Specifications
Issued for Tender
Parks Canada Agency

Renewal Project - Washroom and Maintenance Building
Port Royal National Historic Site

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END

DRAWING LIST

Drawing No.	Title
A-1	Maintenance Building Plans & Details
A-2	Maintenance Building Details
A-3	Washroom Building Details
E-1	Washroom Building Electrical Layouts & Details

END

PART 1 - GENERAL

1.1 Work Covered By Contract Documents

.1 The Work in this Contract comprises the completion of upgrades to the heating, lighting and electrical distribution systems at the washroom building and upgrades to the exteriors of the maintenance and washroom buildings at the Port Royal National Historic Site, Nova Scotia.

.1 Washroom Building
- .1 Replacement of the roofing, fascia, soffit, gutters & downspouts as indicated.
- .2 Replacement of windows and skylights as indicated.
- .3 Cleaning of exterior brickwork.
- .4 Remove and dispose of existing oil furnace and fuel tank in washroom building.

.2 Maintenance Building
- .1 Replacement of the roofing, fascia, soffit, gutters & downspouts as indicated.
- .2 Replacement of all siding including installation of new air barrier, shingle underlayment and cedar shingles. Placement of 40 mm strapping and 15 mm sheathing over existing sheathing on East Wing.
- .3 Replacement of all windows and exterior doors and frames.
- .4 Removal and replacement of existing insulation and protection around foundation of east wing as indicated. Reinstatement of landscaping resulting from this work.

3 Electrical:
- .1 Existing electrical service into the Washroom Building to be deactivated, with the existing main disconnect, PT/CT cabinet and meter to be removed and properly disposed of.

.2 Washroom building to be fed from the Habitation Building utilizing the existing feeders from a new 100A disconnect in the Habitation Building as depicted.

.3 New and existing electrical equipment to be installed and/or utilized as shown.

.4 Habitation Building to be served electrically from the fire suppression bunker, that is to be completed using the coiled 3 #310 cu x #4 cu bond (provided in previous contract) as indicated.

.5 Light fixtures, both exterior and interior, to be replaced in the Washroom Building as shown using energy efficient and reliable LED fixtures. All surfaces (ceiling and walls) that are affected to be made to match prior conditions (patch and paint).

.6 Installation of heat pump system within Washroom Building connecting into existing ductwork. Inspection, resealing and cleaning of existing ductwork.

.7 All requirements detailed within contract drawings and specifications.

1.2 Contract Method

.1 Construct Work under a fixed price contract.

1.3 Work by Others

.1 Coordinate work with that of other Contractors.

.2 Additional payments or schedule extensions due to work or scheduling conflicts with other Contractors will not be considered.

1.4 Work Sequence

.1 Construct Work in stages to accommodate continuous public access to the Port Royal National Historic Site.

1.5 Contractor Use of Premises

.1 Limit use of premises for Work, to allow:
- .1 Work by other contractors.
- .2 Public usage.
- .3 Parks Canada will accommodate the Contractor with a location for their construction trailer.

.2 Storage areas for Contractor’s equipment and materials shall be located outside the Park boundaries. Locations for equipment and materials storage areas shall be the responsibility of the Contractor.

.3 Disposal of waste materials shall be outside the Site Boundaries except as directed in these specifications. Locations and costs associated with waste disposal shall be the responsibility of the Contractor.

.4 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.

.5 The Contractor shall note that water in the washroom building will be shut-off and drained by Parks Canada on October 8, 2016, until May 15th 2017.

.6 The Contractor shall provide their own facilities. The Contractor will not be permitted to use the facilities on site.

1.6 Existing Services

.1 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.

.2 Protect, relocate or maintain existing active services.

1.7 Documents Required

.1 Maintain at job site, one copy of each document as follows:

.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed Shop Drawings.
.5 List of Outstanding Shop Drawings.
.6 Change Orders.
.7 Other Modifications to the Contract.
.8 Field Test Reports.
.9 Copy of Approved Work Schedule.
.10 Health and Safety Plan and Other Safety Related Documents.
.11 Other documents as specified.
.12 Construction Schedule
.13 Environmental Control Plan (ECP)

1.8 Site Operational Season

.1 Site facilities will be closed to the public from October 9, 2016 through May 18, 2017. The facilities will be open for the site operational season from May 18, 2017 until it closes again in October 8, 2017. The site grounds are open to the public at all other times.

1.9 Project Completion Date

.1 All aspects of the work of this project must be totally complete by November 15, 2017. The Washroom must be operational and accessible to visitors during the operating season. The doorways of the maintenance building must be accessible to PCA staff at all times.

END

PART 1 - GENERAL

1.1 Access and Egress

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, in accordance with relevant municipal, provincial and other regulations.

1.2 Use of Site and Facilities

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

.2 Provide for personnel and vehicle access.

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

.4 Contractor to provide own facilities in accordance with Section 01 52 00. Contractor will not be permitted to use site facilities.

1.3 Alterations, Additions or Repairs

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

.2 Finalization of changeover electrical system shall not occur until permission is received from the Departmental Representative.

.1 Emergency power from the existing generator must remain intact during changeover.

.2 The site shall not be left without power for more than 6 hours.

1.4 Existing Services

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

1.5 Special Requirements

.1 Work outside of normal working hours will require 48 hours written notice to the Departmental Representative.

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

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

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

PART 1 - GENERAL

1.1 Measurement

.1 This contract will be paid lump sum unless otherwise indicated.

1.2 Pay Items

.2 All items in this contract will be paid for by lump sum payments for the items listed below.

.1 Bid Item 1: All sections under Division 1 and Division 2 including mobilization and demobilization of all required items and equipment. Temporary fencing and facilities. Any overhead and items not included in bid items 2 - 9

.2 Bid Item 2: Washroom Building Roofing, Soffits, Fascia, Gutters, flashings, Etc., and cleaning of exterior brickwork.

.3 Bid Item 3: Maintenance Building Roofing, Soffits, Fascia, Gutters, flashings, Etc.

.4 Bid Item 4: Maintenance Building Siding and Associated work, work around foundations etc.

.5 Bid Item 5: Washroom Building Windows & Skylights and Associated work.

.6 Bid Item 6: Maintenance Building Windows & Doors and Associated work.

.7 Bid Item 7: Electrical, Lighting and Associated work. Including changing the main power feed for the washroom and Habitation to the line coming from fire pump bunker.

.8 Bid Item 8: Washroom Building Heating System including inspection, re-sealing, and cleaning of existing duct work. Remove and dispose of existing oil furnace and fuel tank in washroom building. Drain and dispose of any oil in the system. Installation of new heat pump system.

.9 Bid Item 9: Earthwork and Sod. Repair any disturbed grass to preconstruction condition

END

PART 1 - GENERAL

1.1 Administrative

.1 The Departmental Representative will schedule and administer project meetings throughout the progress of the work.

.2 The Departmental Representative will prepare agenda for meetings.

.3 The Departmental Representative will distribute written notice of each meeting four days in advance of meeting date.

.4 The Contractor shall provide physical space and make arrangements for meetings.

.5 The Contractor shall preside at meetings.

.6 The Departmental Representative will decide who will record the meeting minutes, including significant proceedings and decisions and identify actions by parties.

.7 The Departmental Representative will assign someone to reproduce and distribute copies of minutes within three days after meetings and transmit to the Contractor, meeting participants, and affected parties not in attendance.

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

1.2 Preconstruction Meeting

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

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

.3 The Contractor shall establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

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

.5 Agenda to include:

.1 Appointment of official representative of participants in the Work.
.2 Schedule of Work: in accordance with NSTIR Standard Specification.
.3 Schedule of submission of shop drawings, samples. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
.5 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
.6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
.7 Owner provided products.
.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, warranties in accordance with Section 01 78 00 - Closeout Submittals.
.11 Monthly progress claims, administrative procedures, photographs, hold backs.
.12 Appointment of inspection and testing agencies or firms.
.13 Insurances, transcript of policies.

1.3 Progress Meetings

.1 During course of Work schedule progress meetings bi-weekly.

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

.3 Notify parties minimum 7 days prior to meetings.

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

PART 1 - GENERAL

1.1 Definitions

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

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

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

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

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

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

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

1.2 Requirements

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

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

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

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

1.3 Action and Informational Submittals

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

.2 Submit to Departmental Representative within 10 working days of Award of Contract, Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

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

1.4 Master Plan

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

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - Execution

3.1 NOT USED

END

PART 1 - GENERAL

1.1 Administrative

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

.2 This section specifies general requirements and procedures for Contractor’s submissions of shop drawings, product data, samples and mock-ups to the Departmental Representative for review. Additional specific requirements for submissions are specified in individual sections.

.3 Do not proceed with Work until relevant submissions are reviewed by the Departmental Representative.

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

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

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

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

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

.9 Make any changes which Departmental Representative may require consistent with Contract Documents and resubmit as directed by the Departmental Representative.

.10 Notify the Departmental Representative, in writing, when resubmitting, of any revisions other than those requested by the Departmental Representative.

1.2 Submission Requirements

.1 Coordinate each submission with requirements of work and Contract Documents.
Individual submissions will not be reviewed until all related information is available.

.2 Allow 7 days for Departmental Representative's review of each submission.

.3 Adjustments made on submissions 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.

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

.5 Accompany submissions with transmittal letter, in duplicate, containing:
- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.
- .6 Submissions include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
    - .4 Contractor's stamp, signed by Contractor's authorized representative

certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

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

1.3 Shop Drawings

.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 Where necessary or requested by the Departmental Representative, submit drawings stamped and signed by professional engineer registered or licensed in the Province of Nova Scotia.

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

.5 Cross-reference shop drawing information to applicable portions of Contract Documents.

1.4 Product Data

.1 Product data: manufacturers catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products.

.1 Submit electronic copies of product data.

.2 Sheet size: 215 x 280 mm, maximum of 3 modules.

.3 Delete information not applicable to project.

.4 Supplement standard information to provide details applicable to project.
.5 Cross-reference product data information to applicable portions of Contract Documents.

1.5 Samples

.1 Samples: examples of materials, equipment, quality, finishes, workmanship.

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

1.6 Test Reports

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

1.7 Certificates

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

1.8 Manufacturer’s Instructions

.1 Submit electronic copies of manufacturer instructions.
.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

1.9 Review

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

.2 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.10 Certificates and Transcripts

.1 Immediately after award of Contract, submit Letter of Good Standing from Workers Compensation Board of Nova Scotia.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

PART 1 - GENERAL

1.1 References

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

.2 Province of Nova Scotia
.1 Occupational Health and Safety Act (most recent version).

1.2 Definitions

.1 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

.2 Competent Person: means a person who is:
.1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;
.2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;
.3 Knowledgeable about potential or actual danger to health or safety associated with the Work.

.3 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.

.4 PPE: personal protective equipment

.5 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.

1.3 Submittals

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

.2 Submit site-specific Health and Safety Plan prior to commencement of Work.

.1 Submit within 10 work days of notification of Bid Acceptance. Provide 3 copies.

.2 Departmental Representative will review Health and Safety Plan and provide comments.

.3 Revise the Plan as appropriate and resubmit within 5 work days after receipt of comments.

.4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.

.5 Submit revisions and updates made to the Plan during the course of Work.

.3 Submit name of designated Health & Safety Site Representative and support documentation specified in the Safety Plan.

.4 Submit copies of permits obtained.

.5 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other department of labour organization.

.1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.

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

.7 Submit copies of incident reports.

.8 Submit WHMIS MSDS - Material Safety Data Sheets.

1.4 Compliance Requirements

.1 Comply with Occupational Health and Safety Act for Province of Nova Scotia, and Regulations made pursuant to the Act.

.2 Comply with Canada Labour Code - Part II (entitled Occupational Health and Safety) and the Canada Occupational Health and Safety Regulations (COSH) as well as any other regulations made pursuant to the Act.

.1 The Canada Labour Code can be viewed at: www.http://laws.justice.gc.ca/en/L-2/

.2 COSH can be viewed at: www.http://laws.justice.gc.ca/eng/SOR-86-304/ne.html

.3 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.

.4 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.

.5 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

1.5 Responsibility

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

.2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.6 Site Control and Access

.1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.

.1 Departmental Representative will provide names of those persons authorized by Departmental Representative to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site. However, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.

.2 Isolate Work Site from other areas of the premises by use of appropriate means.

.1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment.

.2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.

.3 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site.

.4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.

.5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm. Provide security guard where adequate protection cannot be achieved by other means.

1.7 Protection

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

.2 Should unforeseen or peculiar safety related hazard or condition become evident during performance of Work, immediately take measures to rectify situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

1.8 Filing of Notice

.1 File Notice of Project with pertinent provincial health and safety authorities prior to beginning of Work.

.1 Departmental Representative will assist in locating address if needed.

1.9 Permits

.1 Post permits, licenses and compliance certificates, at Work Site.

.2 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.

1.10 Hazard Assessments

.1 Perform site specific health and safety hazard assessment of the Work and its site.

.2 Carryout initial assessment prior to commencement of Work with further assessments as needed during progress of work, including when new trades and subcontractors arrive on site.

.3 Record results and address in Health and Safety Plan.

.4 Keep documentation on site for entire duration of the Work.

1.11 Project / Site Conditions

.1 Following are potential health, environmental and safety hazards at the site for which Work may involve contact with:

.1 Known latent site and environmental conditions:

.1 Electrical safety required.

.2 Working with adverse weather conditions.

.3 Working near trench excavations.

.4 Working near buried utilities.

.5 Working near heavy moving machinery.

.6 Working at heights

.2 Facility on-going operations:

.1 The Contractor will co-operate with users of existing facilities. Maintain access to the existing park facilities and consult with the Departmental Representative for site access limitations.

.3 Should interference occur, take directions from Departmental Representative.

.4 Do not unreasonably encumber site with materials.

.5 Move stored products or equipment which interfere with operations.

.6 Comply with all regulations and authorities having jurisdiction over the work.

.2 Above items shall not be construed as being complete and inclusive of potential health and safety hazards encountered during Work.

.3 Include above items in the hazard assessment of the Work.

.4 MSDS Data sheets of pertinent hazardous and controlled products stored on site can be obtained from Departmental Representative.

1.12 Meetings

.1 Attend pre-construction health and safety meeting, convened and chaired by Departmental Representative, prior to commencement of Work, at time, date and location determined by Departmental Representative. Ensure attendance of:
- .1 Superintendent of Work
- .2 Designated Health & Safety Site Representative
- .3 Subcontractors

.2 Conduct regularly scheduled tool box and safety meetings during the Work in conformance with Occupational Health and Safety regulations.

.3 Keep documents on site.

1.13 Health and Safety Plan

.1 Prior to commencement of Work, develop written Health and Safety Plan specific to the Work. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.

.2 Health and Safety Plan shall include the following components:
- .1 List of health risks and safety hazards identified by hazard assessment.
- .2 Control measures used to mitigate risks and hazards identified.
- .3 On-site Contingency and Emergency Response Plan as specified below.
- .4 On-site Communication Plan as specified below.
- .5 Name of Contractor's designated Health & Safety Site Representative and information showing proof of his/her competence and reporting relationship in Contractor's company.
- .6 Names, competence and reporting relationship of other supervisory personnel used in the Work for occupational health and safety purposes.

.3 On-site Contingency and Emergency Response Plan shall include:

.1 Operational procedures, evacuation measures and communication process to be implemented in the event of an emergency.

.2 Evacuation Plan: site plan layouts showing marshalling areas. Details on alarm notification methods, location of firefighting equipment and other related data.

.3 Name, duties and responsibilities of persons designated as Emergency Warden(s) and deputies.

.4 Emergency Contacts: name and telephone number of officials from:

.1 General Contractor and subcontractors.

.2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.

.3 Local emergency resource organizations.

.5 Harmonize Plan with Facility's Emergency Response and Evacuation Plan. Departmental Representative will provide pertinent data including name of Parks Canada and Facility Management contacts.

.4 On-site Communication Plan:

.1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.

.2 List of critical work activities to be communicated with Facility Manager which have a risk of endangering health and safety of Facility users.

.5 Address all activities of the Work including those of subcontractors.

.6 Review Health and Safety Plan regularly during the Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at Work Site.

.7 Departmental Representative will respond in writing, where deficiencies or concerns are noted and may request re-submission of the Plan with correction of deficiencies or concerns.

.8 Post copy of the Plan, and updates, prominently on Work Site.

1.14 Safety Supervision

.1 Employ Health & Safety Site Representative responsible for daily supervision of health and safety of the Work.

.2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority to:

.1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work

.2 Monitor and enforce Contractor's site-specific Health and Safety Plan.

.3 Conduct site safety orientation session to persons granted access to Work Site.

.4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.

.5 Stop the Work as deemed necessary for reasons of health and safety.

.3 Health & Safety Site Representative will:

.1 Be qualified and competent person in occupational health and safety.

.2 Have site-related working experience specific to activities of the Work.

.3 Be on Work Site at all times during execution of the Work.

.4 All supervisory personnel assigned to the Work shall also be competent persons.

.5 Inspections:

.1 Conduct regularly scheduled safety inspections of the Work on a minimum biweekly basis. Record deficiencies and remedial action taken.

.2 Conduct Formal Inspections on a minimum monthly basis. Use standardized safety inspection forms. Distribute to subcontractors.

.3 Follow-up and ensure corrective measures are taken.

.6 Cooperate with Facility's Occupational Health and Safety representative should one be designated by Departmental Representative.

.7 Keep inspection reports and supervision related documentation on site.

1.15 Training

.1 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task.

.2 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.

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

1.16 Minimum Site Safety Rules

.1 Notwithstanding requirement to abide by federal and provincial health and safety regulations; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:

.1 Wear appropriate PPE pertinent to the Work or assigned task; minimum being hard hat, safety footwear, safety glasses and hearing protection.

.2 Immediately report unsafe condition at site, near-miss accident, injury and damage.

.3 Maintain site and storage areas in a tidy condition free of hazards causing injury.

.4 Obey warning signs and safety tags.

.2 Brief persons of disciplinary protocols to be taken for noncompliance. Post rules on site.

1.17 Correction of 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 noncompliance of health and safety issues identified.

.3 Departmental Representative will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.

1.18 Incident Reporting

.1 Investigate and report the following incidents to Departmental Representative:

.1 Incidents requiring notification to Provincial Department of Occupational Safety and Health, Workers Compensation Board or to other regulatory Agency.

.2 Medical aid injuries.

.3 Property damage in excess of $10,000.00,

.4 Interruptions to Facility operations resulting in an operational loss to a Federal Department in excess of $5000.00.

.2 Submit report in writing.

1.19 Hazardous Products

.1 Comply with requirements of Workplace hazardous Materials Information System (WHMIS).

.2 Keep MSDS data sheets for all products delivered to site.

.1 Post on site.

.2 Submit copy to Departmental Representative.

.3 For interior work in an occupied Facility, post additional copy in one or more publicly accessible locations.

1.20 Blasting

.1 Blasting or other use of explosives is not permitted on site without prior receipt of written permission and instructions from Departmental Representative.

1.21 Confined Spaces

.1 Abide by occupational health and safety regulations regarding work in confined spaces.

.2 Obtain an Entry Permit in accordance with Part XI of the Canada Occupational Health and Safety Regulations for entry into an existing identified confined space located at the Facility or premises of Work.
.1 Obtain permit from Facility Manager
.2 Keep copy of permit issued.

.3 Safety for Inspectors:
.1 Provide PPE and training to Departmental Representative and other persons who require entry into confined space to perform inspections.
.2 Be responsible for efficacy of equipment and safety of persons during their entry and occupancy in the confined space.

1.22 Site Records

.1 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.

.2 Upon request, make available to Departmental Representative or authorized Safety Officer for inspection.

