

SPECIFICATION

MALADY HEAD CONCESSION AREA DEVELOPMENT
TERRA NOVA NATIONAL PARK, NL


P/N: 455

PREPARED FOR


Parks Canada

DATE

August 21, 2019

PROVINCE OF NEWFOUNDLAND

 PERMIT HOLDER
 Class "A"
 This Permit Allows
CROSBIE ENGINEERING LIMITED

To practice Professional Engineering
 in Newfoundland and Labrador
 Permit No. as issued by PEG-NL D0123
 which is valid for the year 2019.

PROVINCE OF NEWFOUNDLAND

 PERMIT HOLDER
 This Permit Allows
 AFN ENGINEERING INC.

To practice Professional Engineering
 in Newfoundland and Labrador.
 Permit No. as issued by APEGNL F0292
 which is valid for the year 2019.



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DRAWING NO

TITLE

A1	Concession Stand Plans Elevations and Schedules
A2	Kiosk Renovation Demolition New Construction Plans Elevations
A3	Sections Details
A4	Accessibility Schedules
C1	Malady Head Partial Site Plan
MP-1	Plumbing Layout
MP-2	Septic Field Layout
MP-3	Septic Field Details
E1	Legend
E2	Concession Building & Kiosk Floor Plans - Electrical Layouts

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APPENDIX A: PARKS CANADA BASIC IMPACT ANALYSIS

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1.1 SCOPE .1 The work consists of the furnishing of all plant, labour, equipment and material for kiosk renovations and new concession building construction in Terra Nova National Park, NL, in strict accordance with specifications and accompanying drawings and subject to all terms and conditions of the Contract.

1.2 DESCRIPTION OF WORK .1 In general, work under this contract consists of construction of two (2) new concession building structures and renovations to an existing kiosk (including new septic tank and tile field).

Do not proceed with any portion of the work until the Departmental Representative has approved the Contractor's written work plan.

1.3 SITE OF WORK .1 Work will be carried out in Terra Nova National Park, NL.

1.4 DATUM .1 If requested by the Contractor, the Departmental Representative will establish a benchmark prior to the start of work activities.

1.5 FAMILIARIZATION WITH SITE .1 Before submitting a bid, it is recommended that bidders visit the site and its surroundings to review and verify the form, nature and extent of the work, materials needed for the completion of the work, the means of access to the site, any accommodations they may require, and in general shall obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid or costs to do the work. No allowance shall be made subsequently in

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this connection on account of error or negligence to properly observe and determine the conditions that will apply.

- .2 Contractors, bidders or those they invite to site are to review specification Section 01 35 29 - Health and Safety Requirements before visiting site. Take all appropriate safety measures for any visit to site, either before or after acceptance of bid.
- .3 Obtain prior permission from the Departmental Representative before carrying out such site inspection.

1.6 CODES AND STANDARDS

- .1 Perform work in accordance with the latest edition of the National Building Code of Canada, and any other code of provincial or local application including all amendments up to project bid closing date provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
- .2 Materials and workmanship must meet or exceed requirements of specified standards, codes and referenced documents.

1.7 TERM ENGINEER

- .1 Unless specifically stated otherwise, the term Engineer where used in the Specifications and on the Drawings shall mean the Departmental Representative.

1.8 SETTING OUT WORK

- .1 Set grades and layout work in detail from control points and grades established by Departmental Representative.
- .2 Assume full responsibility for and execute complete layout of work to locations,

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lines and elevations indicated or as directed by Departmental Representative.

- .3 Provide devices needed to layout and construct work.
- .4 Supply such devices required to facilitate Departmental Representative's inspection of work.

1.9 COST BREAKDOWN

- .1 Before submitting first progress claim submit breakdown of Contract price in detail as directed by Departmental Representative and aggregating contract price.
- .2 Provide cost breakdown in same format as the numerical and subject title system used in this specification project manual and thereafter sub-divided into major work components as directed by Departmental Representative.
- .3 Upon approval by Departmental Representative, cost breakdown will be used as basis for progress payment.
- .4 This will be a lump sum project. Individual work items will not be measured separately for payment.

1.10 WORK SCHEDULE

- .1 Submit within 7 work days of notification of acceptance of bid, a construction schedule showing commencement and completion of all work within the time stated on the Bid and Acceptance Form and the date stated in the bid acceptance letter.
- .2 Provide sufficient details in schedule to clearly illustrate entire implementation plan, depicting efficient coordination of

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tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.

- .3 As a minimum, work schedule to be prepared and submitted in the form of Bar (GANTT) Charts, indicating work activities, tasks and other project elements, their anticipated durations and planned dates for achieving key activities and major project milestones provided in sufficient details and supported by narratives to demonstrate a reasonable plan for completion of project within designated time. Generally Bar Charts derived from commercially available computerized project management system are preferred but not mandatory.
- .4 Submit schedule updates on a minimum bi-weekly basis and more often, when requested by Departmental Representative, due to frequent changing project conditions. Provide a narrative explanation of necessary changes and schedule revisions at each update.
- .5 The schedule, including all updates, shall be to Departmental Representative's approval. Take necessary measures to complete work within approved time. Do not change schedule without Departmental Representative's approval.
- .6 All work on the project will be completed within the time indicated on the Bid and Acceptance Form.

1.11 ABBREVIATIONS

- .1 Following abbreviations of standard specifications have been used in this specification and on the drawings:

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CGSB - Canadian Government Specifications Board
CSA - Canadian Standards Association
NLGA - National Lumber Grades Authority
ASTM - American Society for Testing and Materials

- .2 Where these abbreviations and standards are used in this project, latest edition in effect on date of bid call will be considered applicable.

1.12 SITE OPERATIONS

- .1 Arrange for sufficient space adjacent to project site for conduct of operations, storage of materials and so on. Exercise care so as not to obstruct or damage public or private property in area. All arrangements for space and access will be made by Contractor.

1.13 PROJECT MEETINGS

- .1 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording minutes.
- .2 Project meetings will take place on site of work unless so directed by the Departmental Representative.
- .3 Departmental Representative will assume responsibility for recording minutes of meetings and forwarding copies to all parties present at the meetings.
- .4 Have a responsible member of firm present at all project meetings.

1.14 PROTECTION

- .1 Store all materials and equipment to be incorporated into work to prevent damage by any means.
- .2 Repair or replace all materials damaged in

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transit or storage to the satisfaction of Departmental Representative and at no cost to Canada.

1.15 EXISTING SERVICES

- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to site operations, and tenant operations.
- .2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.
- .3 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of services. Provide temporary services when directed by Departmental Representative to maintain critical facility systems.

1.16 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract Drawings
 - .2 Specifications
 - .3 Addenda
 - .4 Contract and any resulting amendments signed by contracting authority.
 - .5 Test Reports
 - .6 Copy of Approved Work Schedule
 - .7 Site specific Health and Safety Plan and other safety related documents.

1.17 PERMITS

- .1 Obtain and pay for all permits, certificates and licenses as required by Municipal, Provincial, Federal and other Authorities.
- .2 Provide appropriate notifications of project to municipal and provincial inspection authorities.

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- .3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.
- .4 Submit to Departmental Representative, copy of application submissions and approval documents received for above referenced authorities.
- .5 Comply with all requirements, recommendations and advice by all regulatory authorities unless otherwise agreed in writing by Departmental Representative. Make requests for such deviations to these requirements sufficiently in advance of related work.

1.18 CUTTING,
FITTING AND
PATCHING

- .1 Execute cutting, including excavation, fitting and patching required to make work fit properly.

1.19 ACCEPTANCE

- .1 Prior to the issuance of the Certificate of Substantial Performance, in company with Departmental Representative, make a check of all work. Correct all discrepancies before final inspection and acceptance.

1.20 WORKS
COORDINATION

- .1 Responsible for coordinating the work of the various trades, where the work of such trades interfaces with each other.
- .2 Convene meetings between trades whose work interfaces and ensure that they are fully aware of the areas and the extent of where interfacing is required. Provide each trade with the plans and specifications of the interfacing trade, as required, to

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assist them in planning and carrying out their respective work.

- .3 Canada will not be responsible for or held accountable for any extra costs incurred as a result of the failure to carry out coordination work. Disputes between the various trades as a result of their not being informed of the areas and extent of interface work shall be the sole responsibility of the General Contractor and shall be resolved at no extra cost to Canada.

1.21 CONTRACTOR'S
USE OF SITE

- .1 Responsible for arranging the storage of materials on or off site, and any materials stored at the site which interfere with any of the day to day activities at or near the site will be moved promptly at the Contractor's expense, upon request by Departmental Representative.
- .2 Exercise care so as not to obstruct or damage public or private property in the area.
- .3 At completion of work, restore area to its original condition. Damage to ground and property will be repaired by Contractor. Remove all construction materials, residue, excess, etc., and leave site in a condition acceptable to Departmental Representative.

1.22 WORK
COMMENCEMENT

- .1 Mobilization to project site is to commence immediately after acceptance of bid and submission of Site Specific Safety Plan and insurance and bonding documentation, unless otherwise agreed by Departmental Representative.

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- .2 Project work on site is to commence as soon as possible, with a continuous reasonable work force, unless otherwise agreed by Departmental Representative.
- .3 Delivery challenges, coordination with site users, and the location of the work site may require the use of longer working days and additional work force to complete the project within the specified completion time.
- .4 Make every effort to ensure that sufficient material and equipment is delivered to site at the earliest possible date after acceptance of bid and replenished as required.

1.23 SPECIES AT RISK

- .1 Terra Nova National Park is home to the Little Brown Myotis and Northern Myotis, which are a species of bats classified as Endangered under the Species at Risk Act. The Contractor is to note that if they encounter bats in the existing kiosk or any partially built new infrastructure, the following is required:
 - 1. Immediately notify the Departmental Representative for directives to be followed.
 - 2. Stop work activities and do not disturb the roost.
 - 3. Do not initiate further work activities until the bat vacates the premises. The expected time frame for a male bat to vacate the premises would be in the order of 1-3 days. In the event a maternity roost is discovered (females with pups), the expected time frame for the bats to vacate the premises would be in the order of 1-3 weeks.
 - 4. Departmental Representative will make final decision regarding shut-down times

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and work return times, as it relates to the discovery of bats in the work infrastructure. Note that there will be no additional cost to Canada for downtime associated with the discovery of endangered bats in the work infrastructure and the subsequent no-work periods established by the Departmental Representative.

PART 1 - GENERAL

1.1 SECTION
INCLUDES

- .1 Product data.
- .2 Samples.
- .3 Certificates.

