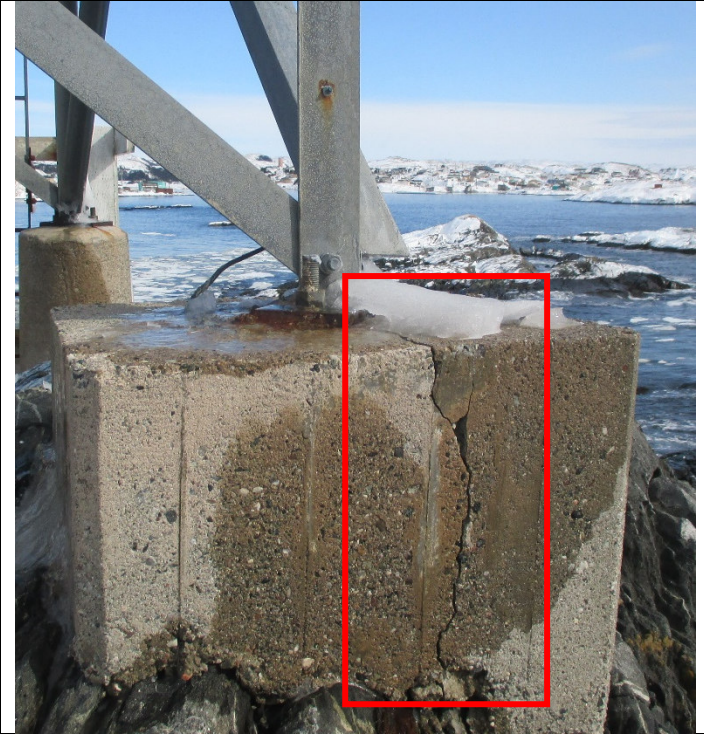
DATE: JANUARY 2020

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**P1.10.** Tower Leg 3 Foundation Crack

CONTRACTOR to supply and apply:

- Sealant to foundation cracks (Sikadur®-35 Hi-Mod LV – high-modulus, low-viscosity, high-strength, epoxy grouting/sealing/binding adhesive or approved equivalent.)





# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

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**P1.11.** Teck cable supports heavily corroded and vertical supports not being utilized. Teck is routed to top of tower using vinyl straps.

CONTRACTOR to:

- Remove and dispose of corroded Tx cable ladder and Unistrut supports.

CONTRACTOR to supply and install:

- New routing for Teck cable using Commscope Feeder Clamps or approved equivalent.





# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

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P1.11.



# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

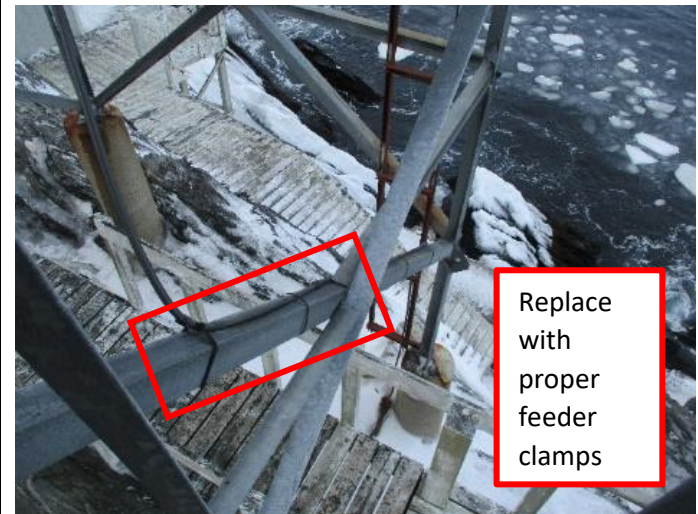
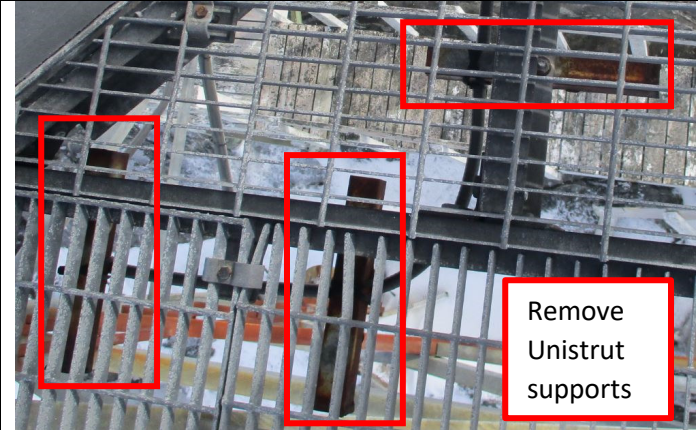
PREPARED BY:



DATE: JANUARY 2020

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P1.11.



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PREPARED BY:



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P1.11.

Replace with proper feeder clamps



# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK



PREPARED BY:



DATE: JANUARY 2020

REVISION: R0

## PHASE 2

ITEM	DESCRIPTION	REPAIR PROCEDURE	REFERENCE PHOTOS
P2.1.	Site building demolition + building foundation wall decking.	<p>CONTRACTOR to:</p> <ul style="list-style-type: none"> <li>Demolish existing site building down to foundation walls and dispose of all materials.</li> <li>Owner to move all equipment within site building prior to work commencement.</li> </ul> <p>CONTRACTOR to supply, fabricate and install:</p> <ul style="list-style-type: none"> <li>New deck framing to go over foundations wall as per drawing specifications.</li> </ul>	 

# COLOMBIER ISLAND REFURBISHMENT – SCOPE OF WORK

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**P2.2.**

Wooden access ramp/landing no longer required.

CONTRACTOR to:

- Remove and dispose of existing wooden ramp and landing.
- Supply, fabricate and install new guardrail as required to match existing.