1.23 Posting of Documents

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Work Site in

accordance with Acts and Regulations of Province having jurisdiction.

.2 Post other documents as specified herein, including:
.1 Site specific Health and Safety Plan
.2 WHMIS data sheets

.3 Fire and Safety Requirements
.4 Special Procedures on Lockout Requirements

END

PART 1 - GENERAL

1.1 Standard

.1 All work of this section shall comply with the requirement of the most recent version of the Nova Scotia Transportation and Infrastructure Renewal (NSTIR) Standard Specification Division 7, except as amended herein.

1.2 References

.1 Nova Scotia Department of Transportation and Infrastructure Renewal Standard Specifications (most recent version):

- .1 NSTIR Standard Specification Division 7– Environmental Protection.
- .2 The Nova Scotia Environment Act and Regulations pursuant to the Act.
- .3 The Erosion and Sedimentation Control Handbook for Construction Sites.
- .4 TIR Environmental Management Program Manual.
- .5 CWRS Erosion and Sediment Control Course and binder.

.2 Canadian Environmental Assessment Act (most recent version).

1.3 Fires

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

1.4 Disposal of Wastes

.1 Dispose of waste material in designated waste disposal area.

.2 Remove and dispose of containers and waste fluids associated with vehicle maintenance in a provincially approved waste disposal site outside the park.

.3 Disposal of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers is prohibited. Dispose of

all waste materials at Provincially approved waste disposal site outside the park boundary. Littering is prohibited.

.4 To the maximum extent possible, divert waste cardboard, plastic and metal products from landfill to appropriate recycling facilities.

1.5 Drainage

.1 Provide temporary drainage and pumping required 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.

1.6 Site Clearing and Plant Protection

.1 Exercise special care to protect trees, shrubs and vegetation within contract limit lines outlined on drawings or as directed by Departmental Representative.

.2 Protect roots of designated trees to drip line during excavation and site grading to prevent disturbance or damage.

.1 Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Restrict tree removal to areas indicated or designated by Departmental Representative.

.5 When, in the opinion of the Departmental Representative/Park Environmental Protection Officer (EPO), negligence on the part of the Contractor results in unnecessary damage or destruction of vegetation, or other environmental or aesthetic features within or beyond the staked or designated work area, the Contractor shall be responsible, at its expense, for the complete restoration including the

replacement of trees, shrubs, grass, etc. to the satisfaction of the Departmental Representative.

1.7 Pollution Control

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

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

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

.4 All equipment, vehicles and plant used on site will be in good operating condition and leak free. The Departmental Representative reserves the right to have the Contractor immediately remove from the site, any deficient equipment, vehicles, etc.

1.8 Vehicular Movements

.1 Restrict movement of vehicles and equipment to existing disturbed areas (access roads, borrow pits, disposal areas and right-of-ways).

1.9 Storage and Handling of Fuels And Dangerous Fluids

.1 Locate fuel storage facility outside Park and minimum of 100 m from any water body. Any fuel storage tankage (s) used shall be of adequate double-walled safety construction and shall be enclosed by an impermeable containment dyking system with a volume capacity equal to at least 110% of fuel storage tank(s)’ fuel storage capacity. Any spillage and/or ponded fuel shall be immediately recovered and placed in secure containers. When no longer required, the fuel storage area shall be cleaned up to satisfaction of the Departmental Representative and any fuel contaminated soil removed to the nearest approved industrial waste disposal site.

.1 Fueling of vehicles or equipment will not be permitted within 100 m of any water body.

.2 Exercise care in handling of fuels to minimize potential for fuel spills. Report immediately any fuel spills to Departmental Representative. Contractor is responsible for any cleanup or repair resulting from any spills.

.3 Supply and maintain on site emergency response material to contain spills and minimize environmental damage, i.e. absorbent material, to the approval of Departmental Representative. Disposal of all contaminated material as per Clause 1.4 of this section.

1.10 Environmental Protection Plan

.1 The Contractor is required to submit a plan showing all pollution control measures and sediment control measures that will be used to fulfill the requirements of the Environmental Protection Section and Environmental Screening attached to this document. This plan will be reviewed by the Departmental Representative and the Environmental Protection Officer prior to start of construction activities.

.2 Proposed location of waste bins shall be indicated in Environmental Protection Plan.

END

PART 1 – GENERAL

1.1 Optional Site Meeting

.1 Prior to tender submission an optional site meeting will be held; project scope and construction details and restrictions will be reviewed.

.2 Tenderers shall be advised that a date and time for the optional site visit will be announced with the tender.

1.2 National Parks Act

.1 The requirements and regulations made under the National Parks Act shall apply to this project.

.2 A copy of this Act may be obtained by contacting the Departmental Representative.

1.3 Archeological Status

.1 Relics and antiquities and items of historical or scientific interest found on site, shall remain property of Parks Canada. Protect such articles, and request directives from the Departmental Representative.

.2 Give immediate notice to the Departmental Representative if evidence of archaeological finds are encountered during construction, and await Departmental Representative’s written instructions before proceeding with work in this area.

.3 An archaeologist, representing Parks Canada, may be present during excavation work. Archaeologist has authority to stop work when excavation uncovers archaeological resources.

.4 Suspend excavation so that appropriate recording and removal of archaeological resources can be completed. Provide labour assistance as necessary to the archaeologist during removal and recording of archaeological resources. There

will be no additional payment to the Contractor as a result of this provision of labour assistance and work suspension.

.5 Any other aspects of the work that might involve disturbance of existing surfaces, grade, walls, etc. may also be subject to archaeological surveillance.

1.4 Pre-Construction Mitigation

.1 The Contractor will be firmly aware that he/she are working in a National Historic Site setting with its emphasis on cultural and natural resource protection. See Basic Impact Assessment (Appendix A)

.2 The Environmental Screening containing two sets of mitigations, one set for cultural resource protection and one set for natural resource protection, will be read in its entirety and mitigation will be followed as described.

.3 The National Parks Act and Historic Parks Regulations will be followed during all phases of construction. The Acts and Regulations can be made available for review at the Administration Office of Port Royal.

.4 Contractor will ensure that all on-site subcontractors and suppliers are fully informed of all information in the Environmental Screening and that this information is issued to all staff.

.5 Contractor to install temporary fencing around work areas and install protective hoarding overhead all entrances of buildings. Barricades are not to be removed unless otherwise stated by Departmental Representative.

.6 The Contractor will adhere to all mitigation set out in the Environmental Screening.

.7 All equipment operators will be trained and familiar with cultural resources.

.8 When surveillance archeology is required the archeologist will oversee all excavation and shall stop the work to record or remove the archeological resources encountered, or to check the presence of these resources.

.9 Departmental Representative will be contacted immediately if archeological resources are encountered.

.10 To mitigate damage to cultural resources encountered during construction the Contractor will undertake additional measures at the direction of the Departmental Representative. They may include geotextile, protective covering and any materials associated with stabilization.

.11 Any artifacts or items of historical significance uncovered or found during construction or maintenance, and their associated archeological records, shall revert back to Canada.

1.5 Construction Mitigation

.1 Archeological surveillance is required along construction corridor only where outlined in the Environmental Screening.

.2 Parking will be permitted in designated areas as directed.

.3 Confine all work actively within the limits specified and outlined in construction plans.

.4 Access to work areas will be via routes approved in advance.

.5 When negligence on the part of the Contractor results in any damage or

destruction of cultural resources, the Contractor shall be responsible, at his/her expense, for complete restoration or rehabilitation to the satisfaction of the Departmental Representative.

.6 Excavations will not be permitted beyond the identified corridor approved by archeology.

.7 If any artifacts, cultural resources or structural features are located during construction activities, all work will stop in that area until the surveillance archeologist reviews the findings.

.8 Temporary water supply will not impact on the grounds surface and will be located in the identified area approved by archeology.

.9 Filtration systems due to sub-excavation will be located in those areas identified on construction plans and will require archeological approval if changes are required.

1.6 Definitions

.1 Archeology: A set of theories, methods and techniques for the study of human behavior from material remains of past activities. Other sorts of evidence, such as documents, are used when available, but archeology deals with the recovery and analysis of physical evidence from on or below the surface of the ground and underwater. Archeological techniques are designed to recover the spatial and chronological relationships (i.e., artifacts that make up archeological sites. It is these relationships that form the essential basis for understanding archeological evidence.

1.7 Relics and Antiquities

.1 Comply with CEAA Environmental Screening (current screening).

.2 Any artifact or items of historical significance uncovered during construction or maintenance and their associated archeological records, shall revert to Canada.

END

PART 1 - GENERAL

1.1 References and Codes

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

.2 Perform Work in accordance with the EA for this project

.3 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

1.2 National Parks Act

.1 Perform Work in accordance with National Parks Act when projects are located within boundaries of National Park or within National Historic Sites.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

PART 1 - GENERAL

1.1 Inspection

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

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

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

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

1.2 Independent Inspection Agencies

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

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

.3 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 the owner. Pay costs for retesting and reinspection.

1.3 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.

1.4 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 orderly sequence to not cause delays in Work.

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

1.5 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 reexecute 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 will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Owner.

1.6 Reports

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

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

1.7 Tests and Mix Designs

.1 Furnish test results and mix designs as requested.

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

PART 1 - GENERAL

1.1 Access

.1 Provide and maintain adequate access to project site.

.2 As required, build and maintain temporary roads during period of work. Parks Canada will approve prior to their use, any proposed temporary roads within the Park.

.3 Upon completion of contract work, rehabilitate any temporary roads to the satisfaction of the Departmental Representative.

.4 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.

.5 Clean roads and parking areas where used by Contractor's equipment or employees' vehicles.

1.2 Site Signs

.1 Safety and Instruction Signs and Notices:

.1 Signs and notices for safety and instruction shall be in both official languages Graphic symbols shall conform to CAN3-Z321-77.

.2 Maintenance and Disposal of Site Signs:

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

.2 No separate payment to be made for Project Identification Site Signs. Cost shall be deemed incidental to work.

1.3 Sanitary Facilities

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

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

1.4 Removal of Temporary Facilities

.1 Remove temporary facilities from site when directed by Departmental Representative.

1.5 Contractor’s Camp

.1 The Contractor will not be permitted to set up a camp within the Port Royal National Historic Site.

.1 Applicable Provincial and/or Municipal regulatory permits for camp(s) outside the Park will be obtained and copies forwarded to Superintendent, the Port Royal National Historic Site.

END

PART 1 - GENERAL

1.1 Installation and Removal

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

.2 Remove from site all such work after use.

1.2 Hoarding

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

1.3 Guard Rails and Barricades

.1 Provide secure, rigid guard rails and barricades around deep excavations.

.2 Provide as required by governing authorities.

.3 Throughout the execution of the work, work areas shall be fenced (approximately 2 m high fence) and signage shall be provided.
.1 Parks Canada Agency staff shall be provided with access to maintenance building at all times.
.2 While the park is open the washroom building shall be accessible to Parks Canada Agency staff and visitors.

1.4 Fire Routes

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

1.5 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.

1.6 Waste Management and Disposal

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

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END

PART 1 - GENERAL

1.1 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 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.

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

1.2 Quality

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

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

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

.4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental

Representative based upon requirements of Contract Documents.

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

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

1.3 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 sheet materials on flat, solid supports and keep clear of ground. Slope to shed moisture.

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

1.4 Transportation

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

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

1.5 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 will establish course of action.

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

1.6 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.

1.7 Co-ordination

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

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

1.8 Remedial Work

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

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

1.9 Existing Utilities

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

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

PART 1 - GENERAL

.1 Departmental Representative’s identification of existing survey control points and property limits as identified on the drawings.

1.1 Existing Services

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

1.2 Location of Equipment and Fixtures

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

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

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

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

1.3 Records

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

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

1.4 Action and Informational Submittals

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

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

.3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

PART 1 - GENERAL

1.1 References

.1 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC) – ID: R0202D, Title: General Conditions “C”, In Effect as Of: May 14, 2004.

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

.3 Clear snow and ice from access to site or facilities of the work, bank/pile snow in designated areas only.

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

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

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

.7 Dispose of waste materials and debris outside the limits of the National Park at a location/facility approved by the Authority having jurisdiction.

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

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

1.3 Final Cleaning

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

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

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

.4 Remove waste products and debris other than that caused by Owner or other Contractors.

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

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

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

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

.9 Remove dirt and other disfiguration from exterior surfaces.

1.4 Waste Management and Disposal

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

PART 2 - PRODUCTS

2.1 NOT USED

END

PART 1 - GENERAL

1.1 Waste Management Goals

.1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss Parks Canada's waste management plan and goals.

.2 Accomplish maximum control of solid construction waste.

.3 Protect environment and prevent environmental pollution damage.

1.2 References

.1 Definitions:

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

.2 Cost/Revenue Analysis Workplan (CRAW): intended as financial tracking tool for determining economic status of waste management practices.

.3 Demolition Waste Audit (DWA): relates to actual waste generated from project.

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

.5 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.

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

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

.8 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.

.9 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.

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

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

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

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

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

1.3 Storage, Handling and Protection

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

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

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

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

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

.6 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.

.1 On-site source separation is recommended.

.2 Remove co-mingled materials to off site processing facility for separation.
.3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.
.4 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.

1.4 Disposal of Wastes

.1 Do not bury rubbish or waste materials.

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

.3 Contractor is responsible for safe disposal of waste off-site in an environmentally acceptable manner and in accordance with all applicable regulations.

1.5 Scheduling

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

PART 1 - GENERAL

1.1 References

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

1.2 Administrative Requirements

.1 Acceptance of Work Procedures:
  .1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
    .2 Request Departmental Representative inspection.
  .2 Departmental Representative Inspection:
    .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
    .2 Contractor to correct Work as directed.
  .3 Completion Tasks: submit written certificates that tasks have been performed as follows:
    .1 Work: completed and inspected for compliance with Contract Documents.
    .2 Defects: corrected and deficiencies completed.
    .3 Equipment and systems: tested, adjusted and balanced and fully operational.
    .4 Operation of systems: demonstrated to Departmental Representative's personnel.
    .5 Work: complete and ready for final inspection.
  .4 Final Inspection:
    .1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
    .2 When Work incomplete according to Departmental Representative, complete outstanding items and request reinspection.

1.3 Final Cleaning

.1 Clean in accordance with Section 01 74 11 - Cleaning.
.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

PART 1 - GENERAL

1.1 Administrative Requirements

.1 Pre-warranty Meeting:
  .1 Convene meeting one week prior to contract completion with contractor's representative and Departmental Representative, in accordance with Section 01 31 19 – Project Meetings to:
    .1 Verify Project requirements.
    .2 Review warranty requirements and manufacturer's installation instructions.

.2 Departmental Representative to establish communication procedures for:
  .1 Notifying construction warranty defects.
  .2 Determine priorities for type of defects.
  .3 Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.2 Action and Informational Submittals

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

.2 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals.

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

1.3 Format

.1 Organize data as instructional manual.

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

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

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

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

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

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

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

1.4 Contents – Project Record Documents

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

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

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

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

.5 Typewritten Text: as required to supplement product data.

.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Testing and Quality Control.

1.5 As -Built Documents and Samples

.1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative one record copy of:
- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Change Orders and other modifications to Contract.
- .5 Reviewed shop drawings, product data, and samples.
- .6 Field test records.
- .7 Inspection certificates.
- .8 Manufacturer's certificates.

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

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

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

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

1.6 Recording Information on Project Record Documents

.1 Record information on set of black line opaque drawings, provided by Departmental Representative.

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

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

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
.1 Measured depths of elements of foundation in relation to finish first floor datum.
.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
.4 Field changes of dimension and detail.
.5 Changes made by change orders.
.6 Details not on original Contract Drawings.
.7 References to related shop drawings and modifications.

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

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

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

1.7 Equipment and Systems

.1 For each item of equipment and each system include description of unit or system, and component parts.

.1 Give function, normal operation characteristics and limiting conditions.
.2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

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

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

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

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

.6 Include sequence of operation by controls manufacturer.

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

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

.9 Include test and balancing reports as specified in Section 01 45 00 – Testing and Quality Control.

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

1.8 Materials and Finishes

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.1 Provide information for re-ordering custom manufactured products.

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

.3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

PART 1 - GENERAL

1.1 Related Documents

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Scope of Work

.1 Removal of existing construction to permit the construction of the New Work. Extent of removals shall encompass everything required to facilitate the creation/construction of what is indicated and intended, as the new work.

.2 Perform all removal of existing materials and assemblies and make good as indicated on the drawings and specified herein. Making good means restoration to the extent that the new work will be complete and finished in all respects.

.3 See Demolition Drawings as well as List of Demolition where applicable. Items and assemblies shown dotted shall be removed completely except as indicated.

.4 Demolition drawings are provided to assist in establishing items to be removed to ensure the new work fits. The new work governs and demolition drawing notes and specifications are to be read in conjunction with the new work requirements.

1.3 Related Work

.1 Division 1: All Sections

1.4 Codes and Standards

.1 Carry out demolition work in accordance with Canadian Construction Safety Code (latest edition), provincial and local codes, regulations and requirements of insurance carriers providing coverage for this work.

.2 Comply with CSA S350-M1980 Code of Practice for Safety in Demolition of Structures.

.3 Do welding in accordance with CSA W59-1984 unless specified otherwise.

1.5 Protection

.1 Prevent movement, settlement or damage of adjacent construction. Make good damage and be liable for damage or injury caused by demolition.

.2 Provide necessary shoring to protect construction adequately during the demolition process.

.3 Take precautions to support structures and if safety of new or existing construction appears to be endangered, cease operations and notify Owner’s Representative.

.4 Provide protection from falling debris. Prevent debris from blocking services, exits, etc.

.5 Provide protection to interior finishes, where applicable.

.6 Provide dust/noise and security protection. Refer to Division 1 requirements.

.7 Protect existing items designated to remain, to be reinstalled and as noted for salvage.

1.6 Recording of Existing Conditions

.1 Prior to demolition, take photographs and make notes to indicate existing conditions, to become familiar with the scope of demolition work and to note items to be handed to Owner after removal from the premises.

.2 Obtain signature of Owner’s Representative on notes and photographs and submit two sets of copies to Owner’s Representative.

1.7 Restrictions on Dust, Noise

.1 Comply with requirements of Division 1 to enable continuous occupancy of the facility.

1.8 On-Site Storage of Removal Items

.1 Store, where directed by Owner's Representative, items designated for re-use in the renovation work or for use by the Owner otherwise.

1.9 Fees

.1 Pay all required fees, including dumping fees. Store, where directed by Owner, items designated for re-use in the renovation work or for use by the Owner otherwise.

PART 2 - PRODUCTS

2.1 Materials

.1 Unless otherwise specifically approved, use only new, solid lumber, utility grade or better, to construct temporary barricades.

.2 Materials for Falsework: to CSA S269.1-1975.

.3 Materials for Scaffolding: to CSA S269.2-M1987.

.4 Welding Materials: to CSA W59-1984.

PART 3 - EXECUTION

3.1 Preparation

.1 Prior to beginning work, inspect all areas of the work and identify objects designated to be turned over to the Owner or to be re-used in renovation work. Turning over of items to the Owner means, delivering items to a specific location in the market as directed by the Market Manager.

.2 Locate services which may be affected by demolition work and provide required protection. Disconnect services as required by the work using qualified tradesman.

.3 Cooperate with the Owner's Representative, provide for continuous occupancy of existing building as specified under Division 1.

.4 Comply with Dept. of Health regulations.

3.2 Demolition Work

.1 Demolish and/or remove parts, assemblies and items of existing building as indicated and required, to permit and accommodate the construction and renovation work, and to complete the work of this Contract.

.2 Remove and protect those items identified for reinstallation in the finished assembly or to be handed to the Owner for use otherwise.