1.2 SUBMITTAL
GENERAL REQUIREMENTS

- .1 Submit to Departmental Representative for review submittals listed, including samples, certificates and other data, as specified in other sections of the Specifications. Note that any and all changes to the contract will have to be approved in writing by the Contracting Authority. Departmental Representative will provide a list of required samples/product data sheets to be provided, after contract award.
- .2 Submit with reasonable promptness and in orderly sequence so as to allow for Departmental Representative's review and not cause delay in Work. Failure to submit in ample time will not be considered sufficient reason for an extension of Contract time and no claim for extension by reason of such default will be allowed.
- .3 Do not proceed with work until relevant submissions are reviewed by Departmental Representative.
- .4 Present product data, samples and mock-ups in SI Metric units.
- .5 Where items or information is not produced in SI Metric units, provide soft converted values.
- .6 Review submittals prior to submission to Departmental Representative. Ensure during review that necessary requirements have been

determined and verified, required field measurements or data have been taken, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents.

.1 Submittals not stamped, signed, dated and identified as to specific project will be returned unexamined by Departmental Representative and considered rejected.

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

.8 Verify field measurements and affected adjacent work and coordinate.

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

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

.11 Submittal format: paper originals, or alternatively clear and fully legible photocopies of originals. Facsimiles are not acceptable, except in special circumstances pre-approved by Departmental Representative. Poorly printed non-legible photocopies or facsimiles will not be accepted and be returned for resubmission.

.12 Make changes or revision to submissions which Departmental Representative may require, consistent with Contract Documents and resubmit as directed by Departmental Representative. When resubmitting, notify Departmental Representative in writing of any

revisions other than those requested.

- .13 Keep one reviewed copy of each submittal document on site for duration of Work.

1.3 PRODUCT DATA

- .1 Product data includes drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit sufficient copies of product data which are required by the General Contractor and sub-contractors plus 2 copies which will be retained by Departmental Representative. Ensure sufficient numbers are submitted to enable one complete set to be included in each of the maintenance manuals specified, if applicable.
- .3 Allow 10 calendar days for Departmental Representative's review of each submission.
- .4 Adjustments or corrections made on product data by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, advise Departmental Representative in writing prior to proceeding with Work.
- .5 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections and comments are made, fabrication and installation may proceed upon receipt of shop drawings. If product data are rejected and noted to be Resubmitted, do not proceed with that portion of work until resubmission and review of corrected product data, through same submission procedures indicated above.
- .6 Accompany each submission with transmittal letter, containing:
 - .1 Date.

- .2 Project title and project number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each product data and sample.
- .5 Other pertinent data.
- .7 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and project number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Cross references to particular details of contract drawings and specifications section number for which product data submission addresses.
 - .6 Details of appropriate portions of Work.
- .8 After Departmental Representative's review, distribute copies.
- .9 The review of samples and product data by the Departmental Representative or their delegated representative is for sole purpose of ascertaining conformance with general concept. This review shall not mean that the Departmental Representative approves the detail design inherent in the product data, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in product data or of responsibility for meeting all requirements of the construction and Contract Documents. 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 all sub-trades.

1.4 SCHEDULES,
PERMITS AND
CERTIFICATES

- .1 Upon acceptance of bid, submit to Departmental Representative copy of Work Schedule and various other schedules, permits, certification documents and project management plans as specified in other sections of the Specifications.
- .2 Submit copy of permits, notices, compliance Certificates received by Regulatory Agencies having jurisdiction and as applicable to the Work.
- .3 Submission of above documents to be in accordance with Submittal General Requirements procedures specified in this section.

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- 1.1 SECTION INCLUDES .1 Fire Safety Requirements.
- .2 Hot Work Permit.
- 1.2 RELATED WORK .1 Section 01 35 29 - Health and Safety Requirements.
- 1.3 REFERENCES .1 Fire Protection Standards issued by Fire Protection Services of Human Resources Development Canada as follows:
- .1 National Fire Code - Standard for Construction Operations - latest edition (http://www.hrsdc.gc.ca/eng/labour/fire_protection/policies_standards/commissioner/301/page00.shtml).
- .2 National Fire Code - Standard for Welding and Cutting - latest edition (http://www.hrsdc.gc.ca/eng/labour/fire_protection/policies_standards/commissioner/302/page00.shtml).
- .3 FCC standards, may also be viewed at the Regional Labour Canada Office located at Baine Johnson Centre, 10 Fort William Place, St. John's, NL, A1C 1K4; Telephone 1-800-641-4049; fax 1-709-772-5985.
- 1.4 DEFINITIONS .1 Hot Work defined as:
- .1 Welding work.
- .2 Cutting of materials by use of torch or other open flame devices.
- .3 Grinding with equipment which produces sparks.
- 1.5 SUBMITTALS .1 Submit copy of Hot Work Procedures and sample of Hot Work permit to Departmental Representative for review, within five (5) calendar days after notification of acceptance of bid.
- .2 Submit in accordance with the Submittal General Requirements specified in Section

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01 33 00.

1.6 FIRE SAFETY
REQUIREMENTS

- .1 Implement and follow fire safety measures during Work. Comply with following:
 - .1 National Fire Code, latest edition.
 - .2 Fire Protection Standards FCC 301 and FCC 302 - latest edition.
 - .3 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 29 - Health and Safety Requirements.
- .2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

1.7 HOT WORK
AUTHORIZATION

- .1 Obtain Departmental Representative's written "Authorization to Proceed" before conducting any form of Hot work on site.
- .2 To obtain authorization submit to Departmental Representative:
 - .1 Contractor's typewritten Hot Work Procedures to be followed on site as specified below.
 - .2 Description of the type and frequency of Hot Work required.
 - .3 Sample Hot Work Permit to be used.
- .3 Upon review and confirmation that effective fire safety measures will be implemented during performance of hot work, Departmental Representative will provide authorization to proceed as follows:
 - .1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;
 - .2 Separate work, or segregate certain parts of work, into individual entities. Each

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entity requiring a separately written "Authorization to Proceed" from Departmental Representative. Follow Departmental Representative's directives in this regard.

- .4 Requirement for individual authorization based on:
 - .1 Nature or phasing of work;
 - .2 Risk to Facility operations;
 - .3 Quantity of various trades needing to perform hot work on project or;
 - .4 Other situation deemed necessary by Departmental Representative to ensure fire safety on premises.
- .5 Do not perform any Hot Work until receipt of Departmental Representative's written "Authorization to Proceed" for that portion of work.

1.8 HOT WORK PROCEDURES

- .1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.
- .2 Procedures to include:
 - .1 Requirement to perform hazard assessment of site and immediate hot work area for each hot work event in accordance with Hazard Assessment and Safety Plan requirements of Section 01 35 29.
 - .2 Use of a Hot Work Permit system for each hot work event.
 - .3 The step by step process of how to prepare and issue permit.
 - .4 Permit shall be issued by Contractor's site Superintendent, or other authorized person designated by Contractor, granting permission to worker or subcontractor to proceed with hot work.
 - .5 Provision of a designated person to carryout a Fire Safety Watch for a minimum of 60 minutes immediately upon completion of the hot work.

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.6 Compliance with fire safety codes and standards specified herein and occupational health and safety regulations specified in Section 01 35 29.

.3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Clearly label as being the Hot Work Procedures applicable to this contract.

.4 Hot Work Procedures shall clearly establish worker instructions and allocate responsibilities of:

.1 Worker(s),

.2 Authorized person issuing the Hot Work Permit,

.3 Fire Safety Watcher,

.4 Subcontractors and Contractor.

.5 Brief all workers and subcontractors on Hot Work Procedures and Permit system established for project. Stringently enforce compliance.

.1 Failure to comply with the established procedures may result in the issuance of a Non-Compliance Notification at Departmental Representative's discretion with possible disciplinary measures imposed as specified in Section 01 35 29.

1.9 HOT WORK
PERMIT

.1 Hot Work Permit to include, as a minimum, the following data:

.1 Project name and project number.

.2 Building name, address and specific room or area where hot work will be performed.

.3 Date when permit issued.

.4 Description of hot work type to be performed.

.5 Special precautions required, including type of fire extinguisher needed.

.6 Name and signature of person authorized to issue the permit.

.7 Name of worker (clearly printed) to

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which the permit is being issued.

.8 Time Duration that permit is valid (not to exceed 8 hours). Indicate start time and date, and completion time and date.

.9 Worker signature with date and time upon hot work termination.

.10 Specified time period requiring safety watch.

.11 Name and signature of designated Fire Safety Watcher, complete with time and date when safety watch terminated, certifying that surrounding area was under continual surveillance and inspection during the full watch time period specified in Permit and commenced immediately upon completion of Hot Work.

.2 Permit to be typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.

.3 Each Hot Work Permit to be completed in full and signed as follows:

.1 Authorized person issuing Permit before hot work commences.

.2 Worker upon completion of Hot Work.

.3 Fire Safety Watcher upon termination of safety watch.

.4 Returned to Contractor's Site Superintendent for safe keeping.

1.10 DOCUMENTS
ON SITE

.1 Keep Hot Work Permits and Hazard assessment documentation on site for duration of Work.

.2 Upon request, make available to Departmental Representative or to authorized safety representative for inspection.

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- 1.1 SECTION INCLUDES .1 Procedures to isolate and lockout electrical facility or other equipment from energy source.
- 1.2 RELATED WORK .1 Section 01 35 24 - Fire Safety Requirements.
.2 Section 01 35 29 - Health and Safety Requirements.
- 1.3 REFERENCES .1 C22.1-06 - Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
.2 CAN/CSA C22.3 No. 1-10 - Overhead Systems.
.3 COSH, Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.
- 1.4 DEFINITIONS .1 Electrical Facility: means any system, equipment, device, apparatus, wiring, conductor, assembly or part thereof that is used for the generation, transformation, transmission, distribution, storage, control, measurement or utilization of electrical energy, and that has an amperage and voltage that is dangerous to persons.
.2 Guarantee of Isolation: means a guarantee by a competent person in control or in charge that a particular facility or equipment is isolated.
.3 De-energize: in the electrical sense, that a piece of equipment is isolated and grounded, e.g. if the equipment is not grounded, it cannot be considered de-energized (DEAD).
.4 Guarded: means that an equipment or facility is covered, shielded, fenced, enclosed, inaccessible by location, or otherwise

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protected in a manner that, to the extent that is reasonably practicable, will prevent or reduce danger to any person who might touch or go near such item.

- .5 Isolate: means that an electrical facility, mechanical equipment or machinery is separated or disconnected from every source of electrical, mechanical, hydraulic, pneumatic or other kind of energy that is capable of making it dangerous.
- .6 Live/alive: means that an electrical facility produces, contains, stores or is electrically connected to a source of alternating or direct current of an amperage and voltage that is dangerous or contains any hydraulic, pneumatic or other kind of energy that is capable of making the facility dangerous to persons.