.3 Provide containers for the collection of demolished materials which will be discarded.

.4 Remove existing equipment, finished construction, services and obstacles where required for refinishing or making good of existing surfaces to remain exposed and replace as work progresses.

.5 At end of each day’s work, leave work in safe condition so that no part or material is in danger of falling or of causing other hazard. Protect interiors from external elements at all times.

.6 Demolish to minimize dusting. Provide dust barrier partitions, the purpose of which is to not permit the passage of any dust.

.7 Carefully remove and lower heavy objects.

.8 Do not disturb adjacent items and surfaces designated to remain in place, unless required to complete new work.

3.3 Disposal

.1 Selling or burning of materials on site is not permitted.

.2 Dispose of all demolished materials not designated for salvage or re-use in the work, off of property. Comply with authorities having jurisdiction.

.3 Remove all debris from site; leave site in a neat, orderly condition. Tarp all containers.

.4 Stockpile and store materials to be reinstalled at location(s) approved by the Owner's Representative.

.5 Turn items over to the Owner where indicated at site.

.6 Remove items from building in designated area only or as directed by Owner's Representative. Provide disposal chutes and dumpsters with suitable tarp coverings only where indicated and/or where approved by Owner's Representative.

3.4 Miscellaneous Removals and Re-Installation

.1 Remove all miscellaneous items noted and as required to carry out the work of this and other sections. Take precautions to prevent damage to items being re-installed. Remove fastenings. Patch fastener holes prior to the installation of new finishes.

.2 Coordinate with Section 09 91 00 for repainting prior to reinstallation where necessary.

.3 Provide required fastenings. Reinstall unless noted otherwise. Use existing fastener holes where practicable. Drill new holes where required; do not use impact type tools. Reinstall items square, plumb and aligned true to building lines.

.4 Where noted or specified, turn items over to other trades for reinstallation.

3.5 Removal of Existing Interior Finishes

.1 Remove existing finishes to extent indicated, and as required by the work. Patch surfaces which will be exposed in finished work and make good.

3.6 Restoration

.1 Mechanical and electrical disconnection’s, removal and reinstallation shall be carried out by their respective trades to the requirements of this Section.

3.7 General Patching and Making Good

.1 Carry out patching and making good of assemblies and finish surfaces to remain in the completed work. Include all openings and damage caused by demolition work of all trades.

.2 Blend patching with existing surfaces. Patching shall be better quality workmanship than adjacent surfaces being blended to.

.3 Patch and restore openings and damage to sound rated assemblies caused by the demolition work to maintain the assembly sound rating.

.4 Patch and restore openings and damage to fire rated assemblies caused by the demolition work to maintain the assembly fire rating.

.5 Patch and restore openings and damage to finish surfaces which will remain exposed in the completed work.

3.8 Reinstallation of Removed Items

.1 Reinstall existing items as indicated except where specified to be reinstalled under other sections.

.2 Protect items for reinstallation. Restore finish where damaged. Re-adjust operating parts for correct operation. Modify as required to suit new work.

.3 Use original fasteners or suitable replacements.

END

PART 1 - GENERAL

1.1 Section Includes

.1 Blocking in wall and roof openings.

.2 Wood furring and grounds.

.3 Framing and miscellaneous wood blocking, curbs and grounds.

.4 Wall and Roof framing: load bearing and non-load bearing.

.5 Wall and roof sheathing.

.6 All associated fasteners and hardware.

1.2 Related Sections

.1 Section 07 21 00 - Building Insulation.

.2 Section 07 31 13 - Asphalt Shingles.

1.3 References

.1 CANPLY (Canadian Plywood Association) - Canadian Plywood Handbook.

.2 CSA B111-1974 (R2003) - Wire Nails, Spikes and Staples.

.3 CSA O141-05 - Softwood Lumber.

.4 CSA O151-04 - Canadian Softwood Plywood.

.5 National Lumber Grades Authority (NLGA) - Standard Grading Rules for Canadian Lumber 2005.

.6 CSA-086-01 (R2000), Engineering Design in Wood (Limit States Design)

.7 ASTM A-307-00, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI tensile strength.

.8 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.

.9 CSA-O437 Series-93 (R2006), Standards on OSB and Waferboard.

.10 CSA O325-07, Construction Sheathing.

.11 CSA B34, Miscellaneous Bolts and Screws.

1.4 Submittals for Review

.1 Submit to Section 01 33 00 – Submittal Procedures.

.2 Product Data:

.1 Submit for each adhesive, sealant or coating product supplied by this Section. Submit for panel products supplied by this Section.

1.5 Quality Assurance

.1 Lumber Products: Graded and stamped to NLGA requirements.

.2 Plywood Products: Certified and graded to CANPLY requirements.

.3 OSB in accordance with CSA standards.

1.6 Delivery, Storage and Protection

.1 Protect materials from warping or other distortion by stacking in vertical position.

PART 2 - PRODUCTS

2.1 Lumber Material

.1 Lumber: NLGA (Standard Grading Rules for Canadian Lumber).
.1 CSA O141, softwood SPF species, Grade 2. Dimension sizes indicated.
.2 19 percent maximum moisture content.
.3 Regional Material: Wood members shall be sourced from timber grown and extracted within 800 km of the Project Site.

.2 Furring, blocking, nailing strips, grounds. Rough bucks, fascia backing and sleepers.

.1 Board sizes: “Standard” or better grade.
.2 Dimensions sizes: “Standard” light framing of better grade.
.3 Post and timbers sizes: “Standard” or better grade.
.4 Regional Material: Wood members shall be sourced from timber grown and extracted within 800 km of the Project Site.

.3 Plywood:

.1 Douglas Fir Plywood (DFP): to CSA O121, Urea-Formaldehyde free, thickness as indicated, grade stamped in accordance with CANPLY and as follows:
.2 CSA O151 (CSP), CANPLY Grade SHG; unsanded, exterior use, thicknesses as indicated; Urea-Formaldehyde free.
.1 General use and equipment mounting boards: Sheathing (SHG).
.2 Exterior use: Sheathing (SHG): exterior grade, tongue and groove, thickness as indicated.
.3 Pressure preservative treatment: to CSA O80.9, plywood to CSA O151 and graded as specified.

2.2 Accessories

.1 In accordance with Part 9 of NBCC 2005 as supplemented by following requirements except where specific type is indicated elsewhere herein or on the drawings.

.2 Embedded Anchor Rods: Galvanized threaded rod to CSA G40.20/G40.21, Grade 300W, complete with same-strength nuts and washers, size as shown on Drawings.

.3 Fasteners and Anchors:

.1 Fasteners: Hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.

.2 Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt fastener for anchorages to steel.

.4 Resilient Furring: to ASTM C645.

.5 Sill Plate Gasket: 6 mm thick, plate width, closed cell polyethylene foam from continuous rolls.

.6 Fasteners for wood:

.1 Nails, spikes and staples: to CSA B111.
.2 Bolts: [12.5] mm diameter unless indicated otherwise, complete with nuts and washers.
.3 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

.7 Framing Anchors:

.1 Framing anchors, truss anchors, and strap ties: galvanized sheet steel. Anchors and strap ties to be of type and thickness as shown on the structural drawings. See details and notes on drawings for details.
.2 Install nails in each hole provided in each anchor.

PART 3 - EXECUTION

3.1 Construction

.1 Comply with requirements of NBC 2010, Part 9, unless these specification or requirements shown on the drawings are more restrictive in which case the more restrictive requirements shall apply.

.2 Prior to commencing work, field verify all existing conditions and dimensions and fabricate members as required to suit existing. Report discrepancies to the Owner.

3.2 Framing and Curbing

.1 Set members level and plumb, in correct position.

.2 Place horizontal members, crown side up.

.3 Construct curb members of single pieces.

.4 Space framing and furring as indicated.

.5 Place foam sill plate gasket under framed assemblies in contact with concrete surfaces.

.6 Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.

.7 Coordinate curb installation with installation of decking and support of deck openings, roofing vapour retardant, and parapet construction.

.8 Construct continuous members from pieces of longest practical length.

.9 Make adequate provision for all possible erection stresses.

.10 Securely brace members in place to maintain plumb and true until permanently fixed and held in structure.

.11 Provide fasteners and anchors at locations as shown or specified on the drawings.

3.3 Openings

.1 Frame and block openings for support of door and window frames, and other equipment, as indicated.

3.4 Electrical and Mechanical Equipment Mounting Boards

.1 Fabricate boards using 19 mm plywood sheathing with 19 mm x 38 mm furring around perimeter and intermediate members spaced maximum 300 mm o.c. vertically. Size the back board by 300 mm beyond size of electrical panel.

.2 Provide fire retardant painted finish in accordance with Section 09 91 00.

3.5 Blocking and Furring

.1 Provide solid blocking in walls where required for support of wall-mounted fixtures and assemblies.

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

.3 Fabricate locker base structure as required by locker manufacturer for field fabricated bases.

3.6 Sheathing

.1 Secure sheathing to framing members with ends over firm bearing and staggered and as specified on the drawings.

.2 Install sheathing to locations shown on the drawings.

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

3.7 Connectors

.1 Install nails or bolts in each hole provided in each framing anchor, tie down, strap, hold down, etc.

3.8 Nailing Strips, Grounds and Rough Bucks

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

END

PART 1 - GENERAL

1.1 Related Sections

.1 Section 06 10 00 - Rough Carpentry

.2 Section 08 11 13 - Standard Metal Doors and Frames.

1.2 References

.1 American Society for Testing and Materials (ASTM).

.1 ASTM C612-04, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
.2 ASTM C665-98, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
.3 ASTM C1320-99, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
.4 ASTM D2369-04, Standard Test Method for Volatile Content of Coatings.

.2 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S701-97, Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
.2 CAN/ULC-S702-97, Thermal Insulation, Mineral Fibre for Buildings.
.3 CAN-ULC-S710.1-05, Standard for Thermal Insulation - Bead - Applied One Component Polyurethane Air Sealant Foam, Part 1.
.4 CAN-ULC-S710.2-05, Standard for Thermal Insulation - Bead-Applied One Component Polyurethane Air Sealant Foam, Part 2.

.3 Scientific Certification Systems (SCS)

.1 Specification SCS-RRC-01, Certification Specifications for Recycled and Recovered Content.

.4 Greenguard Environmental Institute (GEI)

.1 Greenguard Certification Standards for Low Emitting Products for the Indoor Environment.

.5 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).

1.3 Submittals

.1 Submit in accordance with Sections 01 33 00 – Submittal Procedures.

.2 Product Data:

.1 Submit product data and manufacturer's installation recommendations for each product specified.
.2 Submit for each sealant and adhesive product supplied by this Section.

1.4 Mock-Ups

.1 Comply with Section 01 33 00 – Submittal Procedures for requirements for mock-up.

.2 Coordinate the Work of this Section with erection of Work by others.

1.5 Quality Assurance

.1 Installer Qualifications: Qualified by manufacturer to install manufacturer's products, and who has completed installations similar in design, scope and scale to those indicated for this Project.

1.6 Delivery, Storage and Handling

.1 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

.2 Protect from exposure to harmful environmental conditions at temperature and humidity conditions recommended by manufacturer.

PART 2 - PRODUCTS

2.1 Rigid Insulation

.1 Type 4 Rigid Extruded Polystyrene Insulation (XPS): to CAN/ULC-S701, Type 4, ship lapped edge for single layer applications, CFC free and HCFC free:

.1 Compressive Strength: General use 210 kPa (30 psi) and high density 415 kPa (60 psi) where indicated.
.2 Thickness: as indicated on Drawings.
.3 Acceptable Product:
.1 General Use: Owens Corning Foamular C-300, DOW Styrofoam SM or approved equal.
.2 High Density: Owens Corning Foamular 1000, DOW Styrofoam Highload 100 or approved equal.

2.2 Foam Sealant

.1 Expanding Foam Insulation and Sealant: CAN/ULC-S710.1, single component, low expanding polyurethane foam. Compatible with specified rigid insulation.

.1 VOC Limit: < 250 g/l (2.92 lb/gal) when tested in accordance with USEPA Method 24 and ASTM D2369.
.2 Acceptable Products: DAPtex latex Multi-Purpose, DOW Enerfoam, Hilti CF812 or approved equal.

PART 3 - EXECUTION

3.1 Examination

.1 Examine the areas and conditions where building insulation is to be installed and identify any conditions detrimental to the proper and timely completion of the work.

.2 Do not proceed with the work until unsatisfactory conditions are corrected.

3.2 Preparation

.1 Clean substrates of substances harmful to insulation or vapour retarders, including removing projections capable of puncturing vapour retarders or interfering with insulation attachment.

.2 Clean all surfaces free of dirt, grime, grease, oil or other substances which would be detrimental to proper bond of adhesives.

3.3 Installation - General

.1 Install insulation after building substrate materials are dry.

.2 Comply with insulation manufacturer's written instructions and recommendation applicable to products and application indicated.

.3 Install insulation in largest possible size to cover areas indicated on Drawings, closely butted together at sides, ends, and against walls, and structural members.

.4 Extend insulation to the full thickness shown over entire area to be insulated. Neatly cut and fit insulation tightly around obstructions, projections such as pipes, conduits, hangers and other elements, and fill voids with insulation. Remove debris in conflict with insulation installation.

.5 Fit insulation tight around and behind electrical boxes, plumbing and heating pipes and ducts.

.6 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures.

.7 Do not install any insulation that becomes damaged during the course of installation or is no longer in a physical condition to function for the use intended and replace with new material.

.8 Exercise care to avoid damage and soiling of faces on insulation units which will remain exposed to view. Abut joints accurately with adjoining surfaces set flush.

.9 Attach insulation in a manner to ensure stability and eliminate sagging.

.10 Apply a single layer of insulation to the required thickness, unless a double layer is required, to make up the total thickness shown.

.11 Concealed layers of material will not have a vapour retarder facing.

.12 Offset both vertical and horizontal joints in multiple layer applications.

.13 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

3.4 Installation of Expanding Foam Sealant

.1 Apply expanding foam to fill irregular voids and cracks and to interface with building envelope, and around doors, windows, louvres and other openings in exterior walls.

.2 Apply foam sealant to locations shown on Drawings and as described herein.

.3 Apply expanding foam in accordance with CAN/ULC S710.2 and the manufacturer’s written instructions.

.4 Apply foam to underside of roof drains and adjacent roof deck.

.5 Foam fill shim spaces around perimeter of openings for frames of doors, windows and curtain walls.

.6 Foam fill annular space around pipes, electrical boxes, conduits, etc, in insulated walls and roofs.

.7 Finished surface of foam to be free of voids and imbedded foreign objects. Maintain cured skin.

.8 Remove masking materials and over spray from adjacent areas immediately after foam surface has hardened.

END

PART 1 - GENERAL

1.1 Section Includes

.1 Self-adhering sheet air and vapour barrier (AVB membrane) in exterior wall assemblies.

.2 Self-adhesive transition membranes and accessories for air and vapour barrier continuity.

.3 Testing for membrane adhesion.

1.2 Related Sections

.1 Section 06 10 00 - Rough Carpentry.

.2 Section 07 92 00 - Joint Sealants

.3 Section 08 11 13 - Standard Metal Doors and Frames.

1.3 References

.1 ASTM D4263-83(2005), Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.

.2 ASTM D4541-02, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.

.3 ASTM E96/E96M-10, Standard Test Methods for Water Vapor Transmission of Materials.

.4 ASTM E283-04, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.5 ASTM E783-02, Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.

.6 ASTM E1105-00, Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain

Walls by Uniform or Cyclic Static Air Pressure Difference.

.7 ASTM E1186-03, Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems.

1.4 Performance Requirements

.1 Install air and vapour barrier components and assemblies to resist air leakage caused by static air pressure across exterior wall assemblies and other interruptions to the integrity of the building enclosure systems as follows:

.1 Maximum air leakage rate of 0.02 L/sec·m² when subjected to a pressure differential of 75 Pa as measured in accordance with ASTM E283.
.2 Maximum vapour permeance of 2.0 ng/Pa·s·m² when tested according to ASTM E96.

.2 Air and vapour barrier system to be a continuous barrier to air infiltration, air exfiltration and water vapour transmission.

.3 Air and vapour barrier system to act as a liquid water drainage plane, flashed to discharge condensation or water penetration.

.4 Connections to Adjacent Materials: Provide connections to prevent air leakage and vapour migration at the following locations:

.1 Foundation and walls, including penetrations, ties and anchors.
.2 Walls, windows, curtain walls, storefronts, louvers or doors.
.3 Different wall assemblies, and fixed openings within those assemblies.
.4 Wall and roof connections.
.5 Floors over unconditioned space.
.6 Walls, floor and roof across construction, control and expansion joints.
.7 Walls, floors and roof to utility, pipe and duct penetrations.
.8 Seismic and expansion joints.

.9 All other leakage pathways in the building envelope.

.5 Make all penetrations of the AVB membrane and paths of air infiltration/exfiltration airtight.

1.5 Submittals

.1 Section 01 33 00: Submittal procedures.

.2 Product Data: Provide data indicating material characteristics, performance criteria, and limitations. Include data sheets for membrane, primers, and sealants.

.3 Manufacturer's Installation Instructions: Indicate preparation, installation requirements and techniques, and product storage and handling criteria.

1.6 Qualifications

.1 Applicator: Company specializing in performing the work of this section with minimum 5 years documented experience.

1.7 Pre-Installation Meeting

.1 Convene one week prior to commencing work of this section.

1.8 Environmental Requirements

.1 Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

.2 Do not apply AVB membrane to damp or wet substrates.

.3 Do not install AVB membrane in snow, rain, fog or mist.

1.9 Coordination

.1 Coordinate the work of this section with all sections referencing this section.

1.10 Warranty

.1 Material Warranty: Provide manufacturer’s standard product warranty, for a minimum 3 years from date of Substantial Performance.

.2 Installation Warranty: Provide installer’s 2 year warranty from date of Substantial Performance, including all components of the air and vapour barrier assembly, against failures including loss of air tight seal, loss of watertight seal, loss of adhesion, loss of cohesion, failure to cure properly.

PART 2 - PRODUCTS

2.1 Sheet Materials

.1 Exterior Wall Air Barrier: Self-adhering reinforced sheet air barrier membrane, water resistant and vapour permeable, provide primer and lap sealant where recommended by manufacturer:
  .1 Air leakage: <0.02L/s/m2 @ 75Pa when tested in accordance with ASTM E2178.
  .2 Water Vapour Permeance: 29 perms to ASTM E96, Method B.
  .3 Acceptable Product: Bakor Blueskin VP160 or approved equivalent.

.2 Transition Membrane: Self-adhering transition membrane, SBS-modified membrane, minimum 1.0 mm (40 mil) thickness. Top face of membrane to be compatible with subsequent coverings. Provide primer and lap sealant where recommended by manufacturer:
  .1 Air permeability to ASTM E283: < 0.02 L/sec·m² (< 0.004 cfm/ft²)
  .2 Water vapour permeability to ASTM E96: < 2.0 ng/Pa·s·m² (< 0.035 perm)
  .3 Acceptable Products: Bakor Blueskin SA, Grace Perm-A-Barrier, IKO AquaBarrier AVB, Meadows Air-Shield, or approved equal.

2.2 Accessories

.1 Seam tape: Air barrier manufacturer's proprietary or recommended tape, high tack adhesive, UV resistant.

.2 Sealant: Butyl type; to Section 07 92 00.

.3 Select primer based on environmental and substrate conditions at the time of installation.

.4 Penetration and Termination Sealant and Mastic: elastomeric, trowel grade or gunnable material supplied by AVB membrane manufacturer.

PART 3 - EXECUTION

3.1 Examination

.1 Examine substrates, areas, and conditions under which air and vapour barrier assemblies will be applied, with Applicator present, for compliance with requirements.

.2 Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

.3 Ensure that surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants.

.4 Ensure that concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions.

.5 Ensure that masonry joints are flush and completely filled with mortar, and all excess mortar sitting on masonry ties has been removed.

.6 Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263 and take suitable measures until substrate passes moisture test.

.7 Verify sealants used in sheathing are compatible with AVB membrane. Perform field peel-adhesion test on materials to which sealants are adhered.

.8 Do not install AVB membrane until items penetrating it are in place.

.9 Notify Departmental Representative in writing of anticipated problems using AVB membrane over substrate prior to proceeding.

3.2 Surface Preparation

.1 Clean, prepare, and treat substrate according to AVB membrane manufacturer's written instructions.

.2 Prime masonry and concrete substrates with conditioning primer.

.3 Prime glass-fiber surfaced gypsum sheathing with an adequate number of coats to achieve required bond, with adequate drying time between coats.

.4 Prime sheathing, wood, metal, and painted substrates with primer.

.5 Apply primer at rate recommended by manufacturer prior to membrane installation. Allow primer to dry completely before membrane application. Apply as many coats as necessary for proper adhesion.

.6 Perform membrane adhesion tests over each substrate to which AVB membrane is to be installed.

.7 Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air and vapour barrier and at protrusions.

3.3 Installation

.1 Install AVB membrane to provide continuity throughout the building envelope. Install materials in accordance with manufacturer's written recommendations and the following:

.1 When membrane is properly positioned, press into place and roll membrane with roller immediately after placement.
.2 Overlap adjacent sheets in accordance with manufacturer's written recommendations. Roll seams with roller.
.3 Install membrane in shingle fashion starting at lowest course.
.4 Seal around all penetrations with termination mastic, sealant, or membrane tape in accordance with manufacturer’s written recommendations.
.5 Install transition membrane through built-up assemblies at building intersections and roof-to-wall intersections. Coordinate with applicable sections.
.6 Install transition membrane between window and door frames and other openings indicated, and adjacent vapour barrier and seal edges with sealant. Position laps over firm bearing.
.7 Connect AVB membrane continuously to roof vapour barrier, concrete belowgrade structures, windows, curtain wall, storefront, louvers, exterior doors and other intersection conditions.
.8 Provide transition membrane at changes in substrate plane under AVB membrane to eliminate sharp inside corners and to smooth transition from one plane to another.
.9 Provide mechanically fastened non-corrosive metal sheet to span gaps in substrate plane and to smooth transition from one plane to another. Continuously support AVB membrane at all transitions.
.10 Provide backup for AVB membrane at deflection and control joints to accommodate anticipated movement.
.11 Provide transition at expansion and seismic joints assemblies.

3.4 Field Quality Control

.1 Cooperate with Departmental Representative’s testing agency. Allow access to work areas and staging.

.2 Notify Owner’s testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.

.3 Do not cover Work of this Section until testing and inspection is accepted.

3.5 Cleaning and Protection

.1 Protect air and vapour barrier assemblies from damage during application and remainder of construction period, according to manufacturer's written instructions.

.2 Do not allow materials to come in contact with chemically incompatible materials.

.3 Do not expose AVB membrane to sunlight longer than recommended by the manufacturer.

.4 Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer.

END

PART 1 - GENERAL

1.1 Summary

.1 This Section specifies the provision of a complete watertight roofing installation, and includes but is not limited to; metal work and minor carpentry work.

1.2 Section Includes

.1 Glass-mat asphalt shingle roofing.

.2 Ice dam protection, eave, valley and ridge protection.

.3 Associated metal flashings and accessories.

1.3 References

.1 ASTM A653/A653M-01a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 Canadian roofing Contractors' Association (CRCA) Roofing Specifications manual.

.3 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.

.4 CAN/CSA-A123.1/A123.5-98, Asphalt Shingles Made From Organic Felt and Surfaced With Mineral Granules/Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules.

.5 CAN3-A123.51-M85 (R2001), Asphalt Shingle Application on Roof Slopes 1:3 and Steeper.

.6 CAN3-A123.52-M85 (R2001), Asphalt Shingle Application on Roof Slopes 1:6 to Less Than 1:3.

.7 CSA B111-1974 (R1998), Wire Nails, Spikes and Staples.

.8 CSA O141-05 – Softwood Lumber.

.9 CGSB 37-GP-56M-80b (A1985) Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

1.4 Submittals

.1 Submit in accordance with Section 01 33 00

.2 Product Data: Provide data indicating material characteristics, performance criteria and limitations for shingles, underlayment.

.3 Samples:

.1 Submit two (2) samples of each shingle colour indicating colour range and finish texture/pattern; for colour selection.
.2 Submit 300 mm long sample piece of metal flashing in specified colour.

.4 Manufacturer’s Instructions: Indicate installation criteria and procedures for installation of asphalt shingles.

1.5 Quality Assurance

.1 Perform Work in accordance with CRCA Roofing Specifications Manual.

.2 Roofing Contractor to have a minimum of five years proven satisfactory experience. When requested, provide a list of the last three comparable jobs including; job name, job location, and project manager.

1.6 Delivery, Storage and Handling

.1 Deliver, handle, store and protect materials in accordance with manufacturer’s written instructions.

.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Remove only in quantities required for same day use.

1.7 Extra Materials

.1 Provide one unopened bundle of shingles from same production run and dye lot as shingles installed.

.2 All unused shingles remain property of Owner.

PART 2 - PRODUCTS

2.1 Roofing Materials

.1 Glass Mat Shingles: to CSA A123.5, architectural laminate glass fibre mat reinforced:

.1 High Wind Warranty: 180 km/h.
.2 Colour – to be chosen by the Departmental Representative.
.3 Acceptable Product: BP Manoir, IKO Cambridge or approved equal.

2.2 Metal Flashings

.1 Prepainted Steel Sheet: to ASTM A653, 26 gauge, form to profiles indicated; colour selected by Departmental Representative to match shingles.

.2 Exposed Fasteners: Plastic-covered or prepainted socket head, self-drilling screws. Head colour to match sheet metal.

.3 Fabrication:

.1 Form flashings to profiles indicated on Drawings, and to protect roofing materials from physical damage and shed water.
.2 Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.
.3 Hem exposed edges of flashings minimum 6 mm on underside.

2.3 Accessories

.1 Underlayment: Self-Adhered SBS modified bitumen reinforced membrane, 1.0mm thick. Acceptable Manufacturer; Bakor Blueskin ROOF RF 200 or approved equivalent.15 lb.

.2 Eave Protection: Self-adhering membrane, slip resistant surface, minimum thickness 1.0 mm, provide complete with primer.

.3 Shingle Nails: to CSA B111, round wire shingle type, hot dip galvanized steel, 10 or 12 gauge, barbed or deformed shank, minimum 9.5 mm head diameter, sufficient length to just penetrate through nailable sheathing.

.4 Sealants:

.1 Exposed Sealant: Silicone type to ASTM C902, Type S, Grade NS, Class 25, single component neutral cure silicone sealant, plus minus 50% joint movement capability; colours to match adjacent shingles.

.2 Lap Sealant: Buty 1 type to ASTM C1311, single component, solvent release, non-skinning, non-sagging high-temperature resistant, black colour.

PART 3 - EXECUTION

3.1 Examination

.1 Verify deck surfaces are dry, free of ridges, warps or voids.

3.2 Preparation

.1 Fill knot holes and surface cracks with latex filler at areas of bonded eave protection. Cover knot holes with sheet metal.

3.3 Installation – Eave Protection

.1 Place eave drip edge and gable drip edge metal flashings tight with facia boards. Weather lap

joints 50 mm and seal with plastic cement. Secure flange with nails spaced 4 mm on centre.

.2 Install self-adhering membrane in accordance with manufacturer’s written instructions.

.3 Lap joints minimum 100 mm.

.4 Extend eave protection membrane minimum 600 mm up-slope beyond interior face of exterior wall.

3.4 Installation – Underlayment

.1 Place underlayment over entire roof area and as second layer over eave protection, with ends lapped minimum 100 mm. Overlap coursing of underlying layer by half sheet. Lap valley flashings minimum 100 mm. Stagger end laps of each consecutive layer. Back nail in place in laps only.

.2 Install underlayment perpendicular to slope of roof.

.3 Weather lap and seal watertight with plastic cement items projecting through or mounted on roof.

3.5 Installation – Metal Flashing and Accessories

.1 Weather lap joints minimum 50 mm and seal weather tight with plastic cement.

.2 Secure in place with nails at 100 mm on centre. Conceal fastenings.

.3 Flash and seal work weather tight, projecting through or mounted on roofing with plastic cement.

3.6 Shingle Application

.1 Do asphalt shingle work in accordance with CAN3-A123.51, CAN3-A123.52 and CRCA Specification except where specified otherwise.

.2 Install shingles in accordance with manufacturer’s written instructions using nails. Staples not acceptable.

.3 Apply daub of adhesive to underside of each shingle tab during installation.

.4 Install shingle starter strip in accordance with manufacturer’s written instructions.

.5 Project first course of shingles 19 mm beyond fascia boards.

.6 Extend shingles 13 mm beyond face of gable edge fascia boards.

.7 Cap hips and ridges with individual shingles, maintaining 125 mm weather exposure. Place to avoid exposed nails.

.8 Coordinate installation of roof mounted components or work projecting through roof with weather tight placement of counter flashings.

.9 Complete installation to provide weather tight service.

3.7 Protection of Finished Work

.1 Do not permit traffic over finished roof surface.

END

PART 1 - GENERAL

1.1 Related Work

.1 Rough Carpentry: Section 06 10 00.

.2 Sheet Metal Flashing & Trim: Section 07 62 00.

1.2 References

.1 CSA Bill-R2003 Wire nails, Spikes and Staples.

.2 CAN/CGSB-51.32-M77 Sheathing, Membrane, Breather Type.

.3 National Building Code of Canada (NBC) 2010.

1.3 Storage & Handling

.1 Provide and maintain dry, off-ground weatherproof storage.

.2 Remove only in quantities required for same day use.

1.4 Unused Materials

.1 All unused shingles and shakes remain property of Owner.

PART 2 - PRODUCTS

2.1 Materials

.1 Cedar shingles: to CSA 0118.1 knot free 450 mm length, 140 mm (5 5/8”) width, Native Eastern White Cedar, Grade A, 11 mm (7/16”) butt.

.2 Nails: to CSA B111, hot dipped electrogalvanized, 1.9 mm thick with minimum head diameter of 5 mm and of sufficient length to completely penetrate underlying sheathing, as recommended by shingle manufacturers.

.3 Sealants: by Section 07 92 00.

2.2 Underlayment

.1 Rigid 12 mm thick PVC sheet, nailed to sheathing.

.2 1220 x 2440 sheet size.

.3 Acceptable Product: Vent Grid 12.

PART 3 - EXECUTION

3.1 Installation

.1 Install one layer of air barrier horizontally by stapling, lapping edges 150 mm (6”).

.2 Install sill flashings, wood starter strips, internal and external corners, edgings and flashings over openings. Apply corner and header boards in maximum practicable lengths, bevel cut joints and seal.

.3 Install wood shingles in general accordance with MBC 2010 using double starter course at base. Space 3 mm (1/8”) apart, stagger joints 38 mm (1-1/2”) minimum in successive courses ensuring that no joints are in alignment in any 3 courses. Use 2 nails per shingle, space 19 mm (3/4”) from edges and set 38 mm (1-1/2”) above butt line of following course. Drive flush but do not crush shingle face. Weather exposure 150 mm (6”) maximum.

.4 Apply sealant in accordance with section 07 92 00 with neat, consistent bead.

END

PART 1 - GENERAL

1.1 Section Includes

.1 Brake-formed flashing at openings for roof and gable end flashings.

1.2 Related Sections

.1 Section 07 31 13 - Asphalt Shingles.

.2 Section 07 92 00 - Joint Sealants.

1.3 References

.1 American Society for Testing and Materials (ASTM International).

.1 ASTM A653/A653M-01a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

1.4 Submittals

.1 Section 01 33 00 - Submittal procedures.

.2 Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

.3 Submit two samples 50 x 50 mm in size illustrating metal finish colour.

1.5 Qualifications

.1 Fabricator and Installer: Company specializing in sheet metal flashing work with 5 years documented experience.

1.6 Delivery, Storage and Handling

.1 Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to

provide ventilation. Slope metal sheets to ensure drainage.

.2 Prevent contact with materials which may cause discolouration or staining.

PART 2 - PRODUCTS

2.1 Sheet Materials

.1 Prepainted Galvanized Steel Sheet: ASTM A653/A653M, 22 gauge (0.026 inch) zinc coated galvanized steel sheet. Custom colours selected by Departmental Representative from unrestricted range.

2.2 Accessories

.1 Fasteners: Finish exposed fasteners same as flashing metal. Permitted only on approval of Departmental Representative.

.2 Exposed Sealant: Silicone type, as specified in Section 07 92 00 – Joint Sealants; colour to match sheet metal finish.

.3 Bedding Sealant: Butyl, as specified in Section 07 92 00 – Joint Sealants.

.4 Protective Backing Paint: Bituminous.

2.3 Fabrication

.1 Form sections true to shape, accurate in size, square, and free from distortion or defects.

.2 Fabricate cleats of same material as sheet, minimum 50 mm wide, interlockable with sheet.

.3 Form pieces in longest possible lengths.

.4 Hem exposed edges on underside 13 mm; mitre and seam corners.

.5 Form material with flat lock seams.

.6 Fabricate vertical faces with bottom edge formed outward 6 mm and hemmed to form drip.

.7 Fabricate flashings to profiles indicated. Coordinate installation with work of other sections.

2.4 Finish

.1 Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 0.4 mm.

PART 3 - EXECUTION

3.1 Preparation

.1 Install starter and edge strips, and cleats before starting installation.

3.2 Installation

.1 Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.

.2 Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

.3 Seal metal joints watertight.

END

PART 1 - GENERAL

1.1 Section Includes

.1 Preparing substrate surfaces.

.2 Sealant and joint backing.

1.2 Related Sections

.1 Section 07 31 13 - Asphalt Shingles

.2 Section 07 62 00 - Sheet Metal Flashing and Trim.

.3 Section 08 11 13 - Standard Metal Doors and Frames.

1.3 References

.1 American Society for Testing and Materials(ASTM).

.1 ASTM C834-00e1, Standard Specification for Latex Sealants.
.2 ASTM C919-02, Standard Practice for Use of Sealants in Acoustical Applications.
.3 ASTM C920-02, Standard Specification for Elastomeric Joint Sealants.
.4 ASTM D2369-04, Standard Test Method for Volatile Content of Coatings.
.5 ASTM D5893-96, Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements.

.2 United States Environmental Protection Agency (USEPA)

.1 Reference Test Method 24 - Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings.

.3 American Society for Testing and Materials (ASTM)

.1 ASTM D2369-04, Standard Test Method for Volatile Content of Coatings.

1.4 Submittals for Review

.1 Submit in accordance with Sections 01 33 00 – Submittal Procedures.

.2 Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and colour availability.

.3 Samples: Submit two sample ribbons of sealant, illustrating sealant colours for selection.

.4 Submit laboratory tests or data validating product compliance with performance criteria specified. Include SWRI validation certificate where required.

.5 Closeout Submittals: Sealant applicator to submit copies of the Manufacturer's Warranty.

1.5 Submittals for Information

.1 Submit in accordance with Sections 01 33 00 – Submittal Procedures.

.2 Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, perimeter conditions requiring special attention, and field quality control testing.

1.6 Quality Assurance

.1 Installer Qualifications: Qualified to perform work specified by reason of experience or training provided by product manufacturer. Submit reference list including minimum three projects of similar size and scope.

.2 Adhesion Pull Tests: the number of adhesion pull tests to be determined by manufacturer’s weatherseal warranty. Adhesion pull tests to be conducted by or in the presence of manufacturer’s representative. Manufacturer to supply Departmental Representative with results of

adhesion pull tests. Sealant installer responsible for repairing areas where adhesion pull tests are conducted, without change to the Contract price.

.3 Manufacturer’s Representative: Coordinate with manufacturer’s representative to provide access to completed work areas until adhesion pull tests can be completed.

1.7 Delivery, Storage and Handling

.1 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

.2 Store products in a location protected from freezing, damage, construction activity, precipitation, and direct sunlight in strict accordance with manufacturer's recommendations.

.3 Condition products to approximately 16 to 21°C for use in accordance with manufacturer's recommendations.

1.8 Environmental and Safety Requirements

.1 VOC Limitations: for all materials supplied by this Section, the total VOC content will be less than or equal to 250 g/L, less water, when tested to ASTM D2369.

.2 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada.

.3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.4 Dispose used sealants and cartridges in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.9 Warranty

.1 Provide manufacturer’s twenty year material warranty for installed silicone sealant.

PART 2 - PRODUCTS

2.1 Sealant Materials

.1 VOC Limit - Typical for all sealants: < 250 g/l (2.08 lb/gal) when tested in accordance with USEPA Method 24 and ASTM D2369.

.2 Acoustical sealant: to ASTM C919, single component, non-hardening, non-skinning, synthetic rubber. Acceptable product: Tremco Acoustical Sealant, Pecora BA-98

.3 Acrylic latex: to ASTM C 834, single component general purpose siliconized acrylic latex sealant. Acceptable product: BASF Sonnolastic Sonolac, GE L100, Tremco Tremflex 834, Pecora AC-20 + silicone

.4 Butyl Sealant: to ASTM C1311, single component, solvent release, non-skinning, nonsagging, black colour; Acceptable Products: Tremco Butyl Sealant, Pecora BA-98

.5 Epoxy, flexible: Poured flexible 100% solids epoxy joint filler. Acceptable product: BASF Epolith-P, Sika Loadflex 2, Masterseal CR190

.6 Polyurethane Sealant, below grade compatible: Two-component, non-sag to ASTM C920, Type M, Grade NS, Class 25; with ±25% movement capability for vertical joints. Acceptable products: Sika Sikaflex 2C/NS, Pecora Dynatrol II

.7 Polyurethane, self-levelling: to ASTM C 920, Type S, Grade P, Class 25, single component self-levelling polyurethane sealant with plus or minus

25 percent movement capability for horizontal joints. Acceptable product: BASF Sonolastic SL1, Tremco Vulkem 45, Sika Sikaflex 1C SL.

.8 Silicone, one part: to ASTM C 920, Type S, Grade NS, Class 25, single component neutral cure silicone sealant, plus minus 50% joint movement capability. Acceptable product: Dow Corning 795, Tremco Spectrum 2, BASF Omniseal 50, Pecora 895NST

.9 Silicone, mildew resistant: to ASTM C 920, single component mildew resistant silicone sealant, +/- 25% movement capability. Acceptable product: Tremco Tremsil 200, Dow Corning 786, BASF Omniplus.

2.2 Accessories

.1 Primer: Type recommended by the sealant manufacturer and compatible with joint forming materials.

.2 Joint Cleaner: Non-corrosive and non-staining type recommended by sealant manufacturer and compatible with joint forming materials.

.3 Soft Backer Rod: to ASTM C 1330, non-gassing, reticulated closed-cell polyethylene rod designed for use with cold-applied joint sealants. Size required for joint design.

.4 Closed-Cell Backer Rod: to ASTM C 1330, closed-cell polyethylene rod designed for use with cold-applied joint sealants for on-grade or below-grade applications. Size required for joint design.

.5 Joint Filler: closed-cell polyethylene joint filler designed for use in cold joints, construction joints, or isolation joints wider than 6 mm. Size required for joint design.

.6 Bond Breaker: Pressure-sensitive tape recommended by sealant manufacturer to suit application.

2.3 Colours

.1 Unless indicated otherwise in respective technical specification sections, colour selection is at the option of the Departmental Representative.