1.5 COMPLIANCE REQUIREMENTS

- .1 Perform lockouts in compliance with:
 - .1 Canadian Electrical Code.
 - .2 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 29.
 - .3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.
 - .4 Procedures specified herein.
- .2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

1.6 SUBMITTALS

- .1 Submit copy of proposed Lockout Procedures and sample form of lockout permit or lockout tags for review.

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- .2 Submit documentation within 7 calendar days of acceptance of bid. Do not proceed with work until submittal has been reviewed by Departmental Representative.
- .3 Submit above documents in accordance with the submittal requirements specified in Section 01 33 00.
- .4 Resubmit Lockout Procedures with noted revisions as may result from Departmental Representative's review.

1.7 ISOLATION OF
EXISTING SERVICES

- .1 Obtain Departmental Representative's written authorization prior to conducting work on an existing active, energized service or facility required as part of the work and before proceeding with lockout of such services or facility.
- .2 To obtain authorization, submit to Departmental Representative the following documentation:
 - .1 Written Request for Isolation of the service or facility and;
 - .2 Copy of Contractor's Lockout Procedures.
- .3 Make a Request for Isolation for each event, unless directed otherwise by Departmental Representative, and as follows:
 - .1 Fill-out standard forms in current use at the Facility when so directed by Departmental Representative or;
 - .2 Where no form exist at Facility, make request in writing identifying:
 - .1 Identification of system or equipment to be isolated, including it's location;
 - .2 Time duration, indicating Start time and date, and Completion time and date when isolation will be in effect;

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- .3 Voltage of service feed to system or equipment being isolated;
- .4 Name of person making the request.
- .3 Document to be in typewritten format.
- .4 Do not proceed until receipt of written notification from Departmental Representative granting the Isolation Request and authorization to proceed with the isolation of designated equipment or facility. Departmental Representative may designate other individual at the Facility as the person authorized to grant the Isolation Request.
- .5 Conduct safe, orderly shut down of equipment or facilities, de-energize and isolate power and other sources of energy and lockout items in accordance with requirement of clause 1.8 below.
- .6 Plan and schedule shut down of existing services in consultation with the Departmental Representative and the Facility Manager. Minimize impact and downtime of facility operations.
- .7 Determine in advance, as much as possible, in cooperation with the Departmental Representative, the type and frequency of situations which will require a Request for Isolation. Follow Departmental Representative's directives in this regard.
- .8 Conduct hazard assessment as part of the planning process of isolating existing equipment and facilities. Hazard Assessments to conform with requirements of Health and Safety Section 01 35 29.

1.8 LOCKOUTS

- .1 Isolate and lockout electrical facilities, mechanical equipment and machinery from all potential energy sources prior to starting

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work on such items.

- .2 Develop and implement lockout procedures to be followed on site as an integral part of the Work.
- .3 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.
- .4 Use industry standard lockout tags.
- .5 Provide appropriate safety grounding and guards as required.
- .6 Prepare Lockout Procedures in writing. Describe safe work practices, work functions and sequence of activities to be followed on site to safely isolate all potential energy sources and lockout/tagout facilities and equipment.
- .7 Include within procedures a system of worker request and issuance of individual lockout permit by a person, employed by Contractor, designated to be "in-charge" and being responsible for:
 - .1 Controlling issuance of permits or tags to workers.
 - .2 Determining permit duration.
 - .3 Maintaining record of permits and tags issued.
 - .4 Submitting a Request for Isolation to Departmental Representative when required in accordance with Clause 1.7 above.
 - .5 Designating a Safety Watcher, when one is required based on type of work.
 - .6 Ensuring equipment or facility has been properly isolated, providing a Guarantee of Isolation to worker(s) prior to proceeding with work.
 - .7 Collecting and safekeeping lockout

tags, returned by workers, as a record of the event.

- .8 Clearly establish, describe and allocate, within procedures, the responsibilities of:
 - .1 Workers.
 - .2 Designated person controlling issuance of lockout tags/permits.
 - .3 Safety Watcher.
 - .4 Subcontractors and General Contractor.
- .9 Procedures shall meet the requirements of Codes and Regulations specified in clause 1.5 above.
- .10 Generic procedures, if used, must be edited, supplemented with pertinent information and tailored to reflect specific project conditions. Clearly label as being the procedures applicable to this contract.
 - .1 Incorporate site specific rules and procedures established by Facility Manager and in force at site. Obtain such procedures through Departmental Representative.
- .11 Procedures to be in typewritten format.
- .12 Submit copy of Lockout Procedures to Departmental Representative, in accordance with submittal requirements of clause 1.6 herein, prior to commencement of work.

1.9 CONFORMANCE

- .1 Ensure that lockout procedures, as established for project on site, are stringently followed. Enforce use and compliance by all workers.
- .2 Brief all persons working on electrical facilities, mechanical and other equipment fed by an energy source on requirements of this section.

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- .3 Failure to perform lockouts in accordance with regulatory requirements or follow procedures specified herein may result in the issuance of a Non-Compliance Notification at Departmental Representative's discretion with possible disciplinary measures imposed as specified in Section 01 35 29.

1.10 DOCUMENTS
ON SITE

- .1 Post Lockout Procedures on site in common location for viewing by workers.
- .2 Keep copies of Request for Isolation submitted to Departmental Representative and lockout permits or tags issued to workers during the course of work for full project duration.
- .3 Upon request, make such data available to Departmental Representative or to authorized safety representative for inspection.

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- 1.1 RELATED WORK .1 Section 01 35 24 - Special Procedures on Fire Safety Requirements.
- 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.
- .2 Submit to Departmental Representative, copies of the following documents including updates.
- .1 Site specific Health and Safety Plan.

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- .2 Building permit, compliance certification and other permits obtained.
- .3 Reports or directives issued by Federal and Provincial Inspectors and other Authorities having jurisdiction.
- .4 Accident or incident reports.
- .5 WHMIS - MSDS data sheets.
- .6 Name of Contractor's Representative designated to perform health and safety supervision in site.
- .7 Certificate of clearance from Workplace Health Safety and Compensation Commission (Assessment Services Department) of Newfoundland and Labrador.

- .3 Submit within five (5) work days of notification of Bid Acceptance. Provide one (1) copy.
- .4 Departmental Representative will review Health and Safety Plan and provide comments.
- .5 The Contractor will revise the Plan as appropriate and resubmit within five (5) work days after receipt of comments.
- .6 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.
- .7 Submit revisions and updates made to the Plan during the course of Work.

1.4 COMPLIANCE
REQUIREMENTS

- .1 Comply with the Occupational Health and Safety Act for the Province of Newfoundland and Labrador, and the Occupational Health and Safety Regulations

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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/](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](http://laws.justice.gc.ca/eng/SOR-86-304/ne.html).
 - .3 A copy may be obtained at: Canadian Government Publishing Public Works & Government Services Canada Ottawa, Ontario, K1A 0S9 Tel: (819) 956-4800 (1-800-635-7943) Publication No. L31-85/2000 E or F).
- .3 Observe construction safety measures of:
 - .1 Part 8 of National Building Code.
 - .2 Municipal by-laws and ordinances.
- .4 In case of conflict or discrepancy between any specified requirements, the more stringent shall apply.
- .6 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof through submission of Certificate of Clearance from Workplace Health, Safety and Compensation Commission (Assessment Services Department) of Newfoundland and Labrador.
- .7 Obtain and maintain worker medical surveillance documentation where prescribed by legislation or regulation.

1.5 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property 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

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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.

1.9 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.

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- .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 The following are known or potential project related safety hazards at site:
 - .1 Heavy lifting.
 - .2 Working at heights.
 - .3 Cutting tools and other construction power tools.
 - .4 Sharp objects (construction debris).
- .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 into hazard assessment process.

1.12 MEETINGS

- .1 Contractor to hold pre-construction health and safety meeting prior to commencement of Work. Ensure attendance of:
 - .1 Superintendent of Work.
 - .2 Contractor's designated Health & Safety Site Representative.
 - .3 Subcontractor's Health and Safety Site Representative.
 - .4 Health and Safety Site Coordinator.
- .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 and floor plan layouts showing escape routes, marshaling areas. Details on alarm notification methods, fire drills,

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location of fire fighting 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.
- .4 On-site Communication Plan:
 - .1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.
- .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 must:
- .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 daily 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 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.
- .4 All workers dealing with hazardous materials are required to provide evidence of training, in accordance with Provincial regulations.

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 safety vest.
 - .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 non compliance. Post rules on site.

1.17 CORRECTION OF
NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .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.
- .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.

1.20 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.

1.21 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.

1.1 GENERAL

- .1 Hazardous Material refers to: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .2 The Contractor shall comply with all mitigative measures, terms and conditions outlined in the attached Basic Impact Analysis (BIA) Malady Head Concession Area Development. The BIA is attached as Appendix A of this specification. The Contractor shall also comply with all Federal, Provincial or municipal environmental laws or regulations, permits and other elements of environmental protection.
- .3 Timber and vegetation shall not be cleared unless approved by departmental representative.
- .4 Breeding bird in Newfoundland occurs between May 1st and August 15th. Vegetation clearing and grubbing should be avoided during this period.
- .5 All cleared trees and brush shall become the property of the contractor, and are to be disposed of outside of the park boundary and in an approved location.
- .6 Merchantable timber shall be salvaged and become the property of the contractor. (merchantable timber is defined as any timber for which the contractor can find an established market in the general vicinity of the contract)
- .7 Shredding, chipping or burning of vegetation within the park boundaries is prohibited.

- .8 Where new sod of hydroseed is required, proposed sod supplier/grass type/hydroseed mix is to be submitted to the Departmental Representative for approval.

1.2 DISPOSAL OF
WASTES AND
HAZARDOUS
MATERIALS

- .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of hazardous waste or volatile materials, such as mineral spirits, paints, thinners, oil or fuel into waterways, storm or sanitary sewers or waste landfill sites.
- .3 Store, handle and dispose of hazardous materials and hazardous waste in accordance with applicable federal and provincial laws, regulations, codes and guidelines.
- .4 Dispose of construction waste materials and demolition debris, resulting from work, at approved landfill sites only. Carryout such disposal in strict accordance with provincial and municipal rules and regulations. Separate out and prevent improper disposal of items banned from landfills.
- .5 Establish methods and undertake construction practices which will minimize waste and optimize use of construction materials. Separate at source all construction waste materials, demolition debris and product packaging and delivery containers into various waste categories in order to maximize recycling abilities of various materials and avoid disposal of debris at landfill site(s) in a "mixed state". Where recycling firms, specializing in recycling of specific materials exist, transport such materials to the recycling facility and avoid disposal at landfill sites.

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- .6 Communicate with landfill operator prior to commencement of work, to determine what specific construction, demolition and renovation waste materials have been banned from disposal at the landfill and at transfer stations.