2.4 Sealant Schedule

.1 Perimeters of exterior openings where frames meet exterior facade of building. All other exterior applications.

.1 Sealant type: Silicone, one part.

.2 Perimeters of interior door/window frames and surfaces, where required.

.1 Sealant type: Acrylic latex.

.3 Perimeter of washroom fixtures, countertop backsplash at wall.

.1 Sealant type: Silicone, mildew resistant.

.4 Building envelope applications (vapour barrier/vapour barrier, vapour barrier/wall opening, etc):

.1 Sealant type: Acoustical sealant.

.5 Interior partitions and acoustic applications:

.1 Sealant type: Acoustical sealant.

.6 Brick veneer control joints.

.1 Sealant type: Silicone, one part.

.7 Interior concrete control joints and sawcuts.

.1 Sealant type: Epoxy, flexible.

.8 Perimeter of interior concrete slab.

.1 Sealant type: Polyurethane, self-levelling.

.9 For locations not included in this schedule, consult with Departmental Representative for proper selection of sealants.

PART 3 - EXECUTION

3.1 Examination

.1 Verify that substrate surfaces and joint openings are clean, dry, and free of frost and ready to receive work.

.2 Verify that joint backing and release tapes are compatible with sealant.

3.2 Preparation

.1 Remove loose materials and foreign matter which might impair adhesion of sealant.

.2 Clean and prime joints in accordance with sealant manufacturer's written instructions.

.3 Perform preparation in accordance with sealant manufacturer's written instructions.

.4 Protect elements surrounding the work of this section from damage or disfiguration.

3.3 Installation

.1 Install sealant in accordance with sealant manufacturer's written instructions.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.3 Measure joint dimensions and size materials to achieve required 2:1 width/depth ratios.

.4 Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.

.5 Install bond breaker where joint backing is not used.

.6 Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

.7 Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

.8 Tool joints concave.

3.4 Field Quality Control

.1 Joint Sealants: Perform adhesion tests in accordance with manufacturer’s written instructions.

.2 Perform test 21 days after installation at a rate of one test every 300 m of installed sealant.

.3 Remove sealants failing adhesion test, clean substrates, reinstall sealants and perform retesting.

.4 Maintain test log and submit report to Departmental Representative indicating tests, locations, dates, results, and remedial actions.

3.5 Cleaning

.1 Clean adjacent soiled surfaces.

3.6 Protection of Finished Work

.1 Remove masking tape and excess sealant.

.2 Protect sealants until cured.

END

PART 1 - GENERAL

1.1 Related Documents

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Section Includes

.1 The work of this Section includes the provision of all labour, materials, equipment and services required to fabricate and install vinyl windows, as indicated on the drawings, as specified herein and as required for a complete project.

1.3 Related Sections

.1 Section 06 10 00: Rough Carpentry

.2 Section 07 27 00: Sheet Air Barrier

.3 Section 07 62 00: Sheet Metal Flashing and Trim

1.4 References

.1 CAN/CSA-A440-M90 - Windows.

.2 CAN/CGSB-12.8-M76 Insulating Glass Units.

.3 CGSB 79-GP-1M-76 Screens, Aluminum Frame, Window.

1.5 Shop Drawings

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

.2 Indicate materials and details in full scale for head, jamb and sill, profiles of components, interior and exterior trim, junction between combination units, elevations of unit, anchorage details, description of related components and exposed finishes, fasteners and caulking.

.3 Indicate details of insulated units and classification for air and water leakage, wind load and condensation resistance to CAN3-A440-M84.

1.6 Test Reports

.1 Submit test reports from approved independent testing laboratories, certifying compliance with specifications, for:
.1 Insect screens.
.2 Air tightness.
.3 Water tightness.
.4 Wind load resistance.
.5 Condensation resistance.
.6 Energy Star compliance.

1.7 Maintenance Data

.1 Provide operation and maintenance data for windows for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.8 Guarantee

.1 Provide a written guarantee, stating that the windows are guaranteed against leakage, defects and malfunction under normal usage for a Lifetime from the date of Certificate of Completion.

.2 Provide Lifetime warranty on insulated glass units, from date of Certificate of Completion.

.3 Provide warranty on vinyl window frame and sash members for Lifetime from date of Certificate of Completion.

.4 Provide lifetime warranty on hardware components.

PART 2 - PRODUCTS

2.1 Materials for Vinyl Windows

.1 Materials: to CAN3-A440-M90 supplemented as follows:

.2 All vinyl windows by same manufacturer.

.3 Sashes: P.V.C. fusion welded corner construction, fixed over vertical slider type.

.4 Main frame: multi-chambered 3 1/4" (82 mm) wide White P.V.C. 1.1 mm interior and 1.7 mm exterior frame thickness, fusion welded corner construction. Provide alternate price for Beige colour.

.5 Glass:
.1 Insulated glass units: to CAN2-12.8, low emissivity pattern argon filled with outer pane of 1/8" (3 mm) float glass and inner pane of 1/8" (3 mm) float glass with 7/8" (22 mm) total thickness, spacing and spacer type listed as shown on reviewed shop drawings. Warm edge spacer technology required.

.6 Screens: to CGSB 79-GP-1M-76.
.1 Insect screening mesh: count 18 x 16, anti-glare plastic-coated fibrous glass.
.2 Fasteners: tamper proof.
.3 Screen frames: roll formed aluminum, colour to match window frames
.4 Mount screen frames for interior replacement.

.7 Accessories: Installation Brackets factory applied.

2.2 Window Type & Classification

.1 Types: Fixed over vertical slider type and fixed, all with insulated glass units. Acceptable Manufacturers: Kohler - Supreme Series, Global, Extreme or approved equivalent.

.2 Classification rating: to CAN3-A440-M90.
.1 Air leakage: A3.
.2 Water leakage: B7.
.3 Wind load resistance: C5.
.4 Condensation resistance: D1.
.5 Forced Entry: F2.
.6 Insect Screens: HD.
.7 Glazing: G2.

2.3 Fabrication

.1 Fabricate in accordance with CAN3-A440-M90 supplemented as follows.

.2 Fabricate units square and true with maximum tolerance of plus or minus 1/16" (1.5 mm) for units with a diagonal measurement of 6'-0" (1800 mm) or less and plus or minus 1/8" (3 mm) for units with a diagonal measurement over 6'-0" (1800 mm).

.3 Face dimensions detailed are maximum permissible sizes.

.4 Brace frames to maintain squareness and rigidity during shipment and installation.

.5 Finish steel clips and reinforcement with shop coat primer to CGSB 1-GP-40M or 380 g/m^2 zinc coating to CSA G164-1965 (R1972).

2.4 Glazing

.1 Glaze windows in accordance with CAN3-A440-M90.

2.5 Hardware

.1 Hardware: Balance system: block and tackle system with brake shoe, Cam pivot, Cam lock and keeper, White finish.

2.6 Air Barrier & Vapour Retarder

.1 Expanding foam sealant of a type using ozone friendly propellant may be used for this purpose. Acceptable Manufacturer: Tremco Mono Foam, or approved equivalent.

PART 3 - EXECUTION

3.1 Window Installation

.1 Install in accordance with CAN3-A440-M90 Appendix A.

.2 Arrange components to prevent abrupt variation in colour.

3.2 Caulking & Air Barrier Sealant

.1 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip deflectors in bedding compound. Caulk between sill up stand and window frame and butt joints in continuous sills.

.2 Apply sealant and air barrier foam in accordance with Section 07 92 00 – Joint Sealants. Conceal sealant within window units.

END

PART 1 - GENERAL

1.1 Scope

.1 Design, and fabrication of entire skylight to include all extruded aluminum framing and anchors.

.2 Glazing and glazing materials including gaskets, sealants, setting blocks, and related materials.

.3 Finish on metal components.

.4 Installation of the metal framed skylights.

1.2 Related Sections

.1 Section 07 31 13: Asphalt Shingles.

.2 Section 07 62 00: Sheet Metal Flashing and Trim.

1.3 References

.1 Aluminum Association (AA).

.2 American Architectural Manufacturers Association (AAMA).

.3 American Society for Testing and Materials (ASTM).

.4 National Roofing Contractors Association (NRCA).

1.4 Performance Requirements

.1 Skylight framing and dome infill shall be designed to support the following load requirements:
.1 Positive Live Loads: 75 PSF snow load plus dead load.
.2 Negative Live Loads: 40 PSF negative wind or uplift load plus dead load.

.2 Fabrication and installation of skylights shall meet all regional and local building codes for the location of the project.

1.5 Submittals

.1 Shop drawings: Shop drawings as required to fully describe the skylight system shall be submitted and approved by the departmental representative prior to starting any fabrication.

.2 Samples: Finished aluminum samples (color charts or range samples), and plastic glazing samples shall be submitted and approved prior to starting any fabrication.

.3 Submit manufacturer's written warranty as outlined in paragraph 1.07 of this specification.

1.6 Quality Assurance

.1 The skylight manufacturer shall be responsible for the design / fabrication of the skylight assembly.

.2 Substitute manufacturer's will be considered only when all of the following conditions have been satisfied:

.1 Substitute manufacturer's will be approved by departmental representative to bid not less than twenty (20) days prior to bid date.

.2 Detailed drawings for substitute unit skylights are submitted to departmental representative for review.

.3 Prospective manufacturer's will furnish evidence of their ability to perform, including a list of projects of similar design and complexity within the last five (5) years.

.4 Substitute unit skylights will be manufactured by a firm with a minimum of ten (10) years’ experience in the fabrication of unit skylights.

1.7 Warranty

.1 The unit skylights shall be warranted for a period of one (1) year from date of skylight completion, against defects in materials and workmanship.

.2 All aluminum finishes are warranted pursuant to the suppliers standard warranty.

.3 The structural sealant is warranted for one (1) year pursuant to the sealant manufacturer's standard warranty of merchantable quality. Warranty shall certify that cured sealant:
.1 Shall not become brittle or crack due to weathering or normal expansion and contraction of adjacent surfaces.
.2 Shall not change color or bleed significantly when used with compatible backup materials.

PART 2 - PRODUCTS

2.1 Manufacturer

.1 Unit skylights shall be manufactured by: A.I.A. Industries, and Lexusco

2.2 Materials

.1 Framing members:
.1 Framing shall consist of an 0.062" thick retaining angle and 0.072" inner frame extruded from 6063-T5 aluminum.

.2 Fasteners and Anchors:
.1 Exposed fasteners shall be stainless steel or zinc coated, unless otherwise noted.

.3 Glazing Material: Thickness to be determined by codes, glazing area loading conditions and manufacturers recommendations.
.1 Insulating acrylic unit consisting of 6mm clear exterior lite; air space; 6mm clear interior lite. The foam gasket shall allow for independent expansion and contraction of the interior and exterior lites.

.4 Sealants:
.1 Selection of sealants shall be the responsibility of the skylight manufacturer.

.2 All surfaces shall be cleaned and primed within the sealant manufacturers guidelines.

.5 Finishes:

.1 All exposed aluminum shall have a clear anodized aluminum finish.

2.3 Fabrication

.1 Unit skylights shall be shop fabricated.

.2 All welding shall be done by inert gas process.

.3 Unit skylights shall be fabricated using integral condensate gutters and weep systems allowing any water penetration or condensation to drain to the outside.

PART 3 - EXECUTION

3.1 Installation

.1 Unit skylights shall be installed in strict accordance with manufacturer's installation instructions and recommendations.

.2 Prior to installation, installer, shall notify the general contractor of obvious deficiencies or dimensional errors in the support system and/or curb construction. No installation work shall proceed until all such errors and deviations are corrected.

.3 CURB CONSTRUCTION WILL SUPPORT FORCE IMPOSED BY SKYLIGHTS.

.4 Install unit skylights plumb, level and true to line, without warp or rack of frames or panels and anchor securely in place in accordance with approved shop drawings.

.5 Contact areas between dissimilar metals shall be isolated with a protective coating or plastic strip to prevent electrolytic corrosion.

.6 Upon completion of installation, installer shall remove all labels, part number markings and excess sealants from skylight components. Weep system shall be clear of any and all obstructions.

3.2 Final Cleaning

.1 Final cleaning and physical protection of all installed materials shall be the responsibility of the general contractor.

END

PART 1 - GENERAL

1.1 Section Includes

.1 Exterior steel frames and doors.

1.2 Related Sections

.1 Section 07 21 00 - Building Insulation.

.2 Section 07 92 00 - Joint Sealants.

.3 Section 08 71 00 - Door Hardware.

.4 Section 09 91 00 - Painting.

1.3 References

.1 ASTM A653/A653M-04a – Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron alloy-coated (Galvannealed) by the Hot-Dip Process.

.2 CAN4-S104-M80 (R1985) - Fire Tests of Door Assemblies.

.3 CAN4-S105-85 (R1992) - Fire Door Frames Meeting the Performance Required by CAN4-S104.

.4 CAN/ULC-S701-05 - Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.5 CGSB 41-GP-19Ma (1984) Rigid Vinyl Extrusions for Windows and Doors.

.6 CSA G40.20-04/G40.21-04 – General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.7 CSA 0151-04 – Canadian Softwood Plywood.

.8 Canadian Steel Door Manufacturers Association (CSDMA) – Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2000.

.9 Canadian Steel Door and Frame Manufacturers Association (CSDMA) - Selection and Usage Guide for Steel Doors and Frames.

.10 NFPA 80-1999 - Standard for Fire Doors and Fire Windows.

1.4 Submittals for Review

.1 Sections 01 33 00 - Submittal procedures.

.2 Product Data:
.1 Indicate door and frame configurations and finishes, location of cut-outs for hardware reinforcement.

.3 Shop Drawings:
.1 Indicate frame elevations, reinforcement, anchor types and spacing, location of cut-outs for hardware, and finish.
.2 Indicate door elevations, internal reinforcement, closure method, and cut-outs for glazing, and finishes.

1.5 Quality Assurance

.1 Conform to requirements of Canadian Steel Door and Frame Manufacturers Association standards.

1.6 Regulatory Requirements

.1 Fire Rated Door and Frame Construction: Labelled and listed to CAN4-S104M.

.2 Installed Door and Frame Assembly: Conform to NFPA 80 for fire rated class as indicated.

1.7 Delivery, Storage and Protection

.1 Remove doors and frames from wrappings or coverings upon receipt on site and inspect for damage.

.2 Store in vertical position, spaced with blocking to permit air circulation between components.

.3 Store materials on planks or dunnage, out of water and covered to protect from damage.

.4 Clean and touch up scratches or disfigurement caused by shipping or handling with zinc-rich primer.

1.8 Coordination

.1 Coordinate the work with frame opening construction, door, and hardware installation.

.2 Sequence installation to ensure wire connections are achieved in an orderly and expeditious manner.

PART 2 - PRODUCTS

2.1 Manufacturers

.1 Acceptable Manufacturers:
.1 Apex, Baron, Daybar, Fleming or approved equal.

2.2 Materials

.1 Sheet Steel: Galvanized steel to ASTM A653/A653M, commercial grade (CS), Type B,
.1 Coating designation Z275 (G90) for exterior doors and frames,
.2 Coating designation ZF001 (A01) for interior doors and frames.
.3 Recycled content: Minimum 24% post-consumer recycled content.

.2 Reinforcement Channel: To CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653M, ZF75.

.3 Plywood: CSA O151 (CSP), CANPLY Grade SHG; unsanded, exterior use, thickness as indicated; Urea-Formaldehyde free.

2.3 Door Core Materials

.1 Honeycomb Core: Structural small cell 25.4 mm maximum kraft paper honeycomb, sanded to required thickness.

.2 Polystyrene Core: Rigid extruded fire retardant, closed cell board, density 16 to 32 kg/m³, thermal values RSI 1.0 minimum, Type 1, in accordance with CAN/ULC-S701.

2.4 Adhesives

.1 Cores and Steel Components: Manufacturers standard VOC compliant adhesive. Total VOC content of adhesive less than or equal to 250 g/L, less water, when tested to ASTM D2369.

.2 Lock Seam: Manufacturers standard VOC compliant sealant. Total VOC content of sealant less than or equal to 250 g/L, less water, when tested to ASTM D2369.

.3 Construction Adhesive: Low VOC polyurethane construction adhesive, resistant to freezing; VOC Limit: <70 g/L (0.58 lb/gal) when tested in accordance with USEPA Method 24 and ASTM D2369.

2.5 Accessories

.1 Expanding Foam Sealant: to Section 07 21 00, VOC compliant.

.2 Joint Sealers - Interior: Acrylic latex, VOC compliant, to Section 07 92 00.

.3 Joint Sealers - Exterior: Silicone type, VOC compliant, to Section 07 92 00; colour to match adjacent wall finish.

.4 Door Silencers: Single stud rubber/neoprene.

.5 Exterior Top Caps: Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.

.6 Frame Thermal Breaks: Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.

2.6 Fabrication - Doors

.1 Interior Doors: Laminated honeycomb core construction: 16 gauge face sheet thickness, honeycomb core, laminated under pressure to face sheets.

.2 Exterior Doors: Polystyrene insulated and stiffened construction: 16 gauge face sheet thickness.

.3 Longitudinal Edges:
.1 Interior Doors: Adhesive-assisted mechanical interlock and tack welded.
.2 Exterior Doors: Fully welded; seamless.

.4 Size doors to have 19 mm gap between bottom of door and finished floor.

.5 Mortised, blanked, reinforced, drilled and tapped for templated hardware, in accordance with templates provided by hardware supplier.

.6 Reinforce for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware.

.7 Top and Bottom Channels: Inverted, recessed, welded steel channels.

.8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

.9 Attach fire rated label to each fire rated door unit. Fire labels to be riveted tags; embossed labeling not acceptable.

2.7 Fabrication – Frames

.1 Interior Frames: 16 gauge face sheet thickness, welded type construction.

.2 Exterior Frames: 16 gauge face sheet thickness, welded type construction, thermally broken.

.3 Provide frame profiles indicated, including custom, extra wide face profiles.

.4 Mortised, blanked, reinforced, drilled and tapped for templated hardware, in accordance with templates provided by hardware supplier.

.5 Reinforce frames wider than 1200 mm with roll formed steel channels fitted tightly into frame head, flush with top.

.6 Prepare frames for silencers. Provide three single silencers for single doors and mullions of double doors on strike side. Provide two silencers on frame head at double doors without mullions.

.7 Attach fire rated label to each fire rated frame unit. Fire labels to be riveted tags; embossed labeling not acceptable.

.8 Infill Panels: Fabricate infill panels as metal sheet laminated to plywood core using construction adhesive. Field paint to match frames.

.9 Frames assemblies joined in field to be fully welded, ground and sanded, and all seams to be filled and sanded smooth.

2.8 Finish

.1 Finish: Field painted in accordance with Section 09 91 00 - Painting.

PART 3 - EXECUTION

3.1 Examination

.1 Verify that opening sizes and tolerances are acceptable; check floor area within path of door swing for flatness.

.2 Verify doors and frames are correct size, swing, rating and opening number.

.3 Remove temporary shipping spreaders.

3.2 Installation

.1 Install doors and frames to CSDMA.

.2 Install fire-rated doors and frames in accordance with NFPA 80, and local authority having jurisdiction.

.3 Coordinate with wall construction for anchor placement.

.4 Coordinate installation of glass and glazing.

.5 Coordinate installation of doors and frames with installation of hardware specified in Section 08 71 00.

.6 Set frames plumb, square, level and at correct elevation.

.7 Secure anchorages and connections to adjacent construction.

.8 Foam fill shim space at perimeter of frame and open back sections to maintain continuity of thermal envelope.

.9 Brace frames rigidly in position while building-in. Install wood spreaders at third points of frame rebate height to maintain frame width. Provide vertical support at centre of head for openings exceeding 1200 mm in width.

.10 Remove wood spreaders after frames have been built-in.

.11 Make allowance for deflection to ensure structural loads are not transmitted to frame product.

.12 Install doors, and hardware in accordance with hardware templates and manufacturer's instructions.

.13 Adjust operable parts for correct clearances and function.

.14 Install glazing, louvres and door silencers.

.15 Finish paint in accordance with Section 09 91 00.

.16 Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.

3.3 Erection tolerances

.1 Maximum Diagonal Distortion: 3 mm measured with straight edges, crossed corner to corner.

END

PART 1 - GENERAL

1.1 Related Documents

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Work Included

.1 The work of this Section includes the provision of all labour, materials, equipment and services required for the specification and supply of door hardware, as indicated on the drawings, as specified herein and as required for a complete project.

1.3 Related Work

.1 Standard Metal Doors and Frames: Section 08 11 13

1.4 Reference Standards

.1 Standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturer's Association.

1.5 Requirements
Regulatory Agencies

.1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.

1.6 Qualifications

.1 The hardware supplier shall have on staff, a member of the Door and Hardware Institute, that shall insure proper submissions and coordination of all Door Hardware for this project.

1.7 Hardware List

.1 General Contractor and Hardware Consultant shall meet with the Departmental Representative, to prepare a hardware schedule.

.2 Submit contract hardware list in accordance with Section 01 33 00 – Submittal Procedures. If requested, supply samples of specific items identified by Departmental Representative.

.3 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.

1.8 Maintenance Data

.1 Provide operation and maintenance data for all Finish Hardware detailed in Section 08 71 00 for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

.2 Brief maintenance staff regarding proper care, cleaning, and general maintenance.

1.9 Maintenance Materials

.1 Supply two sets of wrenches for door closers, lock sets and fire exit hardware.

1.10 Delivery and Storage

.1 Store finishing hardware in locked, clean and dry area.

.2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

PART 2 - PRODUCTS

2.1 Hardware Items

.1 Supply hardware items listed in sets at end of this Section in quantities required as indicated on drawings.

.2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of finish hardware as well as compatibility with door material.

.3 Exposed fastening devices to match finish of hardware.

2.2 Keying

.1 Hardware supplier to coordinate with the owners all keying details prior to ordering any hardware. Master keys and day keys to be delivered via registered mail direct to Department Representative.

.2 All locks shall have two change keys per cylinder.

.3 All cylinders to be construction keyed as listed.

.4 Supply 3 master keys.

PART 3 - EXECUTION

3.1 Installation Instructions

.1 Furnish steel door and steel frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.

.2 Furnish manufacturer’s instructions for proper installation of each hardware component.

.3 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers Association.

.4 Ensure Contractor is aware of cutting, patching or recesses in slab, walls, thresholds, etc. required to make hardware function properly.

.5 All thresholds shall be firmly and fully bedded in a mastic sealant prior to mechanical attachment.

3.2 Materials

.1 Hardware shall be the best grade for each item or service specified and free from all defects in manufacture and finish. Where a particular item of hardware is not listed for a door, but is required for proper function of the door, provide items as listed for a similar location.

.2 The Hardware Supplier shall provide a qualified Architectural Hardware Consultant (AHC) on staff who shall cooperate with the installer and clarify the location and/or installation methods of particular items.

3.3 Certification

.1 After installation, Hardware Writer is to inspect and certify in writing that all items and their installations are in accordance with specified requirements.

3.4 Hardware Sets

.1 Provide hardware list for all doors shown and listed on drawings, for Departmental Representative’s review.

END

PART 1 - GENERAL

1.1 Related Sections

.1 Section 08 11 00 - Metal Doors and Frames.

1.2 References

.1 Master Painters Institute (MPI)
  .1 MPI Architectural Painting Specifications Manual, 2004.

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

.3 American Society for Testing and Materials (ASTM)
  .1 ASTM D2369-04, Standard Test Method for Volatile Content of Coatings.

1.3 Quality Assurance

.1 Qualifications: Contractor with minimum of five years proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.

1.4 Submittals

.1 Submittals in accordance with Section 01 33 00.

.2 Submit product data and instructions for each paint and coating product to be used.

.3 Samples: Submit full range colour sample chips to indicate where colour availability is restricted.

.4 Submit painting schedule, identifying room, surfaces, paint, VOC limits and MPI product list.

1.5 Delivery, Storage and Handling

.1 Packing, Shipping, Handling and Unloading: in accordance with manufacturer's written instructions.

.2 Remove damaged, opened and rejected materials from site.

.3 Storage and Protection:
- .1 Provide and maintain dry, temperature controlled, secure storage.
- .2 Store materials and supplies away from heat generating devices.
- .3 Store materials and equipment in well ventilated area with temperature range 7°C to 30°C.

1.6 Site Conditions

.1 Heating, Ventilation and Lighting:
- .1 Provide heating facilities to maintain ambient air and substrate temperatures above 10°C for 24 hours before, during and after paint application until paint has cured sufficiently.
- .2 Provide continuous ventilation for seven days after completion of application of paint.
- .3 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.

.2 Surface and Environmental Conditions:
- .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
- .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
- .3 Apply paint when previous coat of paint is dry or adequately cured.

PART 2 - PRODUCTS

2.1 Materials

.1 Paint materials shall be listed on the current edition of the MPI Approved Products List. Where selection of finishes from MPI Approved Products List is limited, selection of alternate materials will be at the option of the Departmental Representative.

.2 Under no circumstance shall paint materials be applied without prior review of VOC limits by the Departmental Representative.

.3 Provide interior non-flat paint products with a VOC range <151 g/L.

.4 Provide interior flat paint products with a VOC range <51 g/L.

.5 Provide exterior paint products with a VOC range <201 g/L.

.6 Provide paint materials for paint systems from single manufacturer.

.7 Conform to latest MPI requirements for interior and exterior painting work including preparation and priming.

.1 Restricted Components: Paints and coatings shall not contain any of the following:

.1 Acrolein.
.2 Acrylonitrile.
.3 Antimony.
.4 Benzene.
.5 Butyl benzyl phthalate.
.6 Cadmium.
.7 Di (2 ethylhexyl) phthalate.
.8 Di n butyl phthalate.
.9 Di n octyl phthalate.
.10 1,2 dichlorobenzene.
.11 Diethyl phthalate.
.12 Dimethyl phthalate.
.13 Ethylbenzene.
.14 Formaldehyde.
.15 Hexavalent chromium.
.16 Isophorone.

.17 Lead.
.18 Mercury.
.19 Methyl ethyl ketone.
.20 Methyl isobutyl ketone.
.21 Methylene chloride.
.22 Naphthalene.
.23 Toluene (methylbenzene).
.24 1,1,1 trichloroethane.
.25 Vinyl chloride.

2.2 Colours

.1 Departmental Representative will provide Colour Schedule after Contract award and after appropriate paint schedule has been submitted and reviewed. No more than five colours will be selected for entire project and no more than four colours will be selected in each area.

.2 Selection of colours from manufacturers' full range of colours.

.3 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 Mixing and Tinting

.1 Perform colour tinting operations prior to delivery of paint to site.

.2 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.

.3 Thin paint for spraying in accordance with paint manufacturer's instructions.

2.4 Gloss/Sheen Ratings

.1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following values:

Gloss Level Category	Units @ 60°	Units @ 85°
G1 - matte	0 to 5	max. 10
G2 - velvet	0 to 10	10 to 35
G3 - eggshell	10 to 25	10 to 35

G4 - satin	20 to 35	min. 35
G5 - semi-gloss	35 to 70	
G6 - gloss	70 to 85	
G7 - high	gloss > 85	

.2 Gloss level ratings of painted surfaces shall be selected by Departmental Representative after Contract Award, unless noted otherwise.

PART 3 - EXECUTION

3.1 Manufacturer’s Instructions

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

3.2 General

.1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.3 Preparation

.1 Protection:
- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .4 Protect passing pedestrians, building occupants and general public in and about the building.

.2 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements.

.3 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

3.4 Application

.1 Conform to manufacturer's application instructions unless specified otherwise.

.2 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.3 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.4 Sand and dust between coats to remove visible defects.

.5 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.

.6 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.5 Interior Paint and Coating Systems

.1 Provide interior paint products with maximum VOC limits specified by this Section. Where selection of finishes from MPI Approved Products List is limited, selection of alternate materials will be at the option of the Departmental Representative.

.2 Interior painting systems to be based on MPI Premium grade unless noted otherwise. The following is list of principal items only. Surfaces not included in this schedule shall be painted at the discretion of the Consultant.

.3 Galvanized Metal: steel doors and frames, steel framing.
.1 INT 5.3L - Alkyd Finish:
.1 One coat VOC compliant non-cementitious primer (omit when shop primed),
.2 Two finish coats VOC compliant alkyd.

.4 Dressed lumber: including window trim.
.1 INT 6.3A – High performance architectural latex finish (one coat primer and two finish coats)

3.6 Site Tolerances

.1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.

.2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.

.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.7 Restoration

.1 Clean and re-install hardware items removed before undertaken painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust. Avoid scuffing newly applied paint.

END

PART 1 - GENERAL

1.1 References

.1 Air-Conditioning, Heating and Refrigeration Institute (AHRI)
.1 AHRI 210/240-2008, Standard for Unitary Air Conditioning and Air-Source Heat Pump Equipment.

.2 American National Standards Institute/National Fire Protection Association (ANSI/NFPA)
.1 ANSI/NFPA 90A-298, Installation of Air Conditioning and Ventilating Systems.

.3 American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE)
.1 ASHRAE Standard 15-2013, Safety Code for Mechanical Refrigeration.

.4 Canadian Standards Association (CSA)
.1 CAN/CSA-B52-2013, Mechanical Refrigeration Code

1.2 Shop Drawings and Product Data

.1 Submit shop drawings in accordance with Division 1.

.2 Indicate:
.1 Capacities
.2 ARI Ratings
.3 Sound Power levels
.4 Installation instructions
.5 Start-up Instructions
.6 O&M, Instructions

1.3 Warranty

.1 For heat pumps, the 12 month warranty period prescribed in subsection GC32.1 of General Conditions ‘C’ is extended to 5 years.

PART 2 - PRODUCTS

2.1 General

.1 Heat pumps carry AHRI or CSA certification seal.

2.2 Refrigerants

.1 R-410 or approved equal.

2.3 Drain Pans

.1 Design and construct condensate drain pans under indoor coils so that no water can accumulate and install to allow for easy cleaning.

2.4 Air-Source Heat Pump

.1 General:

.1 Split air-source heat pump system consisting of outdoor unit with refrigerant compressor and indoor unit with fan and coil.

.2 Performance data:

.1 Electrical: 240 V, 1 ph, 60 Hz.

.2 Cooling:

.1 Total: 6.6 kW; Sensible: 4.5 kW.

.2 Indoor coil: 277 L/s; 26.60C/190C EDBT/EWBT.

.3 Outdoor coil: 350C EDBT

.4 16.25 SEER

.3 Heating:

.1 Capacity: 6.8 kW @ 8.30C OAT, 5.0 kW @ -8.30C OAT

.2 9.4 HSPF

.3 Electrical: 20A MCA, 25A MOP, 240 V, 1P

.4 Ratings: in accordance with AHRI Standards

.5 Supplementary electric heating coil: none provided

.4 Outdoor Unit:

.1 Outdoor unit with condenser coil guard, tube-in-fin coil, refrigerant compressor, ECM condenser fan with swept wing blades, composite base pan, isolated compressor compartment, factory installed filter-drier, factory installed external discharge muffler.

.2 Outdoor unit shall control heat pump system. Microprocessor based control with defrost control, temperature and pressure safety cutouts.

.3 Acceptable Manufacturer:

.1 York Affinity YZH02412C

.2 Daikin McQuay

.3 Trane
.4 or approved equal

.5 Indoor Unit:
.1 Indoor fan coil unit of same manufacturer and series as outdoor unit. Insulated cabinet with 19 mm foil faced insulation, painted galvanized steel casing, internal 25 mm filter rack, ECM variable speed motor, polymer drain pan.
.2 3 row refrigerant coil with sweat connection, 12 fpi, 0.36 sq metre face, 9.5 mm OD tubes.
.3 Acceptable Manufacturer:
.1 York Affinity AHV024
.2 Daikin McQuay
.3 Trane
.4 or approved equal

.6 Refrigeration piping:
.1 Between outdoor unit, compressor section and indoor coil, complete with all refrigerant metering devices and valves.
.2 Type ACR copper refrigerant tubing complete with 25 mm thick elastomeric insulation.

.7 Accessories:
.1 Indoor heating/cooling thermostat.

PART 3 - EXECUTION

3.1 Installation

.1 Install where indicated and in accordance with manufacturer’s instructions.

.2 Install outdoor units at ground level on concrete housekeeping pad, as indicated.

.3 Secure with hold-down bolts.

.4 Make all duct connections through flexible connections.

.5 Level unit with fans running. Align ductwork, flexible connections. Misalignment with fan stopped not to strain or damage flexible connection.

.6 Make all piping connections.

.7 Nothing to obstruct ready access to all components or to prevent removal of components for servicing.

.8 Indoor unit shall be connected to existing ductwork with new galvanized steel duct fabricated to SMACNA standards. Provide duct transition from unit inlet/discharge to existing duct size. Insulation shall match existing work.

.9 Refrigerant piping shall be installed in accordance with ASHRAE Standard 15 and CSA B52.

3.2 Drain Pans

.1 Install so that no water can accumulate and arrange so as to be easily accessible for cleaning.

3.3 Housekeeping Pads

.1 Exterior unit to be supported on 150mm thick x 1400mm x 1400mm concrete pad. Concrete pad to be constructed with 32 MPa concrete having 5-8% entrained air and containing 7-15M x 1300 Lg deformed steel reinforcing each way.

.2 Construction of housekeeping pad shall consist of:

- .1 Excavation to a minimum depth of 600 mm.
- .2 Proof compacting of the insitu subgrade.
- .3 Placement and compaction of free draining 25mm minus quarried aggregate compacted in 150mm lifts to underside of pad.
- .4 Construction of formwork and placement of concrete such that the top surface will be approximately 50mm above finish grade.
- .5 Concrete to be vibrated and top surface to receive a light brown finish.
- .6 Restore landscaping around concrete pad using 100mm of top soil and sod.
- .7 In lieu of the above, Contractor may support the exterior wall structure. Contractor will be responsible to ensure the existing structure is suitable to provide the support and that such support is acceptable by the unit manufacturer and the Departmental Representative.

3.4 Start-up and Commissioning

.1 Perform start-up according to manufacturer’s instructions. Submit written report to Consultant.

END

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1-15, Canadian Electrical Code, Part 1 (23rd Edition), Safety Standard for Electrical Installations.

1.2 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.

.3 Language operating requirements: provide identification nameplates and labels for control items in English.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit for review single line electrical diagrams under plexiglass and locate as indicated.

. 1 Electrical distribution system in main electrical room.

.3 Shop drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia, Canada.

.2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.

.3 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
.4 Submit three (3) 600 x 600 mm minimum size drawings to authority having jurisdiction.
.5 If changes are required, notify Departmental Representative of these changes before they are made.

.4 Quality Control: in accordance with Section 01 45 00 - Quality Control.
.1 Provide CSA certified equipment and material.
.2 Submit test results of installed electrical systems and instrumentation.
.3 Permits and fees: in accordance with General Conditions of contract.
.4 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
.5 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.

1.4 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices in accordance with authorities having jurisdiction as per the conditions of Provincial Act respecting manpower vocational training and qualification.
.1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
.2 Permitted activities: determined

based on training level attained and demonstration of ability to perform specific duties.

.3 Site Meetings:
.1 In accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Charts.

.4 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Material Delivery Schedule: provide Departmental Representative with schedule within 2 weeks after award of Contract.

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

1.6 SYSTEM STARTUP

.1 Instruct Departmental Representative in operation, care and maintenance of systems, system equipment and components.

1.7 OPERATING INSTRUCTIONS

.1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.

.2 Operating instructions to include following:
.1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
.2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
.3 Safety precautions.
.4 Procedures to be followed in event of equipment failure.

.5 Other items of instruction as recommended by manufacturer of each system or item of equipment.

.3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.

.4 Post instructions where directed.

.5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.

.6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

.1 Provide material and equipment in accordance with Section 01 61 00 - Common Product Requirements.

.2 Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.

2.2 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

.1 Verify installation and co-ordination responsibilities related to motors, equipment and controls, as indicated.

.2 Control wiring and conduit: in accordance with Section 26 29 03 - Control Devices except for conduit, wiring and connections below 50 V which are related to control systems specified in mechanical sections and as shown on mechanical drawings.

2.3 WARNING SIGNS

.1 Warning Signs: in accordance with requirements of Departmental Representative.

.2 Decal signs, minimum size 175 x 250 mm.

2.4 WIRING TERMINATIONS

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

2.5 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates as follows:

.1 Nameplates: lamicoid 3 mm thick plastic engraving sheet, matt white finish face, black core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.

.2 Sizes as follows:

NAMEPLATE SIZES

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

.2 Labels: embossed plastic labels with 6mm high letters unless specified otherwise.

.3 Wording on nameplates to be approved by Departmental Representative prior to manufacture.

.4 Allow for minimum of twenty-five (25) letters per nameplate.

.5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

.6 Identify equipment with Size 3 labels engraved "ASSET INVENTORY NO. " as directed by Departmental Representative.

.7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

.8 Terminal cabinets and pull boxes: indicate system and voltage.

.9 Transformers: indicate capacity, primary and secondary voltages.

2.6 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, 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 coding: to CSA C22.1.

2.7 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code conduits, boxes and metallic sheathed cables.

.2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

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

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red

Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

2.8 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

.1 Paint indoor switchgear and distribution enclosures light gray to EEMAC 2Y-1.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

.2 Do overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.

3.2 NAMEPLATES AND LABELS

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

3.3 CONDUIT AND CABLE INSTALLATION

.1 Install conduit and sleeves prior to pouring of concrete.

.1 Sleeves through concrete: plastic, sized for free passage of conduit, and protruding 50 mm.

.2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

.3 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

3.4 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.

3.5 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 Load Balance:

.1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

.3 Provide upon completion of work, load balance report as directed in PART 1 - SUBMITTALS: phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.

.2 Conduct following tests in accordance with Section 01 45 00 - Quality Control.

.1 Power 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 operation of systems where applicable.

.5 Insulation resistance testing:

.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.

.2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.

.3 Check resistance to ground before energizing.

.3 Carry out tests in presence of Departmental Representative.

.4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

3.7 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

PART 1 - GENERAL

1.1 REFERENCES

.1 CSA International
- .1 CAN/CSA-C22.2 No.18, Outlet Boxes, Conduit Boxes and Fittings.
- .2 CAN/CSA-C22.2 No.65, Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).

.2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
- .1 EEMAC 1Y-2, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

.3 National Electrical Manufacturers Association (NEMA)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for wire and box connectors and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for wire and box connectors for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
- .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect wire and box connectors from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and recycling as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Pressure type wire connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.

.2 Fixture type splicing connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

.3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:
- .1 Connector body and stud clamp for conductors.
- .2 Clamp for copper conductors.
- .3 Clamp for ACSR conductors.
- .4 Stud clamp bolts.
- .5 Bolts for copper conductors.
- .6 Sized for conductors as indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wire and box connectors installation in accordance with manufacturer's written instructions.
  .1 Visually inspect substrate in presence of Departmental Representative.
  .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Remove insulation carefully from ends of conductors and:
  .1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No.65.
  .2 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65. Replace insulating cap.
  .3 Install bushing stud connectors in accordance with EEMAC 1Y-2.