1.3 POLLUTION
CONTROL

- .1 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
- .4 Have emergency spill response equipment and rapid clean-up kit, appropriate to work, at site. Locate adjacent to work and where hazardous materials are stored. Provide personal protective equipment as required for clean-up.
- .5 Report, to Federal and Provincial Department of the Environment, spills of petroleum and other hazardous materials as well as accidents having potential of polluting the environment. Also notify Departmental Representative and submit a written spill report to Departmental Representative within 24 hours of occurrence.

- 1.1 SANITARY FACILITIES
- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
 - .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
- 1.2 WATER SUPPLY
- .1 Arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.
- 1.3 CONSTRUCTION SIGN AND NOTICES
- .1 Contractor or subcontractor advertisement signboards are not permitted on site.
 - .2 Only notices of safety or instructions are permitted on site.
 - .3 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.
- 1.4 REMOVAL OF TEMPORARY FACILITIES
- .1 Remove temporary facilities from site when directed by Departmental Representative.

PART 1 - GENERAL

1.1 GENERAL

- .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- .2 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .3 Prevent accumulation of wastes which create hazardous conditions.
- .4 Provide adequate ventilation during use of volatile or noxious substances.

1.2 CLEANING DURING CONSTRUCTION

- .1 Maintain project grounds and public properties in a tidy condition, free from accumulations of waste material and debris. Clean areas on a daily basis.
- .2 Provide on-site garbage containers for collection of waste materials and debris.
- .3 Remove waste materials and debris from site on a daily basis.

1.3 FINAL CLEANING

- .1 In preparation for acceptance of the Work perform final cleaning.

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1.1 PROJECT RECORD
DOCUMENTS

- .1 Departmental Representative will provide two white print sets of contract drawings and two copies of Specifications.
- .2 Maintain at site one set of the contract drawings and specifications to record actual "As-Built" site conditions.
- .3 At project completion, submit full manual of products used in new work (complete with manufacturer's data sheets, appliance warranty data, user manuals, etc.).

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PART 1 GENERAL**1.1 REFERENCES**

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C260, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
 - .4 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
 - .5 ASTM D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
 - .6 ASTM D1751, Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-Extruding and Resilient Bituminous Types).
- .2 Canadian Standards Association (CSA)
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN3-A266.4, Guidelines for the Use of Admixtures in concrete.
 - .3 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .4 CSA-A3001, Cementitious Materials for Use in Concrete.

1.2 ACRONYMS AND TYPES

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

1.3 SUBMITTALS

- .1 Provide certification that mix proportions selected will produce concrete of quality,

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yield and strength as specified in concrete mixes, and will comply with CSA-A23.1/A23.2. Minimum compressive strength of concrete is 30MPa at 28 days (for all pre-cast sections or any cast-in-place concrete used on site).

- .2 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1/A23.2.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle all pre-cast concrete to avoid damage by any means. Damaged sections will not be accepted and are to be replaced at no cost to Canada.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Portland cement: to CAN/CSA-A3001, Type GU.
- .2 Water: to CAN/CSA-A23.1.
- .3 Aggregates: to CSA-A23.1.
- .4 Coarse aggregates to be normal density to CSA-A23.1/A23.2.
- .5 Admixtures:
 - .1 Air entraining admixture: to ASTM C260.
 - .2 Chemical admixtures: to ASTM C494, Owner's Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

2.2 MIXES

- .1 Proportion normal density concrete in accordance with CSA-A23.1/A23.2, Alternative 1 to give following quality and yield for all concrete.
 - .1 Minimum compressive strength at 28 days, 30MPa.
 - .2 Minimum cement content: 300 kg/m³ of concrete.
 - .3 Class of exposure: N.

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- .4 Nominal size of coarse aggregate: 20 mm.
- .5 Slump at time and point of discharge: 75 to 100 mm.
- .6 Air content: 5 to 8 %.
- .7 Chemical admixtures: admixtures in accordance with ASTM C494.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Obtain Owner's Representative approval before initiated pre-cast units or casting concrete in place on site.
- .2 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .3 Do not place load upon new concrete until authorized by Owner's Representative.

3.2 CONSTRUCTION

- .1 Do all concrete work in accordance with CSA-A23.1/A23.2.
- .2 Sleeves/bolts/inserts.
 - .1 Where approved by Owner's Representative (for such items as lifting hooks for pre-cast units), they must be approved by Owner's Representative under plans sealed by a professional engineer (sealed plans are the responsibility of the contractor).
- .3 Finishing.
 - .1 Finish concrete in accordance with CSA-A23.1/A23.2.

3.3 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Owner's Representative in accordance with CSA-A23.1/A23.2.

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- .2 Owner's Representative will pay for costs of concrete testing.

END OF SECTION

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PART 1 **GENERAL****1.1** **REFERENCES**

- .1 American Wood-Preservers' Association (AWPA)
 - .1 AWPA M2, Standard Inspection of Treated Wood Products.
 - .2 AWPA M4, Standard for the Care of Preservative-Treated Wood Products.
- .2 Canadian Standards Association (CSA)
 - .1 CSA O80 Series, Wood Preservation.

1.2 **CERTIFICATES**

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

1.3 **WASTE MANAGEMENT AND DISPOSAL**

- .1 Do not dispose of preservative treated wood through incineration.
- .2 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- .3 Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill approved by Owner's Representative.
- .4 Dispose of unused wood preservative material at official hazardous material collections site approved by Owner's Representative.

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- .5 Do not dispose of unused preservative material into sewer system, into streams, lakes, onto ground or in other location where they will pose health or environmental hazard.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Preservative: to CAN/CSA-080 Series, stained finish.

PART 3 **EXECUTION**

3.1 **APPLICATION: PRESERVATIVE**

- .1 Treat lumber to CAN/CSA- 080 Series.
- .2 Following water-borne preservative treatment, dry material to maximum moisture content of 19%.

3.2 **APPLICATION: FIELD TREATMENT**

- .1 Comply with AWPA M4 and revisions specified in CAN/CSA-080 Series, Supplementary Requirements to AWPA Standard M2.
- .2 Treat all field cuts with two (2) coats of clear copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.
- .3 Remove chemical deposits on treated wood to receive applied finish.

END OF SECTION

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PART 1 **GENERAL****1.1** **RELATED SECTIONS**

- .1 Section 06 05 73 - Wood Treatment.
- .2 Section 06 17 53 - Shop-Fabricated Wood Trusses.

1.2 **REFERENCES**

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-71.26, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.
- .3 Canadian Standards Association (CSA)
 - .1 CSA B111, Wire Nails, Spikes and Staples.
 - .2 CSA 0112.9, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).
 - .3 CSA 0121, Douglas Fir Plywood.
 - .4 CAN/CSA-0141, Softwood Lumber.
 - .5 CSA 0151, Canadian Softwood Plywood.
 - .6 CAN/CSA-0325.0, Construction Sheathing.
- .4 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber.

1.3 **QUALITY ASSURANCE**

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

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1.4 SUBMITTALS

- .1 Submit proof of compatibility between Alkaline Copper Quaternary (ACQ) pressure treated lumber and fasteners to be utilized.

PART 2 PRODUCTS**2.1 FRAMING AND LUMBER MATERIALS**

- .1 Lumber: unless specified otherwise, softwood, No. 1 or No. 2 grade, S4S, moisture content 19% (S-dry) or less in accordance with following standards:
 - .1 CAN/CSA-0141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Framing and board lumber: in accordance with NBC.
- .3 Furring, blocking, nailing strips, grounds, rough bucks, fascia backing and sleepers:
 - .1 Board sizes: "Standard" or better grade.
 - .2 Dimension sizes: "Standard" light framing or better grade.
 - .3 Post and timbers sizes: "Standard" or better grade.
- .4 Pressure treated material to be Alkaline Copper Quaternary (ACQ).

2.2 PANEL MATERIALS

- .1 Plywood, OSB and wood based composite panels: to CAN/CSA-0325.0.
- .2 Douglas fir plywood (DFP): to CSA 0121, standard construction.
- .3 Canadian softwood plywood (CSP): to CSA 0151, standard construction.

2.3 ACCESSORIES

- .1 Exterior wall sheathing paper/air barrier: to CAN/CGSB-51.32 single ply, spunbonded olefin type coated impregnated as indicated.

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- .2 Sill Gasket: closed cell polyurethane or polyethylene.
- .3 General purpose adhesive: to CSA O112.9.
- .4 Nails, spikes and staples: to CSA B111.
- .5 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .6 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.
- .7 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, type approved by Owner's Representative.

2.4 FASTENER FINISHES

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

2.5 WOOD PRESERVATIVE

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

PART 3 EXECUTION

3.1 PREPARATION

- .1 Treat surfaces of material with wood preservative, before installation.
- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3-minute soak on lumber and one-minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

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- .4 Treat all material as indicated as follows:
 - .1 Wood fascia, backing, curbs, nailers.
 - .2 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

3.2 **INSTALLATION**

- .1 Comply with requirements of NBC latest edition, Part 9 supplemented by following paragraphs.
- .2 Install members true to line, levels and elevations, square and plumb.
- .3 Construct continuous members from pieces of longest practical length.
- .4 Install spanning members with "crown-edge" up.
- .5 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.
- .6 Install wall sheathing in accordance with manufacturer's printed instructions.
- .7 Install roof sheathing in accordance with requirements of NBC.
- .8 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding electrical equipment mounting boards, and other work as required.
- .9 Install furring to support siding applied vertically where there is no blocking and where sheathing is not suitable for direct nailing.
 - .1 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .10 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .11 Install, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.

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- .12 Install sleepers as indicated.

3.3 ERECTION

- .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .2 Countersink bolts where necessary to provide clearance for other work.
- .3 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

3.4 SCHEDULES

- .1 Roof sheathing:
 - .1 Plywood, DFP or CSP sheathing grade (SHG) T&G edge, thickness as indicated.
- .2 Exterior wall sheathing:
 - .1 Plywood, DFP or CSP sheathing grade (SHG, thickness as indicated.
- .3 Subflooring:
 - .1 Plywood, DFP or CSP sheathing grade (SHG) T&G edge, thickness as indicated.
- .4 Electrical equipment mounting boards:
 - .1 Plywood, DFP or CSP grade, (G1S) select square edge 16 mm thick, unless otherwise indicated.

END OF SECTION

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PART 1 **GENERAL****1.1** **RELATED SECTIONS**

- .1 Section 06 05 73 - Wood Treatment.
- .2 Section 06 10 00 - Rough Carpentry.