3.3 CLEANING

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

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

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS	.1	Section 26 05 20 – Wire and Box Connectors (0-1000V).
1.2 PRODUCT DATA	.1	Provide product data in accordance with Section 01 33 00 - Submittal Procedures.
1.3 DELIVERY, STORAGE AND HANDLING	.1	Packaging Waste Management: remove for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 BUILDING WIRES	.1	Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.
	.2	Copper conductors: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL	.1	Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
	.2	Perform one (1) test using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.
	.3	Perform tests before energizing electrical system.
3.2 GENERAL CABLE INSTALLATION	.1	Install cable in trenches in accordance with Section 33 71 73.02 - Underground Electrical Service.

.2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).

.3 Cable Colour Coding: to Section 26 05 00 - Common Work Results for Electrical.

.4 Conductor length for parallel feeders to be identical.

.5 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.

.6 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.

3.3 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:

.1 In conduit systems in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

.2 In underground ducts in accordance with Section 33 65 76 – Direct Buried Underground Cable Ducts.

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for grounding equipment and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for grounding equipment for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect grounding equipment from nicks, scratches, and blemishes.

.3 Replace defective or damaged

materials with new.

PART 2 - PRODUCTS

2.1 EQUIPMENT

.1 Clamps for grounding of conductor: size as required to electrically conductive underground water pipe.

.2 Copper conductor: minimum 6 m long for each concrete encased electrode, bare, stranded, soft annealed, size as indicated.

.3 Rod electrodes: copper clad steel 19 mm diameter by minimum 3 m long.

.4 Grounding conductors: bare stranded copper, soft annealed, size as indicated.

.5 Insulated grounding conductors: green, copper conductors, size as indicated.

.6 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
.1 Grounding and bonding bushings.
.2 Protective type clamps.
.3 Bolted type conductor connectors.
.4 Thermit welded type conductor connectors.
.5 Bonding jumpers, straps.
.6 Pressure wire connectors.

PART 3 - EXECUTION

3.1 EXAMINATION

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

of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION GENERAL

.1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Where EMT is used, run ground wire in conduit.

.2 Install connectors in accordance with manufacturer's instructions.

.3 Protect exposed grounding conductors from mechanical injury.

.4 Make buried connections, and connections to conductive water main, electrodes, using copper welding by thermit process.

.5 Use mechanical connectors for grounding connections to equipment provided with lugs.

.6 Soldered joints not permitted.

.7 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

.8 Bond single conductor, metallic armoured cables to cabinet at supply end, and load end.

.9 Ground secondary service pedestals.

3.3 ELECTRODES

.1 Make ground connections to continuously conductive underground water pipe on street side of water meter.

.2 Install water meter shunt.

.3 Install rod electrodes and make grounding connections as indicated.

.4 Bond separate, multiple electrodes together.

.5 Use size 3/0 AWG copper conductors for connections to electrodes.

3.4 SYSTEM AND CIRCUIT GROUNDING

.1 Install system and circuit grounding connections of primary 600 V system, and a secondary 240 V system.

3.5 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, transformers, switchgear, duct systems, frames of motors, motor control centres, starters, control panels, building steel work, generators, elevators and escalators, distribution panels, outdoor lighting, cable trays.

3.6 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

3.7 CLEANING

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

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

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

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

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 WASTE MANAGEMENT AND DISPOSAL

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

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.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Secure equipment to solid masonry, tile and plaster surfaces with lead anchors.

.2 Secure equipment to poured concrete with expandable inserts.

.3 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.4 Fasten exposed conduit or cables to building construction or support system using straps.

.1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.

.2 Two-hole steel straps for conduits and cables larger than 50 mm.

.3 Beam clamps to secure conduit to exposed steel work.

.5 Suspended support systems.
  .1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.
  .2 Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.

.6 For surface mounting of two or more conduits use channels at 1500mm on centre spacing.

.7 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.8 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

.9 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.10 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.

.11 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

END

PART 1 – GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
  .1 CSA C22.1-15, Canadian Electrical Code, Part 1, 23rd Edition.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
  .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.
  .1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia, Canada.

1.4 DELIVERY, STORAGE AND HANDLING

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

PART 2 - PRODUCTS

2.1 JUNCTION AND PULL BOXES

.1 Construction: welded steel enclosure.

.2 Covers Flush Mounted: 25 mm minimum extension all around.

.3 Covers Surface Mounted: screw-on flat covers.

PART 3 - EXECUTION

3.1 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1.

3.2 IDENTIFICATION

.1 Equipment Identification: to Section 26 05 00- Common Work Results for Electrical.

.2 Identification Labels: size 2 indicating voltage and phase or as indicated.

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS
.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES
.1 Canadian Standards Association (CSA International)
.1 CSA C22.1-15, Canadian Electrical Code, Part 1, 23rd Edition.

1.3 ACTION AND INFORMATIONAL SUBMITTALS
.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.4 DELIVERY, STORAGE AND HANDLING
.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

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

PART 2 - PRODUCTS

2.1 OUTLET AND CONDUIT BOXES GENERAL
.1 Size boxes in accordance with CSA C22.1.

.2 102 mm square or larger outlet boxes as required.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

2.2 GALVANIZED STEEL OUTLET BOXES
.1 One-piece electro-galvanized construction.

.2 Utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.

.3 102 mm square or octagonal outlet boxes for lighting fixture outlets.

.4 Extension and plaster rings for flush mounting devices in finished plaster tile walls.

2.3 CONDUIT BOXES

.1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of devices.

2.4 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 35mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

.4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Do not install reducing washers.

.5 Vacuum clean interior of outlet boxes before installation of wiring devices.

.6 Identify systems for outlet boxes as required.

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
- .1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
- .2 CSA C22.2 No. 45, Rigid Metal Conduit.
- .3 CSA C22.2 No. 211.2, Rigid PVC (Unplasticized) Conduit.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product data: submit manufacturer's printed product literature, specifications and datasheets.
- .1 Submit cable manufacturing data.

.3 Quality assurance submittals:
- .1 Test reports: submit certified test reports.
- .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .3 Instructions: submit manufacturer's installation instructions.

1.4 WASTE MANAGEMENT AND DISPOSAL

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

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

PART 2 - PRODUCTS

2.1 CABLES AND REELS

.1 Provide cables on reels or coils.
  .1 Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel umber.

.2 Each coil or reel of cable to contain only one continuous cable without splices.

.3 Identify cables for exclusively dc applications.

.4 Reel and mark shielded cables rated 2,001 volts and above.

2.2 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, galvanized steel, threaded.

.2 Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.

.3 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings with expanded ends.

.4 Rigid pvc conduit: to CSA C22.2 No. 211.2.

.5 Flexible metal conduit: to CSA C22.2 No. 56, steel.

2.3 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits 50 mm and smaller.
  .1 Two hole steel straps for conduits larger than 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 1.5m on centre.

.4 Threaded rods, 6 mm diameter, to support suspended channels.

2.4 CONDUIT FITTINGS

.1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.

.2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.

2.5 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Weatherproof expansion fittings with internal bonding assembly suitable for 200 mm linear expansion.

.2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.

.3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.6 FISH CORD

.1 Polypropylene.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Surface mount conduits except in public areas of washroom building.

.3 Use rigid galvanized steel threaded conduit except where specified otherwise (all interior work within service rooms).

.4 Use electrical metallic tubing (EMT) for servicing lighting within washroom

building.

.5 Use rigid pvc conduit underground.

.6 Use flexible metal conduit for connection to motors in dry areas and connection to surface or recessed fluorescent or LED fixtures.

.7 Minimum conduit size for lighting and power circuits: 19 mm.

.8 Bend conduit cold:
.1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.9 Mechanically bend steel conduit over 19 mm diameter.

.10 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.11 Install fish cord in empty conduits.

.12 Remove and replace blocked conduit sections.
.1 Do not use liquids to clean out conduits.

.13 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Group conduits wherever possible on surface channels.

.3 Do not pass conduits through structural members except as indicated.

.4 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.4 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.

3.5 CONDUITS UNDERGROUND

.1 Slope conduits to provide drainage.

3.6 CLEANING

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

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

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
- .1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
- .2 CSA C22.2 No. 45, Rigid Metal Conduit.
- .3 CSA C22.2 No. 211.2, Rigid PVC (Unplasticized) Conduit.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product data: submit manufacturer's printed product literature, specifications and datasheets.
- .1 Submit cable manufacturing data.

.3 Quality assurance submittals:
- .1 Test reports: submit certified test reports.
- .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .3 Instructions: submit manufacturer's installation instructions.

1.4 WASTE MANAGEMENT AND DISPOSAL

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

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

PART 2 - PRODUCTS

2.1 CABLES AND REELS

.1 Provide cables on reels or coils.
  .1 Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.

.2 Each coil or reel of cable to contain only one continuous cable without splices.

.3 Identify cables for exclusively dc applications.

.4 Reel and mark shielded cables rated 2,001 volts and above.

2.2 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, galvanized steel, threaded.

.2 Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.

.3 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings with expanded ends.

.4 Rigid pvc conduit: to CSA C22.2 No. 211.2.

.5 Flexible metal conduit: to CSA C22.2 No. 56, steel.

2.3 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits 50 mm and smaller.
.1 Two hole steel straps for conduits larger than 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 1.5m on centre.

.4 Threaded rods, 6 mm diameter, to support suspended channels.

2.4 CONDUIT FITTINGS

.1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.

.2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.

2.5 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Weatherproof expansion fittings with internal bonding assembly suitable for 200 mm linear expansion.

.2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.

.3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.6 FISH CORD

.1 Polypropylene.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Surface mount conduits except in public areas of washroom building.

.3 Use rigid galvanized steel threaded conduit except where specified otherwise (all interior work within service rooms).

.4 Use electrical metallic tubing (EMT) for servicing lighting within washroom building.

.5 Use rigid pvc conduit underground.

.6 Use flexible metal conduit for connection to motors in dry areas and connection to surface or recessed fluorescent or LED fixtures.

.7 Minimum conduit size for lighting and power circuits: 19 mm.

.8 Bend conduit cold:

.1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.9 Mechanically bend steel conduit over 19 mm diameter.

.10 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.11 Install fish cord in empty conduits.

.12 Remove and replace blocked conduit sections.

.1 Do not use liquids to clean out conduits.

.13 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS	.1	Run parallel or perpendicular to building lines.
	.2	Group conduits wherever possible on surface channels.
	.3	Do not pass conduits through structural members except as indicated.
	.4	Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.
3.4 CONCEALED CONDUITS	.1	Run parallel or perpendicular to building lines.
3.5 CONDUITS UNDERGROUND	.1	Slope conduits to provide drainage.
3.6 CLEANING	.1	Proceed in accordance with Section 01 74 11 - Cleaning.
	.2	On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

.1 CSA International
.1 CSA C22.2 No.29, Panelboards and Enclosed Panelboards.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for panelboards and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia, Canada.
.2 Include on drawings:
.1 Electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for panelboards for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

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

PART 2 - PRODUCTS

2.1 PANELBOARDS

.1 Panelboards: to CSA C22.2 No.29 and product of one manufacturer.
.1 Install circuit breakers in panelboards before shipment.

.2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.

.2 250 V panelboards: bus and breakers rated for 10 kA (symmetrical) interrupting capacity or as indicated.

.3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.

.4 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated.

.5 Minimum of 2 flush locks for each panel board.

.6 Two keys for each panelboard and key panelboards alike.

.7 Copper bus with neutral of same ampere rating of mains.

.8 Mains: suitable for bolt-on breakers.

.9 Trim with concealed front bolts and hinges.

.10 Trim and door finish: baked enamel.

2.2 BREAKERS

.1 Breakers: to Section 26 28 16.02 - Moulded Case Circuit Breakers.

.2 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.

.3 Lock-on devices for emergency light circuits.

2.3 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Nameplate for each panelboard size 4 engraved.

.3 Complete circuit directory with typewritten legend showing location and load of each circuit, mounted in plastic envelope at inside of panel door.

PART 3 - EXECUTION

3.1 EXAMINATION

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

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.

.2 Install surface mounted panelboards on plywood backboards. Where practical, group panelboards on common backboard.

.3 Mount panelboards to height specified in Section 26 05 00 - Common Work Results for Electrical or as indicated.

.4 Connect loads to circuits.

.5 Connect neutral conductors to common neutral bus with respective neutral identified.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

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

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

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

3.4 PROTECTION

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

.2 Repair damage to adjacent materials caused by panelboards installation.

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings:

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

.2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia, Canada.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Ship fuses in original containers.

.2 Do not ship fuses installed in switchboard.

.3 Store fuses in original containers in moisture free location.

.4 Waste Management and Disposal:

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

1.4 EXTRA MATERIALS

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 Six spare fuses of each type and size installed up to and including 600 A.

PART 2 - PRODUCTS

2.1 FUSES - GENERAL

.1 Fuse type references L1, L2, J1, R1, etc. have been adopted for use in this specification.

.2 Fuses: product of one manufacturer.

2.2 FUSE TYPES

.1 Class J fuses.
  .1 Type J1, time delay, capable of carrying 500% of its rated current for 10 s minimum.
  .2 Type J2, fast acting.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install fuses in mounting devices immediately before energizing circuit.

.2 Ensure correct fuses fitted to physically matched mounting devices.

.3 Ensure correct fuses fitted to assigned electrical circuit.

.4 Provide spare fuses.

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

.1 CSA International
.1 CSA C22.2 No. 5, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, and NMX-J-266-ANCE-2010).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for circuit breakers and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address (should come integral with new panelboard).

.3 Storage and Handling Requirements:
.1 Store circuit breakers in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Protect circuit breakers from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 BREAKERS GENERAL

.1 Moulded-case circuit breakers: to CSA C22.2 No. 5

.2 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40 degrees C ambient.

.3 Common-trip breakers: with single handle for multi-pole applications.

.4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
.1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.

.5 Circuit breakers to have minimum 10 kA symmetrical rms interrupting capacity rating.

2.2 THERMAL MAGNETIC BREAKERS DESIGN A

.1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

2.3 OPTIONAL FEATURES

.1 Include, where required:
.1 On-off locking device.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install circuit breakers as indicated.

3.2 CLEANING

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

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and

equipment in accordance with Section 01 74 11 - Cleaning.

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

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

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International).
- .1 CAN/CSA C22.2 No.4, Enclosed Switches.
- .2 CSA C22.2 No.39, Fuseholder Assemblies.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

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

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

PART 2 - PRODUCTS

2.1 DISCONNECT SWITCHES

.1 Fusible and non-fusible disconnect switch in CSA Enclosure, size as indicated.

.2 Provision for padlocking in on-off switch position by one lock.

.3 Mechanically interlocked door to prevent opening when handle in ON position.

.4 Fuses: size as indicated.

.5 Fuseholders: to CSA C22.2 No.39, suitable without adaptors, for type and size of fuse indicated.

.6 Quick-make, quick-break action.

.7 ON-OFF switch position indication on switch enclosure cover.

.8 All disconnect switches, fusible and non-fusible types are to be rated “heavy duty”.

2.2 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Indicate name of load controlled on size 4 nameplate.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install disconnect switches complete with fuses if applicable.

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical.

.2 Refer to fixture schedule on drawings.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Provide complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Departmental Representative.

.3 Quality assurance submittals: provide following in accordance with Section 01 45 00 - Quality Control.
.1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.3 DELIVERY, STORAGE AND HANDLING

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

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Divert unused metal materials from landfill to metal recycling facility.

.4 Disposal and recycling of fluorescent lamps as per local regulations.

.5 Disposal of old PCB filled ballasts.

PART 2 - PRODUCTS

2.1 LAMPS

.1 LED lamps to be A19, medium base, no dimming, 3500 K, CRI of 85+, 25,000 hr life and initial lumens of 1100. L70 life minimum to be 35,000 hours.

2.2 FINISHES

.1 Light fixture finish and construction to meet ULC listings and CSA certifications related to intended installation.

2.3 LUMINAIRES

.1 As indicated in fixture schedule on drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Locate and install luminaires as indicated.

.2 Provide adequate support.

3.2 WIRING

.1 Connect luminaires to lighting circuits:
.1 Install flexible or rigid conduit for luminaires as indicated.

3.3 LUMINAIRE ALIGNMENT

.1 Align luminaires mounted in continuous rows to form straight uninterrupted line.

.2 Align luminaires mounted individually parallel or perpendicular to building grid lines.

3.4 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.
.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

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

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

.1 CSA International
- .1 CSA C22.2 No.141, Emergency Lighting Equipment.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for emergency lighting and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for emergency lighting for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
- .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect emergency lighting from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

1.6 WARRANTY

.1 For batteries in this Section 26 52 00 - Emergency Lighting, 12 months warranty period is extended to 120 months.

PART 2 - PRODUCTS

2.1 EQUIPMENT

.1 Emergency lighting equipment: to CSA C22.2 No.141.

.2 Supply voltage: 120 V, AC.

.3 Output voltage: 12 V DC.

.4 Operating time: 30 minutes.

.5 Battery: sealed, maintenance free.

.6 Charger: solid state, multi-rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01 V for plus or minus 10% input variations.

.7 Solid state transfer circuit.

.8 Low voltage disconnect: solid state, modular, operates at 80% battery output voltage.

.9 Signal lights: solid state, for 'AC Power ON' and 'High Charge'.

.10 Lamp heads: integral on unit, 360 degrees horizontal and 180 degrees vertical adjustment. Lamp type: LED, 5W, minimum.

.11 Cabinet: suitable for direct or shelf mounting to wall and c/w knockouts for conduit. Removable or hinged front panel for easy access to batteries.

.12 Finish: white.

.13 Auxiliary equipment:
- .1 Ammeter.
- .2 Voltmeter.
- .3 Test switch.
- .4 Time delay relay.
- .5 Battery disconnect device.
- .6 AC input and DC output terminal blocks inside cabinet.
- .7 Mounting bracket where required.

.14 Auto diagnostic function.

2.2 WIRING OF REMOTE HEADS

.1 Conduit: in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

.2 Conductors: in accordance with Section 26 05 21 - Wires and Cables (0-1000 V), sized in accordance with manufacturer's recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for emergency lighting installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from

Departmental Representative.

3.2 INSTALLATION

.1 Install unit equipment and remote mounted fixtures.

.2 Direct heads.

3.3 CLEANING

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

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

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

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

.2 Repair damage to adjacent materials caused by emergency lighting installation.

END

PART 1 - GENERAL

1.1 General Requirements

.1 The Work under this section shall include the supply of labour, supervision, materials, equipment, and transportation necessary to complete excavation and backfill as shown on the Contract Drawings, per the Specifications, and as directed by the Departmental Representative, complete in every respect.

.2 Generally, the Work includes but is not necessarily limited to the following:
- .1 Foundation excavations.
- .2 Dewatering.
- .3 Backfilling of select materials.
- .4 Compacting fill materials.
- .5 Removal from site all excavated materials except for material required for backfilling and grading.

1.2 Measurement Procedures

.1 Work performed under this Section will be incidental to Work in other Sections.

1.3 References

.1 Nova Scotia Department of Transportation and Infrastructure Renewal Standard Specifications (most recent version):
- .1 NSTIR Standard Specification Division 2 Earthwork.

.2 Excavation limit as shown on the Plans.

1.4 Definitions

.1 Excavation class: one class of excavation will be recognized; common excavation.
- .1 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

.2 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.3 Borrow material: material obtained from locations outside area to be graded, and required for

construction of fill areas or for other portions of Work.