1.2 **REFERENCES**

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

1.3 **QUALITY ASSURANCE**

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

PART 2 **PRODUCTS****2.1** **MATERIALS**

- .1 Wood decking: to NLGA standard Grading Rules for Canadian Lumber Select grade Spruce 38 mm, predrilled at 750mm o.c. for lateral spiking, single tongue and groove and "Veed" one side. Kiln dry decking to 15% maximum moisture content.
- .2 Decking lengths: 1.8 to 6 m or longer with a minimum of 90% planks exceeding 3.0 m. square end trimmed. For single spans shorter than 3 m use decking of same length as span.
- .3 Nails: to CSA B111, hot dipped galvanized finish; sizes as recommended in CAN/CSA-086. Supply 200 mm spiral spikes for lateral nailing.

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- .4 Splines: galvanized metal, as recommended by decking manufacturer.
- .5 Wood preservative: water borne type to CAN/CSA 080.

PART 3 **EXECUTION**

3.1 **INSTALLATION**

- .1 Do wood deck work in accordance with CAN/CSA 086 except where specified otherwise.
- .2 Install decking in accordance with CAN/CSA 086, simple span pattern.
- .3 Provide minimum of one bearing support for each plank.
- .4 Stagger end joints in adjacent planks minimum of 0.5 m. Separate joints in same area by at least two intervening courses. Avoid joints in first fifth of end spans. Minimize joints in middle third of any span.
- .5 Touch up end cuts with preservative where pressure treated lumber is specified.

3.2 **FIELD QUALITY CONTROL**

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

3.3 **CLEANING**

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

3.4 **FINISH**

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

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3.5 PROTECTION

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

END OF SECTION

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PART 1 **GENERAL****1.1** **RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 06 10 00 - Rough Carpentry.

1.2 **REFERENCES**

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-080 Series, Wood Preservation.
 - .2 CAN/CSA-086.1, Engineering Design in Wood.
 - .3 CAN/CSA-0141, Softwood Lumber.
 - .4 CSA S307, Load Test Procedure for Wood Roof Trusses for Houses and Small Buildings.
 - .5 CSA S347, Method of Test for Evaluation of Truss Plates Used in Lumber Joints.
- .2 National Lumber Grades Authority (NLGA)
 - .1 NLGA, Standard Grading Rules for Canadian Lumber.
- .3 Truss Plate Institute of Canada (TPIC)
 - .1 TPIC, Truss Design Procedures and Specifications for Light Metal Plate Connected Trusses (Limit States Design)

1.3 **DESIGN REQUIREMENTS**

- .1 Design light metal plate connected wood trusses in accordance with TPIC truss design procedures for wood truss chords and webs in accordance with engineering properties in CSA 086.
- .2 Design light metal plate connected wood trusses in accordance with TPIC truss design procedures for truss joint designs to test engineering properties in accordance with CSA S347 and listed in CCMC Registry of Product Evaluations.
- .3 Design trusses, bracing and bridging in accordance with CAN/CSA-086.1 for minimum uniform and minimum concentrated loadings stipulated in NBC.

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- .4 Limit live load deflection to 1/360th of span where plaster gypsum board ceilings are hung directly from trusses.
- .5 Limit live load deflections to 1/240th of span unless otherwise specified or indicated.

1.4 SOURCE QUALITY CONTROL

- .1 Identify lumber by grade stamp of an agency certified by Canadian Lumber Standards Administration Board.

1.5 QUALITY ASSURANCE

- .1 Provide Certificate of Quality Compliance from truss manufacturer upon completion of fabrication.
- .2 Provide Certificate of Quality Compliance upon satisfactory completion of installation.

1.6 SUBMITTALS

- .1 Each shop drawing submission shall bear signature and stamp of Professional Engineer registered or licensed in Province of Newfoundland and Labrador, Canada.
- .2 Indicate TPIC Truss Design Procedure and CSA 086 Engineering Design in Wood and specific CCMC Product Registry number of the truss plates.
- .3 Indicate species, sizes, and stress grades of lumber used as truss members. Show pitch, span, camber, configuration and spacing of trusses. Indicate connector types, thicknesses, sizes, locations and design value. Show bearing details. Indicate design load for members.
- .4 Submit stress diagram or print-out of computer design indicating design load for truss members. Indicate allowable load and stress increase.
- .5 Indicate arrangement of webs or other members to accommodate ducts and other specialties.
- .6 Show lifting points for storage, handling and erection.

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- .7 Show location of lateral bracing for compression members.

1.7 DELIVERY AND STORAGE

- .1 Store trusses on job site in accordance with manufacturer's instructions. Provide bearing supports and bracings. Prevent bending, warping and overturning of trusses.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Lumber: Spruce (S-P-F) species, No. 1 grade, softwood, S4S, with maximum moisture content of 19% at time of fabrication and to following standards:
 - .1 CAN/CSA-0141.
 - .2 NLGA (National Lumber Grading Association), Standard Grading Rules for Canadian Lumber.
- .2 Fastenings: to CAN/CSA-086.1.

2.2 FABRICATION

- .1 Fabricate wood trusses in accordance with reviewed shop drawings.
- .2 Provide for design camber and roof slopes when positioning truss members.
- .3 Connect members using metal connector plates.

PART 3 EXECUTION

3.1 ERECTION

- .1 Erect wood trusses in accordance with reviewed erection drawings.
- .2 Indicated lifting points to be used to hoist trusses into position.

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- .3 Make adequate provisions for handling and erection stresses.
- .4 Exercise care to prevent out-of-plane bending of trusses.
- .5 Install temporary horizontal and cross bracing to hold trusses plumb and in safe condition until permanent bracing and decking are installed.
- .6 Install permanent bracing in accordance with reviewed shop drawings, prior to application of loads to trusses.
- .7 Do not cut or remove any truss material without approval of Owner's Representative.

3.2 CLEANING

- .1 Remove surplus materials, excess materials, rubbish, tools and equipment on completion of installation.

END OF SECTION

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PART 1 GENERAL**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.

1.2 REFERENCES

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

1.3 QUALITY ASSURANCE

- .1 Lumber by grade stamp of agency certified by Canadian Lumber Standards Accreditation Board (CLSAB).
- .2 Plywood, particleboard, OSB and wood based composite panels to CSA and ANSI standards.

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1.4 SUBMITTALS

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

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Protect materials against dampness during and after delivery.
- .2 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

PART 2 PRODUCTS**2.1 LUMBER MATERIAL**

- .1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:
 - .1 CAN/CSA-0141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
 - .3 AWMAC custom premium grade, moisture content as specified.
- .2 Machine stress-rated lumber is acceptable.
- .3 Hardwood lumber: moisture content 10 % or less in accordance with following standards:
 - .1 National Hardwood Lumber Association (NHLA).
 - .2 AWMAC custom grade, moisture content as specified.

2.2 PANEL MATERIAL

- .1 Panel materials to be urea-formaldehyde free.
- .2 Douglas fir plywood (DFP): to CSA 0121, standard construction.
- .3 Canadian softwood plywood (CSP): to CSA 0151, standard construction.
- .4 Hardwood plywood: to ANSI/HPVA HP-1.

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- .5 Poplar plywood (PP): to CSA O153, standard construction.
- .6 Hardboard: to CAN/CGSB-11.3.
- .7 Medium density fibreboard (MDF): to ANSI A208.2, density 640-800 kg/m³.
- .8 Decorative overlaid composite panels.
 - .1 Decorative overlay, heat and pressure laminated with suitable resin to 12.7 mm thick particleboard MDF core.
 - .2 Overlay bonded to both faces where exposed two sides, and when panel material require surface on one side only, reverse side to be overlaid with a plain (buff) balancing sheet.
 - .3 Edge finishing: matching melamine and polyester overlay edge strip with self-adhesive.

2.3 ACCESSORIES

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

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- .2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate

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 piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.

- .3 Form joints to conceal shrinkage.

3.2 CONSTRUCTION

- .1 Fastening.

- .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
- .2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
- .3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round cleanly cut hole and plug with wood plug to match material being secured.
- .4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

- .2 Standing and running trim.

- .1 Butt and cope internal joints of baseboards to make snug, tight, joint. Cut right angle joints of casing and base with mitred joints.
- .2 Fit backs of baseboards and casing snugly to wall surfaces to eliminate cracks at junction of base and casing with walls.
- .3 Make joints in baseboard, where necessary using a 45° scarf type joint.
- .4 Install door and window trim in single lengths without splicing.

- .3 Shelving.

- .1 Install shelving on shelf brackets, where indicated.

- .4 Hardware.

- .1 Install cabinet and miscellaneous hardware as indicated.

- .5 Panelling:

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- .1 Secure panelling and perimeter trim using adhesive recommended for purpose by manufacturer. Fill nail holes caused by temporary fixing with filler matching wood in colour.
- .2 Secure panelling and perimeter trim using concealed fasteners.
- .3 Secure panelling and perimeter trim using counter sunk screws plugged with matching wood plugs.

END OF SECTION

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PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

1.2 **SUBMITTALS**

- .1 Submit manufacturer's product data sheets.
- .2 Submit manufacturer's installation instructions.

1.3 **QUALITY ASSURANCE**

- .1 Perform work in accordance with Sealant and Waterproofer's Institute - Sealant and Caulking Guide Assurance program and requirements for materials and installation.
- .2 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance program and requirements for materials and installation.
- .3 Manufacturer's Representative:
 - .1 Inspect substrate prior to commencement of work, twice during application of membrane and at commissioning to ascertain that air/vapour barrier system is installed according to membrane manufacturer's most current published specifications and details.
 - .2 Provide technical assistance to applicator and assist where required in correct installation of membrane.
 - .3 Provide certificate of quality compliance upon satisfactory completion of installation.
- .4 Maintain one copy of documents on site.

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1.4 QUALIFICATIONS

- .1 Applicator: Company specializing in performing work of this section with minimum 5 years documented experience with installation of air/vapour barrier system. Complete installation must be approved by the material manufacturer.
- .2 Applicator: Company who is currently licensed by certifying organization must maintain their license throughout the duration of the project.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions. Deliver membrane materials in factory wrapped packaging indicating name of manufacturer and product.
- .2 Avoid spillage. Immediately notify Owner's Representative if spillage occurs and start clean up procedures.
- .3 Clean spills and leave area as it was prior to spill.
- .4 Store roll materials on end in original packaging.
- .5 Store primers at temperature of 5° C and above to facilitate handling. Keep solvent away from open flame and excessive heat.

1.6 PROJECT ENVIRONMENTAL REQUIREMENTS

- .1 Do not install solvent curing sealants or vapour release adhesive materials in enclosed spaces without ventilation
- .2 Maintain temperature and humidity recommended by materials manufacturer before, during and after installation.

1.7 WARRANTY

- .1 Provide a written warranty for work of this section from manufacturer for failure due to defective materials and from contractor for failure due to

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defective installation workmanship for ten (10) years respectively from the date of Substantial Completion.

- .2 Include coverage of installed sealant and sheet materials which fail to achieve watertight seal, exhibit loss of adhesive or cohesion or do not cure.

PART 2 PRODUCTS

2.1 SHEET MATERIALS THERMAL BARRIER AND AIR/VAPOUR BARRIER

- .1 Roof Underlay: Grace Ice and Water Shield, or approved Equal

2.2 SEALANTS

- .1 Sealants: recommended by membrane manufacturer.
- .2 Primer: recommended by membrane manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept the work of this section.
- .2 Ensure all surfaces are clean, dry, sound, smooth, continuous and comply with membrane manufacturer's requirements.
- .3 Report any unsatisfactory conditions to the Owner's Representative in writing.
- .4 Do not start work until deficiencies have been corrected.

3.2 PREPARATION

- .1 Remove loose or foreign matter which might impair adhesion of materials.

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- .2 Ensure all substrates are clean of oil or excess dust; all concrete surfaces free of large voids, spilled areas or sharp protrusions.
- .3 Ensure all substrates are free of surface moisture prior to application of membrane and primer.
- .4 Ensure metal closures are free of sharp edges and burrs.
- .5 Prime substrate surfaces to receive adhesive and sealants in accordance with manufacturer's instructions.

3.3 **INSTALLATION**

- .1 Install materials in accordance with manufacturer's instructions.
- .2 Over the properly prepared substrate surface apply primer with a roller and allow drying to a tacky surface. Prime only area to be covered in a working day. Reprime area not covered with membrane within 24 hours.
- .3 After primer has dried, using a hand roller firmly press the entire membrane onto the primed surface in strict accordance with membrane manufacturer's written instructions.
- .4 Ensure complete coverage of and adhesion of all substrates to receive membrane, including wall penetrations. Co-operate with other trades to ensure continuity of the membrane.
- .5 Overlap membrane 50 mm and carefully smooth out with a roller to ensure full continuous bond throughout overlaps without fissures or fishmouthing.
- .6 It is important that a complete water seal be achieved. Be responsible for the completeness of the membrane wherever it is not specifically detailed. Consult with Owner's Representative if there is any doubt as to the integrity of the membrane, whether detailed or not.

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- .7 In order to ensure a complete seal, seal membrane to all penetrations in an approved manner.
- .8 Apply a trowelled bead of mastic to all terminations of the membrane at the end of a day's work.
- .9 Do not enclose membrane until it has been inspected and approved by Owner's Representative. Inform Owner's Representative four (4) working days prior to required inspection.

3.4 PROTECTION OF WORK

- .1 Do not permit adjacent work to damage work of this section.
- .2 Ensure finished work is protected from climatic conditions.

3.5 INSPECTION

- .1 Carefully inspect for continuity of waterproofing prior to placement of drainage board.
- .2 Repair all deficient membrane areas.
- .3 Misaligned or inadequately lapped seams, punctures or other damage must be repaired with a patch of membrane extending 50 mm in all directions from edge of damaged areas.
- .4 Cover membrane immediately after Owner's Representative's inspection to protect from damage by other trades.

END OF SECTION

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PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C1289, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- .2 Canadian General Standards Board (CGSB).
 - .1 CGSB 71-GP-24M, Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .3 Underwriters Laboratories of Canada (ULC).
 - .1 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
 - .2 CAN/ULC-S702, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
 - .3 CAN/ULC-S704, Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

1.2 **SUBMITTALS**

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's insulation products and adhesives.
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.3 **QUALITY ASSURANCE**

- .1 Provide certificate of quality compliance from insulation manufacturer.

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PART 2 **PRODUCTS**

2.1 **INSULATION**

- .1 Extruded polystyrene (XPS): for use below grade and exterior walls to CAN/ULC S701, RSI 0.88 per 25 mm, total thickness as indicated on drawings, Styrofoam by Dow Chemical or approved equal.
- .2 Insulation types not indicated on drawings to be expanded polystyrene (EPS), Type 2 as a default, as per article 2.1.1.

2.2 **ADHESIVE**

- .1 Adhesive suitable for bonding to substrates as indicated.

2.3 **ACCESSORIES**

- .1 Joint sealing tape: air resistant pressure sensitive adhesive tape as recommended by insulation manufacturer.

PART 3 **EXECUTION**

3.1 **MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions and data sheets.

3.2 **WORKMANSHIP**

- .1 Install insulation after building substrate materials are dry.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .3 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only

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insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.

- .4 Offset both vertical and horizontal joints in multiple layer applications.
- .5 Do not enclose insulation until it has been inspected and approved by Owner's Representative.

3.3 EXAMINATION

- .1 Examine substrates and immediately inform Owner's Representative in writing of defects.
- .2 Prior to commencement of work ensure:
 - .1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.4 RIGID INSULATION INSTALLATION

- .1 Apply adhesive to insulation board in accordance with manufacturer's recommendations.

3.5 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

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PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 American Society for Testing and Materials, (ASTM).
 - .1 ASTM C665, Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - .2 ASTM C1320, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
 - .3 ASTM E84, Test Method for Surface Burning Characteristics of Building Materials.
- .2 Underwriters Laboratories of Canada (ULC).
 - .1 CAN/ULC-S702, Standard for Mineral Fibre Insulation.

1.2 **SUBMITTALS**

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet.
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

PART 2 **PRODUCTS**

2.1 **INSULATION**

- .1 Thermal batt and blanket mineral fibre:
 - .1 Un-faced glass fiber thermal insulation to ASTM C665 Type I, thickness and/or RSI value as indicated on drawings.
- .2 Acoustic batt insulation:
 - .1 Un-faced glass fiber acoustical insulation to ASTM C665, Type I, thickness as indicated (full wall thickness).

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- .1 Flame spread: 10 to ASTM E84.
- .2 Smoke development: 10 to ATSM E84.
- .3 Sound transmission Class: STC 49.
- .4 Dimensional stability: linear shrinkage less than 0.1%.

PART 3 EXECUTION**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSULATION INSTALLATION

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces and for sound attenuation as noted on drawings.
- .2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .3 Do not compress insulation to fit into spaces.
- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls and CSA B149.1 and CSA B149.2 Type B and L vents.
- .5 Do not enclose insulation until it has been inspected and approved by Owner's Representative.

3.3 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

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PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 Canadian Urethane Foam Contractors' Association Inc. (CUFCA)
- .2 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S101, Fire Endurance Tests of Building Construction and Materials.
 - .2 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.
 - .3 CAN/ULC-S705.1, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Material Specification.
 - .4 CAN/ULC-S705.2, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Installer's Responsibilities-Specification.

1.2 **TEST REPORTS**

- .1 Submit test reports, verifying qualities of foam sealant meet or exceed requirements of this specification.
- .2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

1.3 **QUALITY ASSURANCE**

- .1 Applicators to conform to CUFCA Quality Assurance Program.

1.4 **SAFETY REQUIREMENTS**

- .1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:
 - .1 Workers must wear gloves, respirators, dust masks, eye protection, protective clothing when applying foam sealant.

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- .2 Workers must not eat, drink or smoke while applying foam sealant.

1.5 PROTECTION

- .1 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hours after application to maintain non-toxic, unpolluted, safe working conditions.
- .2 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.
- .3 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.
- .4 Dispose of waste foam sealant daily.

1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Apply foam sealant only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Low expanding, one-component, polyurethane foam sealant, curing to a semi-rigid, closed cell urethane foam providing a RSI of 0.9 per 25.4 mm. To meet the following physical properties:
 - .1 Density: 25.7 kg/m³
 - .2 Compressive Strength Parallel @ 10%: 69-96 psi
 - .3 Tensile Strength: 103 psi
 - .4 Water Vapour Transmission: 5.97 perms
 - .5 Flame Spread: 20
 - .6 Smoke Development: 70

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PART 3 **EXECUTION**

3.1 **APPLICATION**

- .1 Apply foam sealant to clean surfaces in accordance manufacturer's printed instructions. Surfaces to be free of dust, dirt, oil and other foreign materials.
- .2 Cover surfaces not intended to be foamed.
- .3 Apply foam sealant to perimeter of all openings, such as doors and windows and other exterior wall penetrations, and to thickness as recommended by manufacturer and so as to completely fill cavity. Trim excess cured foam from finished area.
- .4 Cover exposed urethane foam sealants to protect from adverse affects from ultraviolet light (sunlight).

END OF SECTION

PART 1 **GENERAL****1.1** **REFERENCES**

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.
- .2 Underwriters Laboratories Canada (ULC)
 - .1 CAN/ULC S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.2 **SUBMITTALS**

- .1 Submit manufacturer's printed product literature, specifications and datasheet and include:
 - .1 Product characteristics.
 - .2 Performance criteria.
 - .3 Limitations.
- .2 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).
- .3 Quality assurance submittals:
 - .1 Certificates: submit certificates certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions and comply with written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

PART 2 **PRODUCTS****2.1** **SHEET VAPOUR RETARDER**

- .1 Polyethylene film: to CAN/CGSB-51.34, thickness as indicated with a water vapour permeance of not greater than 45 ng/(P·s·m²), flame spread rating of less than 150 to CAN/ULC S102.

2.2 ACCESSORIES

- .1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.
- .2 Sealant: compatible with vapour retarder, recommended by vapour retarder manufacturer.
- .3 Staples: minimum 6 mm leg.
- .4 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Ensure services are installed and inspected prior to installation of retarder.
- .2 Install sheet vapour retarder on warm side of exterior wall and ceiling space assemblies prior to installation of gypsum board and other prescribed room finishes to form continuous retarder.
- .3 Install sheet vapour retarder under concrete slab-on-grade and lap and seal all joints, seal to perimeter foundation wall, and seal to all pipe and/or other penetrations.
- .4 Use sheets of largest practical size to minimize joints.
- .5 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

3.2 EXTERIOR SURFACE OPENINGS

- .1 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame.

3.3 PERIMETER SEALS

- .1 Seal perimeter of sheet vapour barrier as follows:

- .1 Apply continuous bead of sealant to substrate at perimeter of sheets.
- .2 Lap sheet over sealant and press into sealant bead.
- .3 Install staples through lapped sheets at sealant bead into wood substrate.
- .4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.4 LAP JOINT SEALS

- .1 Seal lap joints of sheet vapour barrier as follows:
 - .1 Attach first sheet to substrate.
 - .2 Apply continuous bead of sealant over solid backing at joint.
 - .3 Lap adjoining sheet minimum 150 mm and press into sealant bead.
 - .4 Install staples through lapped sheets at sealant bead into wood substrate.
 - .5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 ELECTRICAL BOXES

- .1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:
 - .1 Install moulded box vapour barrier or wrap boxes with film sheet providing minimum 300 mm perimeter lap flange.
 - .2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

3.6 CLEANING

- .1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL**1.1 REFERENCES**

- .1 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-37.4, Fibrated, Cutback Asphalt, Lap Cement for Asphalt Roofing.
 - .2 CAN/CGSB-37.5, Cutback Asphalt Plastic Cement.
- .2 Canadian Roofing Contractors' Association (CRCA).
 - .1 CRCA Roofing Specification Manual.
- .3 Canadian Standards Association (CSA).
 - .1 CAN/CSA-A123.1/A123.5, Asphalt Shingles Made From Organic Felt and Surfaced With Mineral Granules/Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules.
 - .2 CSA A123.2, Asphalt-Coated Roofing Sheets.
 - .3 CAN/CSA-A123.3, Asphalt Saturated Organic Roofing Felt.
 - .4 CAN3-A123.51, Asphalt Shingle Application on Roof Slopes 1:3 and Steeper.
 - .5 CAN3-A123.52, Asphalt Shingle Application on Roof Slopes 1:6 to Less Than 1:3.
 - .6 CSA B111, Wire Nails, Spikes and Staples.
- .4 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC).
 - .1 CCMC, Registry of Product Evaluations.