.4 Unsuitable materials:
.1 Weak, chemically unstable, and compressible materials.
.2 Frost susceptible materials:
.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
.2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 – 100
0.02 mm	10 - 80
0.005 mm	0 - 45

.3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

1.5 Action and Informational Submittals

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

.2 Quality Control: in accordance with Section 01 45 00 – Testing and Quality Control:
.1 Submit to Departmental Representative written notice at least 7 days prior to excavation work, to ensure cross sections are taken.
.2 Submit to Departmental Representative written notice when bottom of excavation is reached.

.3 Preconstruction Submittals:
.1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
.2 Submit records of underground utility locates, indicating: clearance record from utility authority.

.4 Samples:
.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
.2 Inform Departmental Representative at least 2 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.
.3 Submit 70 kg samples of type of fill specified including representative samples of excavated material.
.4 Ship samples prepaid to Departmental Representative, in tightly closed containers to prevent contamination and exposure to elements.

1.6 Quality Assurance

.1 Health and Safety Requirements:
.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.7 Waste Management And Disposal

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

.2 Divert excess materials from landfill to local facility for reuse as directed by Departmental Representative.

1.8 Existing Conditions

.1 Buried services:
.1 Before commencing work establish location of buried services on and adjacent to site.
.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
.3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.
.4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.5 Prior to beginning excavation Work, notify applicable Departmental Representative and authorities having jurisdiction establish location and state of use of buried utilities and structures. Departmental Representative to clearly mark such locations to prevent disturbance during Work.

.6 Confirm locations of buried utilities by careful test excavations.

.7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.

.8 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing. Costs for such Work to be paid by Departmental Representative.

.9 Record location of maintained, re-routed and abandoned underground lines.

.10 Confirm locations of recent excavations adjacent to area of excavation.

.3 Existing buildings and surface features:

.1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

.3 Where required for excavation, cut roots or branches as directed by Departmental Representative.

1.9 Archeological Definitions

.1 Archeological Site. While most of the sites will be subsurface or submerged; this is not a universal or necessary condition because a built heritage site and an archeological site exist in a continuum, and the inclusion of a given site in

one category, or the other, may be somewhat arbitrary. For the purpose of this document, an archeological site is a surface vestige, or the subsurface, or submerged remains of human activity at which an understanding of these activities and the management of these resources can be achieved through the employment of archeological techniques.

.2 Archeological Artifact: An object, a component of an object, a fragment, or shred of an object that was for or used by humans; a soil, botanical or other sample of archeological investigation of a site.

.3 Archeological Records: Notes, drawings, photographs, plans, computer databases, reports and any other audio-visual records related to the archeological investigation of a site.

.4 Archeological Collection: Archeological artifacts and associated archeological records.

.5 Archeological Resource: An archeological site and its associated archeological collection.

.6 All surface modifications are restricted to the identified corridors. Construction corridors to be accurately located by field survey by the Contractor prior to commencement of work operations.

1.10 Protection of Existing Features

.1 Existing buried utilities, services and structures:

.1 Size, depth and location of existing utilities, services and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.2 Prior to commencing any excavation work, notify applicable owner or authorities having jurisdiction, establish location and state of use of buries utilities, services and structures. Clearly mark such

locations to prevent disturbance during work.

.3 Confirm locations of buried utilities and services by careful test excavations.

.4 Maintain and protect from damage, water, sewer, electric, telephone and storm sewers, communications and other utilities, services and structures encountered as indicated. Obtain direction of Departmental Representative before moving or otherwise disturbing utilities, services or structures.

.5 Submit plans and details to show how existing utilities and services are to be maintained and protected while completing trench excavations and installing new services and utilities in the immediate area.

.6 Record location of maintained, re-routed and abandoned underground utilities and services.

.7 Repair all services, utilities and structures damaged during construction to the satisfaction of the Departmental Representative using new materials equivalent in manufacture, class, size and shape to the existing. The cost of all repair work shall be borne by the Contractor.

.2 Existing buildings and surface features:

.1 Conduct, with Departmental Representative, condition survey of existing buildings, lawns, sea wall, service poles, wires, pavement, survey bench marks and monuments which may be affected.

.2 Protect existing buildings and surface features which may be affected by work from damage while work is in progress. In the event of damage, immediately make repair to approval of Departmental Representative.

.3 Where excavation necessitates root or branch cutting, do so only as approved by Departmental Representative.

.4 All surface modifications are restricted to the identified corridors. Construction corridors to be accurately located by field

survey by the Contractor prior to commencement of work operations.

.5 All vehicle traffic is restricted to existing roadways or as indicated in project plans. Any deviation from the identified corridor requires Archeological review. A field visit will be scheduled with Contractor for locational confirmation and all areas of proposed construction will be marked in the field with orange flagging tape prior to commencement of work.

.6 The locational data for all encountered services and utilities that are to remain in service and all newly installed utilities and services will be provided in northing and easting (eg. N 5088673.329, E 734175.481) referenced to UTM Zone 20, vertical datum CGVD28, to an accuracy of ± 2 cm. This locational information is to be provided on disk in a DWG and DXF format which is compatible with SPANS EXPLORER.

.7 Port Royal protects a large and complex archeological site. These archeological resources will be respected and maintained in accordance with Parks Canada Cultural Resources Guidelines.

PART 2 PRODUCTS

2.1 Materials

.1 Clear stone: to NSTIR Division 3, Section 4 – Clear Stone C5

.1 Aggregates shall be composed of clean, hard, sound, durable, uncoated particles that do not contain friable, soluble or reactive minerals or other deleterious materials or conditions that would make the aggregate prone to decomposition or disintegration when exposed to the natural elements after placement in the work.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.

.3 Maximum Micro-Deval loss of 25% when tested to DOT & PW TM-1.

.4 Maximum freeze-thaw loss of 20% when tested to MTO LS 614.
.5 Plasticity Index to zero (0) when tested to ASTM D4318.
.6 Absorption to maximum 1.75% when tested to ASTM C127
.7 Table:

Sieve Designation	% Passing
28 mm	100
20 mm	90 – 100
10 mm	0 – 40
5 mm	0 - 10

.2 Backfill soils: to NSTIR Division 3, Section 10 – Fill Against Structure
.1 Aggregates shall be composed of clean, hard, sound, durable, uncoated particles that do not contain friable, soluble or reactive minerals or other deleterious materials or conditions that would make the aggregate prone to decomposition or disintegration when exposed to the natural elements after placement in the work.
.2 Gradations to be within limits specified in Table 3.10.2 for ‘Fill Against Concrete Structures’ when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.
.3 Maximum LA Abrasion (Grading A) of 45 when tested to ASTM C131.
.4 Maximum Plasticity Index (sand portion) of 6 when tested to ASTM D4318.
.5 Table:

Sieve Designation	% Passing
	Table 3.10.2
80 000 µm	100
56 000 µm	70 – 100
28 000 µm	50 - 80
14 000 µm	35 – 65
5 000 µm	20 – 50
160 µm	5 – 12
80 µm	3 – 5

PART 3 EXECUTION

3.1 Site Preparation

.1 Remove obstructions from surfaces to be excavated within limits indicated.

3.2 Preparation/ Protection

.1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.4 Protect buried services that are required to remain undisturbed.

3.3 Stockpiling

.1 Stockpile fill materials in areas designated by Departmental Representative.
  .1 Stockpile granular materials in manner to prevent segregation.
  .2 Protect fill materials from contamination.
  .3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.4 Cofferdams, Shoring, Bracing and Underpinning

.1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29.06 - Health and Safety Requirements and Health and Safety Act for the Province of Nova Scotia.
  .1 Where conditions are unstable, Departmental Representative to verify and advise methods.

.2 Obtain permit from authority having jurisdiction for temporary diversion of water course.

.3 Construct temporary Works to depths, heights and locations as directed by Departmental Representative.

.4 During backfill operation:
- .1 Unless otherwise indicated or directed by Departmental Representative, remove sheeting and shoring from excavations.
- .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
- .3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.

.5 When sheeting is required to remain in place, cut off tops at elevations as indicated.

.6 Upon completion of substructure construction:
- .1 Remove cofferdams, shoring and bracing.
- .2 Remove excess materials from site and restore watercourses as directed by Departmental Representative.

3.5 Dewatering and Heave Prevention

.1 Keep excavations free of water while Work is in progress.

.2 Provide for Departmental Representative’s review and approval details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cutoffs.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
- .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures and in a manner not detrimental to public and private property, or portion of Work completed or under construction.

.1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

.6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

3.6 Excavation

.1 Advise Departmental Representative at least 7 days in advance of excavation operations for initial cross sections to be taken.

.2 Excavate to lines, grades, elevations and dimensions as directed by Departmental Representative.

.3 Remove obstructions encountered during excavation in accordance with Section 02 41 13 - Selective Site Demolition.

.4 Excavation will not interfere with bearing capacity of adjacent foundations.

.5 Do not disturb soil within branch spread of trees or shrubs that are to remain.

.1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.6 Keep excavated and stockpiled materials safe distance away from edge of excavation as directed by Departmental Representative.

.7 Restrict vehicle operations directly adjacent to open excavations.

.8 Dispose of surplus and unsuitable excavated material as directed by the Departmental Representative.

.9 Do not obstruct flow of surface drainage or natural watercourses.

.10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.11 Notify Departmental Representative when bottom of excavation is reached.

.12 Obtain Departmental Representative approval of completed excavation.

.14 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.

.15 Correct unauthorized over-excavation as follows:
.1 Fill under areas with Gravel Borrow (NSTIR Standard Specification Division 3 – Granular Materials, Section 1 – Gravel Borrow compacted to not less than 95 % of corrected Standard Proctor maximum dry density.

.16 Hand trim, make firm and remove loose material and debris from excavations.
.1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

3.7 Backfilling

.1 Do not proceed with backfilling operations until completion of following:
.1 Departmental Representative has inspected and approved installations and construction below finished grade.
.2 Inspection, testing, approval and recording location of underground utilities.
.3 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.5 Backfilling around installations:
- .1 Place bedding and surround material as specified elsewhere.
- .2 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 300mm.

3.8 Restoration

.1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21 - Construction/Demolition Waste Management and Disposal, trim slopes, and correct defects as directed by Departmental Representative.

.2 Replace topsoil as directed by Departmental Representative.

.3 Reinstate lawns to elevation which existed before excavation.

.4 Clean and reinstate areas affected by Work as directed by Departmental Representative.

.5 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END

PART 1 GENERAL

1.1 Related Requirements

.1 Section 32 92 23 - Sodding

1.2 References

.1 Agriculture and Agri-Food Canada
  .1 The Canadian System of Soil Classification, Third Edition, 1998.

.2 Canadian Council of Ministers of the Environment PN1340-2005, Guidelines for Compost Quality.

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

.4 Nova Scotia Department of Transportation and Infrastructure Renewal Standard Specification (most recent version):
  .1 NSTIR Standard Specification – Division 7 – Environmental Protection, Section 8 – Topsoil.

1.3 Definitions

.1 Compost:
  .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.
  .2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.
  .3 Product will be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below 25, and contain no toxic or growth inhibiting contaminates).
  .4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A) (B).

1.4 Submittals

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

.2 Quality control submittals:
.1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.
.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 Quality Assurance

.1 Perform Work in accordance with the projects Erosion and Sedimentation Control Plan as specified in Section 01 35 43 – Environmental Procedures.

.2 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Division 1.

1.6 Waste Management and Disposal

.1 Separate waste materials for reuse and recycling in accordance with Division 1.

.2 Divert unused soil amendments from landfill to official hazardous material collections site approved by Departmental Representative.

.3 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

PART 2 PRODUCTS

2.1 Topsoil

.1 Existing Topsoil: if available, to be used on all areas in amended form, salvaged topsoil to meet following criteria:
  .1 50% sand maximum and 3 to 10% organic content.
  .2 Fertility: major soil nutrients present in following ratios:
    .1 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
    .2 Natural Phosphorus (P): 10 to 20 micrograms of phosphate per gram of topsoil.
    .3 Potassium (K): 80 to 120 micrograms of potash per gram of topsoil.
    .4 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
  .3 pH value: 6.0 – 7.5
  .4 Contain no toxic elements or growth inhibiting materials.
  .5 Free from:
    .1 Debris and stones over 10 mm diameter.
    .2 Coarse vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
  .6 Consistence: friable when moist.
  .7 Double screen salvaged topsoil to remove all stones over 10 mm diameter.

2.2 Soil Amendments

.1 Fertilizer:
  .1 Fertility: major soil nutrients present in following amounts:
  .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
  .3 Natural Phosphate products (P): 40 to 50 micrograms of phosphate per gram of topsoil.
  .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
  .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to

support germination and/or establishment of intended vegetation.
.6 pH value: 5.5 to 7.5.

.2 Peatmoss:
.1 Derived from partially decomposed species of Sphagnum Mosses.
.2 Elastic and homogeneous, brown in colour.
.3 Free of wood and deleterious material which could prohibit growth.
.4 Shredded particle minimum size: 5 mm.

.3 Sand: washed coarse silica sand, medium to coarse textured.

.4 Organic matter: compost Category A, B in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.

.5 Limestone:
.1 Ground agricultural limestone.
.2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.

.6 Fertilizer: industry accepted “phosphate free” standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

2.3 Source Quality Control

.1 Advise Departmental Representative of sources of topsoil and manufactured topsoil to be utilized with sufficient lead time for testing.

.2 Contractor is responsible for amendments to existing topsoil and to supply topsoil as specified.

.3 Soil testing by recognized testing facility for pH, P and K, and organic matter. Soil test to identify amendments necessary to meet requirements for topsoil as specified.

.4 Testing of topsoil will be carried out by testing laboratory designated by Departmental Representative.
.1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

PART 3 EXECUTION

3.1 Placing and Spreading of Topsoil/ Planting Soil

.1 Place topsoil after Departmental Representative has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 150 mm.

.3 For sodded areas keep topsoil 15 mm below finished grade.

.4 Spread topsoil as indicated to following minimum depths after compaction to 85% Modified Proctor Density.
200 mm for sodded areas.

.5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.2 Soil Amendments

.1 Apply soil amendments with rules as specified and as determined by soil sample test.

3.3 Finish Grading

.1 Grade to eliminate rough spots and low areas and ensure positive drainage.
.1 Prepare loose friable bed by means of cultivation and subsequent raking.
.2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.
.1 Leave surfaces smooth, uniform and firm against deep foot printing.

3.4 Acceptance

.1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.5 Surplus Material

.1 Dispose of materials except topsoil not required where directed by Departmental Representative.

3.6 Cleaning

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

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END

PART 1 GENERAL

1.1 Related Requirements

.1 Section 31 23 33 – Excavating, Trenching and Backfilling

1.2 Payment Procedures

.1 Testing of topsoil: Departmental Representative will pay for cost of tests.

1.3 References

.1 Nova Scotia Department of Transportation and Infrastructure Renewal Standard Specification (most recent version):
.1 NSTIR Standard Specification – Division 7 – Environmental Protection, Section 8 – Topsoil.

1.4 Administrative Requirements

.1 Scheduling:
.1 Schedule sod laying to coincide with preparation of soil surface.
.2 Schedule sod installation when frost is not present in ground.
.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section [01 31 19 - Project Meetings].

1.5 Submittals

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

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for sod, geotextile and fertilizer and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit [2] copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.3 Samples.
.1 Submit:
.1 Sod for each type specified.
.1 Install approved samples in one square metre mock-ups and maintain in accordance with maintenance requirements during establishment period.
.2 Bio-degradable geotextile fabric.
.3 0.5 kg container of fertilizer.
.2 Obtain approval of samples by Departmental Representative.

.4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements of seed mix, seed purity, and sod quality.

.5 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties of seed mix, seed purity, and sod quality.

1.6 Quality Assurance

.1 Perform Work in accordance with the project Erosion and Sedimentation Control Plan as specified in Section 01 35 43 – Environmental Procedures.

1.7 Delivery, Storage and Handling

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer’s name and address.

1.8 Waste Management and Disposal

.1 Separate waste materials for reuse and recycling in accordance with Division 1.

.2 Divert unused soil amendments from landfill to official hazardous material collections site approved by Departmental Representative.

.3 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

PART 2 PRODUCTS

2.1 Materials

.1 Commercial Grade Turf Grass Nursery:
- .1 Mow sod at height directed by Departmental Representative within 36 hours prior to lifting, and remove clippings.
- .2 Not more than 5 broadleaf weeds and up to 20% native grasses per 40 square metres.

.2 Sod establishment support:
- .1 Geotextile fabric: biodegradable, square mesh.
- .2 Wooden pegs: [17 x 8 x 200] mm.
- .3 Biodegradable starch pegs: [17 x 8 x 200] mm

.3 Water:
- .1 Supplied by Departmental Representative at designated source.

.4 Fertilizer:
.1 To Canada "Fertilizers Act" and Fertilizers Regulations.
.2 Complete, synthetic, slow release with [65] % of nitrogen content in water-insoluble form.

2.2 Source Quality Control

.1 Obtain written approval from Departmental Representative of sources of sod at source.

.2 When proposed source of sod is approved, use no other source without written authorization from Departmental Representative.

PART 3 EXECUTION

3.1 Examination

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sod installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Departmental Representative.
.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from Departmental Representative.

3.2 Preparation

.1 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.

.2 Fine grade surface free of humps and hollows to

smooth, even grade, to tolerance of plus or minus 15 mm for Commercial Grade Turf Grass Nursery, surface to drain naturally.

.3 Remove and dispose of weeds; debris; stones [50] mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site or as directed by Departmental Representative in accordance with Section 01 74 21 - Construction/ Demolition Waste Management and Disposal.

3.3 Sod Placement

.1 Lay sod within [24] hours of being lifted if air temperature exceeds 20 degrees C.

.2 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.

.3 Roll sod as directed by Departmental Representative. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.4 Fertilizing Program

.1 Fertilize during establishment and warranty periods.

3.5 Cleaning

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .1 Leave Work area clean at end of each day.
- .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance

with Section 01 74 11 - Cleaning.
.1 Clean and reinstate areas affected by Work.

.3 Waste Management: separate waste materials for reuse, compost, and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
.1 Remove recycling and compost containers and bins from site and dispose of materials at appropriate facility.
.2 Divert unused fertilizer from landfill to official hazardous material collections site approved by Departmental Representative.

3.6 Protection Barriers

.1 Protect newly sodded areas from deterioration with snow fence on rigid frame or as directed by Departmental Representative.

.2 Remove protection 2 weeks after installation as directed by Departmental Representative.

3.7 Maintenance During Establishment Period

.1 Perform following operations from time of installation until acceptance.
.1 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.
.2 Cut grass to 50 mm when or prior to it reaching height of 75 mm.

3.8 Acceptance

.1 Sodded Commercial Grade Turf Grass Nursery Sod areas will be accepted by Departmental Representative provided that:
.1 Sodded areas are properly established.
.2 Extent of surface soil visible when grass has been cut to height of 60 mm is acceptable.
.3 Sod is free of bare or dead spots and extent of

weeds apparent in grass is acceptable.

.4 Sodded areas have been cut minimum 2 times prior to acceptance.

.5 Fertilizing in accordance with fertilizer program has been carried out at least once.

.2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.9 Maintenance During Warranty Period

.1 Perform following operations from time of acceptance until end of warranty period:

.1 Water sodded areas at weekly intervals to obtain optimum soil moisture conditions to depth of 75 to 100 mm.

.2 Repair and resod dead or bare spots to satisfaction of Departmental Representative.

.3 Cut grass and remove clippings that will smother grass as directed by Departmental Representative to height as follows:

.1 Commercial Grade Turf Grass Nursery Sod:

.1 60 mm during normal growing conditions

.2 Cut grass at 2 week intervals or as directed by Departmental Representative, but at intervals so that approximately one-third of growth is removed in single cut.

.3 Fertilize areas in accordance with fertilizing program.

.4 Eliminate weeds by mechanical or chemical means to extent acceptable to Departmental Representative.

END