1.2 EXTRA MATERIALS

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

1.3 SUBMITTALS

- .1 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures.

- .2 Submit product data sheets for asphalt shingles.
Include:

- .1 Product characteristics.
- .2 Performance criteria.
- .3 Installation instructions.
- .4 Limitations.
- .5 Colour and finish.

- .3 Submit duplicate samples of full size specified shingles.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Provide and maintain dry, off-ground weatherproof storage.
- .2 Remove only in quantities required for same day use.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Place materials defined as hazardous or toxic in designated containers.
- .2 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .3 Use the least toxic sealants, and adhesives necessary to comply with requirements of this section.
- .4 Close and seal tightly. Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .5 Place used hazardous sealant tubes and adhesive containers in areas designated for hazardous materials.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Asphalt shingles: to CSA A123.1/A123.5.
 - .1 Type: self-seal, standard, pattern rectangular
 - .2 Mass: minimum 33 kg/3m²
 - .3 Colour: as selected by Owner's Representative

- .4 Cambridge Architectural Shingles by IKO or approved equal, complete with Roof Starter and Ridge Cap Shingles
- .2 Roofing underlayment: to 07 13 26
- .3 Continuous Ridge Vent: minimum 285 mm wide durable, copolymer plastic ridge vent, providing minimum 357 cm²/m net free vent area, capable of accepting asphalt shingle cap over for shingle finish.
- .4 Cement: Plastic cement: to CAN/CGSB-37.5.
- .5 Nails: to CSA B111, of galvanized steel, sufficient length to penetrate 19 mm into deck.

PART 3 **EXECUTION**

3.1 **APPLICATION**

- .1 Do asphalt shingle work in accordance with CAN3-A123.51/CAN3-A123.52, NBC/CRCA Specification, except where specified otherwise.
- .2 Install layer of self-adhesive roof underlayment over the entire roof area.
- .3 Install drip edge along eaves, overhanging 12 mm, with minimum 50 mm flange extending onto roof decking. Nail to deck at 400 mm oc.
- .4 Install bottom step flashing (soaker base flashing) interleaved between shingles at vertical junctions.
- .5 Install asphalt shingles on roof slopes 1:3 and steeper in accordance with CAN3-A123.51.

END OF SECTION

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PART 1 GENERAL

1.1 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A135.6, Hardboard Siding Standard.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-11.3, Hardboard.
 - .2 CAN/CGSB-11.5, Hardboard, Pre-coated, Factory Finished, for Exterior Cladding.
 - .3 CAN/CGSB-11.6, Installation of Exterior Hardboard Cladding.
- .3 Canadian Standards Association (CSA)
 - .1 CSA B111, Wire Nails, Spikes and Staples.
- .4 National Lumber Grading Authority (NLGA)
 - .1 NLGA Standard Grading Rules for Canadian Lumber.

1.2 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet.
 - .2 Submit copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's for caulking materials during application and curing.
- .2 Submit duplicate 300 x 300 mm size profile specified.
- .3 Submit manufacturer's installation instructions.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver siding suitable packaged to avoid damage to finished surface.

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- .3 Store in an unheated structure or under cover until application. Siding may be temporarily stored outside if at least 4 inches off the ground and on a flat, well drained surface protected from moisture with a shed pack or waterproof cover.

1.4 QUALITY ASSURANCE

- .1 Provide Certificate of Quality Compliance from siding manufacturer upon completion of fabrication.
- .2 Provide Certificate of Quality Compliance upon satisfactory completion of installation.

1.5 WARRANTY

- .1 Warranty Period: 15 years against cracking, peeling, blistering, chalking, loss of coating adhesion, yellowing with age, and no damage caused by rinse cleaning surface dirt. Warranty to commence at date of Substantial Completion.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Clapboard Siding: Cape Cod prefinished wood siding, or approved equal; color and profile as selected by Owner; Western Lodgepole Pine, No. 1 select or better grade, factory finished, saw texture, free of large knots, knot holes, or loose knots; maximum moisture content of 15 percent.
- .2 Moldings and trim: Cape Cod prefinished wood siding, or approved equal; color and profile as selected by Owner; Western Lodgepole Pine, No. 1 select or better grade, factory finished same as siding.
- .3 Strapping: Softwood Lumber, pressure treated.
- .4 Nails: stainless steel, length as recommended by siding manufacturer, double nailed, color matched to siding

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- .5 Sealant: Thermoplastic type, color to exactly match siding.
- .6 Concealed Flashings: 0.4 mm thick galvanized steel.

2.2 FINISH

- .1 Pre-finish color: Thermoplastic acrylic latex emulsion, factory coated under controlled environment conditions by a modified vacuum coat method, one prime coat and one finish coat, applied to all board surfaces, minimum 0.15 mm dry film thickness.
 - .1 Standard color or custom color from manufacturers range of colors.
 - .2 Touch-Up Paint: Thermoplastic acrylic latex emulsion, same type and color as siding.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verify that substrate surfaces and wall openings are ready to receive work.

3.2 PREPARATION

- .1 Install metal flashing continuous over window and other openings. Secure in position tight to wall sheathing.
- .2 Install one layer of sheathing membrane horizontally on sheathed walls, weather lap edges and ends minimum 150 mm. Stagger vertical laps. Tape all edges.
- .3 Install strapping at 406 mm o.c.
- .4 Install starter strips behind first row of siding.
- .5 Apply sealant around window, door and other opening frames.

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3.3 INSTALLATION

- .1 Install siding and accessories to manufacturer's instructions.
- .2 Install screen at bottom of base trim.
- .3 Install siding for natural watershed.
- .4 Install siding in straight aligned lengths, set level with plumb ends and corners.
- .5 Achieve siding joints no less than 800 mm apart in adjoining boards and distribute evenly over wall surface.
- .6 Miter external and internal corners: Install corner strips, closures, frieze boards skirt boards and trim.
- .7 Fasten siding securely to wood batten substrate.
- .8 Face nail 25 mm from bottom of siding board directly into wood strapping, drive nail head just flush with siding surface; do not indent or penetrate painted coating.

3.4 INCIDENTAL SITE FINISHING

- .1 Carefully set exposed nails flush with siding coating.
- .2 Touch-up blemished siding materials to match siding color.

3.5 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

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PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 The Aluminum Association Inc. (AA)
 - .1 Aluminum Sheet Metal Work in Building Construction.
 - .2 AA DAF45, Designation System for Aluminum Finishes.
- .2 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .3 ASTM D523, Standard Test Method for Specular Gloss.
 - .4 ASTM D822, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .3 Canadian General Standards Board (CGBS)
 - .1 CAN/CGSB-37.5, Cutback Asphalt Plastic Cement.
- .4 Canadian Roofing Contractors Association (CRCA)
 - .1 Roofing Specifications Manual.
- .5 Canadian Standards Association (CSA International)
 - .1 CSA B111, Wire Nails, Spikes and Staples.

1.2 **SAMPLES**

- .1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish.

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PART 2 **PRODUCTS****2.1** **SHEET METAL MATERIALS**

- .1 Aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, grade 33 with AZ150 coating, regular spangle surface, 0.60 mm base metal thickness. Pre-painted to CGSB -GP-71.

2.2 **PREFINISHED STEEL SHEET**

- .1 Prefinished sheet with factory applied polyvinylidene fluoride.
 - .1 Class F1S
 - .2 Colour as selected by Owner's Representative from manufacturer's standard range.
 - .3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.
 - .4 Coating thickness: not less than 22 micrometres.
 - .5 Resistance to accelerated weathering for caulk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:
 - .1 Outdoor exposure period 2500 hours.
 - .2 Humidity resistance exposure period 5000 hours.

2.3 **ACCESSORIES**

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB 37.5.
- .3 Underlay for metal flashing: to Section 07 13 26.
- .4 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .5 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .6 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

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- .7 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details as indicated.
- .2 Fabricate aluminum flashings and other sheet aluminum work in accordance with Aluminum Association Aluminum Sheet Metal Work in Building Construction.
- .3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .4 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.
- .5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

- .1 Form flashings, copings and fascias to profiles indicated of 0.60 mm thick prefinished steel.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Install sheet metal work in accordance with CRCA FL series details and as detailed.
- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.
- .4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints

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using S-lock forming tight fit over hook strips, as detailed.

- .5 Lock end joints and caulk with sealant.

END OF SECTION

PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 Canadian Standards Association (CSA International)
 - .1 CSA B111, Wire Nails, Spikes and Staples.

1.2 **SUBMITTALS**

- .1 Submit shop drawing, product data and installation instructions for approval for all components in system: gutter c/w cover, downspout, diverter, connector, elbows, corner, end (or center) with outlet, band, stainless steel fasteners and all other accessories required for complete operational system.

1.3 **DELIVERY AND STORAGE**

- .1 Store products off ground and under cover in a dry, well ventilated enclosure.
- .2 Stack pre-formed material in manner to prevent twisting, bending and rubbing.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Vinyl Gutter System by Euramax Canada, or approved equal, complete with all accessories from same manufacturer.
- .2 Color as selected by Owner's Representative.
- .3 Trough/Gutter size: 125 mm (5") wide complete with snap-on cover; Traditional Style.
- .4 Gutter Supports, Downpipe Band, Elbows, Caps, Corners Ends, Connector, etc : per manufacturer
- .5 Downpipes: 3" x 4".
- .6 Sealant: As approved by Departmental Representative.

- .7 Accessories: install Clip-up Diverter Kit, by Euramax, to each downspout.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Install gutter supports/debris catchers to provide a continuous slope to drain all water from the gutter.
- .2 Install gutter, cover, elbows, caps, downspouts, ends, bands, etc., as required by manufacturer for complete system.
- .3 Install downpipes to a distance of 0.3 metres from grade. Install Clip-up Diverter Kit to each downspout.
- .4 Install sealant as required to ensure all joints are watertight.
- .5 When work is completed, provide a water test to ensure there are no leaks and that all the water runs from the gutter.

3.2 CLEANING

- .1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Leave works areas clean, free from grease, finger marks and stains.

END OF SECTION

PART 1 **GENERAL****1.1** **REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C834, Standard Specification for Latex Sealants.
 - .2 ASTM C882, Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.
 - .3 ASTM C919, Standard Practice for Use of Sealants in Acoustical Applications.
 - .4 ASTM C920, Standard Specification for Elastomeric Joint Sealants.
 - .5 ASTM C1330, Standard Specification for Cylindrical Sealant Backing for use with Cold Liquid Applied Sealants.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.21, Sealing and Bedding Compound Acoustical.
- .3 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA).
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act (TDGA).

1.2 **SUBMITTALS**

- .1 Manufacturer's product to describe.
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

- .4 Installation instructions, surface preparation and product limitations.
- .2 Manufacturers' instructions to include installation instructions for each product used.

1.3 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 Condition products to approximately 16 to 20 degrees C for use in accordance with manufacturer's recommendations.
- .3 Handle all products with appropriate precautions and care as stated on the Material Safety Data Sheet.

1.4 PROJECT CONDITIONS

- .1 Environmental Limitations:
 - .1 Do not proceed with installation of joint sealants under following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4°C.
 - .2 When joint substrates are wet.
- .2 Joint-Width Conditions:
 - .1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:
 - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

PART 2 **PRODUCTS****2.1** **SEALANT MATERIALS**

- .1 Sealants and Caulking compounds must:
 - .1 Meet or exceed all applicable governmental and industrial safety and performance standards; and
 - .2 Be manufactured and transported in such a manner that all steps fo the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the Fisheries Act and the Canadian Environmental Protection Act (CEPA).
- .2 Sealant and caulking compounds must not be formulated or manufactured with: aromatic solvents, fibrous talc or asbestos, formaldehyde, halogenated solvents, mecury, lead, cadium, hexavalent chromium, barium or their compounds, except barium sulphate.
- .3 Sealant and caulking compounds must no contain a total of volatile organic compound (VOC's) in excess of 100 grams per litre as calculated from records of the amounts of constituents used to make the product.
- .4 Sealant and caulking compounds must be accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.
- .5 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
- .6 When low toxicity caulks are not possible, confine usage to areas which off-gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.
- .7 Where sealants are qualified with primers use only these primers.
- .8 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB

Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

- .1 Single component, low odor, moisture cure, medium modulus, low VOC sealant for use in sealing air/vapour barrier penetrations, to ASTM C920, Type S, Grade NS, Class 35.
 - .1 ASTM C719: \pm 35%.
 - .2 Ultimate Elongation: 450 - 550%.
 - .3 Modulus, 100%: 275 - 345 kPa.
 - .4 Shore A Hardness: 25 \pm 5.
 - .5 Tensile Strength: 1034 - 1378 kPa.
 - .6 Maximum VOC: 5 g/L.
- .2 Single component, medium modulus, high-performance, neutral-cure silicone sealant for general purpose exterior use, to ASTM C920, Type S, Grade NS, Class 35, Use NT, M, A and O.
 - .1 ASTM C719: \pm 25%.
 - .2 Ultimate Elongation: 550%.
 - .3 Modulus, 50% extension: 380 kPa.
 - .4 Shore A Hardness: 25 \pm 5.
 - .5 Tensile Strength: 1240 kPa.
 - .6 Maximum VOC: 35 g/L.
 - .7 Colour to be selected from manufacturer's standard range.
- .3 Single component, low modulus, neutral-cure silicone sealant for general purpose masonry use, to ASTM C920, Type S, Grade NS, Class 50, Use T, NT, M, G, A and O.
 - .1 ASTM C719: \pm 50%.
 - .2 Ultimate Elongation: 1600%.
 - .3 Modulus, 50% extension: 193 kPa.
 - .4 Shore A Hardness: 15.
 - .5 Tensile Strength: 690 kPa.
 - .6 Maximum VOC: 22 g/L.
 - .7 Colour to be selected from manufacturer's standard range.

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- .4 Two-component, high modulus, neutral-cure flexible silicone rubber sealant for use with aluminum window and curtain wall fabrication, assembly and glazing installation, to ASTM C1184 and ASTM C920, Type M, Grade NS, Class 12 ½, Use NT.
 - .1 ASTM C719: ± 25%.
 - .2 Ultimate Elongation: 120%.
 - .3 Shore A Hardness: 30 - 40.
 - .4 Tensile Strength: 2000 kPa.
 - .5 Maximum VOC: < 18 g/L.
 - .5 Single component, medium modulus, neutral-cure silicone sealant for general roofing applications, to ASTM C920, Type S, Grade NS, Class 50, Use NT, G, A and O.
 - .1 ASTM C719: ± 50%.
 - .2 Shore A Hardness: 35.
 - .3 Tensile Strength: 415 kPa.
 - .4 Maximum VOC: 28 g/L.
 - .5 Colour to be selected from manufacturer's standard range.
 - .6 Single component, chemical cure, silicone rubber sealant, for use with plumbing fixtures, showers, sinks, tubs, and junction of counter tops and adjacent wall finishes, to ASTM C920, Type S, Grade NS, Class 25, Use NT.
 - .1 Shore A Hardness: 25.
 - .2 Tensile Strength: 2100 kPa.
 - .3 Maximum VOC: 36 g/L.
 - .4 Colour to be selected from manufacturer's standard range.
 - .7 Single component, high-performance, elastomeric polyurethane sealant, paintable, for general purpose interior use, to ASTM C920, Type S, Grade NS, Class 35, Use NT, M, A, T, O and I.
 - .1 ASTM C719: 35%.
 - .2 Ultimate Elongation: 800%.
 - .3 Shore A Hardness: 25 - 30.
 - .4 Tensile Strength: 2400 kPa.

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- .5 Maximum VOC: 35 g/L.
- .6 Colour to be selected from manufacturer's standard range.
- .8 Single component, non-skinning, non-hardening, synthetic rubber sealant for use in acoustical applications, to CAN/CGSB 19.21.
 - .1 Shrinkage: maximum 20%.
 - .2 Maximum VOC: 53 g/L.
 - .3 Sag: Maximum 4.0 mm.
- .9 Two-component, non-sag, tamper resistant, elastomeric polyurethane sealant, for use in interior joints, penetrations, doors, windows, perimeters of fixtures, where a flexible security sealant is required due to idle tampering or vandalism, to ASTM C920, type M, Grade NS, Class 12.5, Use T₁, M and O.
 - .1 Ultimate Elongation: 175 - 200%.
 - .2 Shore A Hardness: 40 - 45.
 - .3 Tensile Strength: 2000 to 2400 kPa.
 - .4 Maximum VOC: Activator - < 25 g/L, Base - < 100 g/L.
 - .5 Colour to be selected from manufacturer's standard range.

2.3 ACCESSORIES

- .1 Primer: Type as recommended by sealant manufacturer. Primer to be 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 Preformed Compressible and Non-Compressible back-up materials.
 - .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
 - .1 Extruded closed cell foam backer rod.
 - .2 Size: oversize 30 to 50 %.
 - .2 Neoprene or Butyl Rubber.
 - .1 Round solid rod, Shore A hardness 70.
 - .3 High Density Foam.

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- .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m³ density, or neoprene foam backer, size as recommended by manufacturer.
- .4 Bond Breaker Tape.
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

PART 3 **EXECUTION****3.1** **PROTECTION**

- .1 Protect installed Work of other trades from staining or contamination.

3.2 **SURFACE PREPARATION**

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.
- .5 All joint forming materials to be primed prior to sealant installation.
- .6 Prepare surfaces in accordance with manufacturer's directions.

3.3 **PRIMING**

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

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- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 **BACKUP MATERIAL**

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 **MIXING**

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 **APPLICATION**

- .1 Sealant.
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing.
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.
- .3 Cleanup.

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- .1 Clean adjacent surfaces immediately and leave Work neat and clean.
- .2 Remove excess and droppings, using recommended cleaners as work progresses.
- .3 Remove masking tape after initial set of sealant.

3.7

CLEANING

- .1 Clean adjacent surfaces immediately and leave Work neat and clean.
- .2 Remove excess and droppings, using recommended cleaners as work progresses.
- .3 Remove masking tape after initial set of sealant.

END OF SECTION

PART 1 **GENERAL****1.1** **REFERENCES**

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-79.1, Insect Screens.
- .2 Canadian Standards Association (CSA)
 - .1 CSA-A440-00/A440.1, A440, Windows / Special Publication A440.1, User Selection Guide to CSA Standard A440, Windows.
 - .2 CAN/CSA-Z91, Health and Safety Code for Suspended Equipment Operations.

1.2 **SUBMITTALS**

- .1 Indicate materials and details in scale full size for head, jamb and sill, profiles of components, interior and exterior trim, junction between combination units, elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes fasteners, and caulking.
- .2 Indicate location of manufacturer's nameplates.
- .3 Shop drawings to include continuation of air barrier and vapour barrier between wall assembly and vinyl window.
- .4 Include frame, sash, sill, glazing and weatherproofing method, insect screens, surface finish and hardware.
- .5 Submit product and installation instructions.

1.3 **TEST REPORTS**

- .1 Submit test reports from approved independent testing laboratories, certifying compliance with specifications, for:
 - .1 Windows classifications
 - .2 Air tightness
 - .3 Water tightness

- .4 Wind load resistance
- .5 Condensation resistance
- .6 Forced entry resistance
- .7 Insect screens
- .8 Glazing
- .9 Safety drop - vertical sliding windows only
- .10 Ease of operation - windows with operable lights
- .11 Sash pull-off - vinyl windows

1.4 WARRANTY

- .1 Provide a written warranty for work under this Section from Manufacturer for failure due to defective materials and from Contractor for failure due to defective installation, workmanship for ten (10) years respectively from the date of Substantial Completion.

1.5 CLOSEOUT SUBMITTALS

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

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Windows and Doors by Kohltech Windows and Entrance Systems, or approved equal.
- .2 All windows and doors by same manufacturer.
- .3 Sizes, operation and features as indicated on drawings, supplemented as follows:
 - .1 **Windows:** Kohltech Supreme Series, combination of casement and fixed units as indicated; plain frame, EnerglassPlus glazing, color by Owner from standard color chart, insect screens on all operable units.
 - .2 **Doors:** Kohltech Traditional Series, color by Owner from standard color chart, venting lite (all doors), rectangular grill pattern, 5/8" flat

Colonial Grill (color by Owner), EnerglassPlus glazing, stainless steel hinges, 7/8" vinyl exterior trim, aluminum sill, weather stripping (color by Owner), vinyl clad frame, insect screens on all operable lites.

- .4 Screens: to CAN/CGSB-79.1.
 - .1 Insect screening mesh: count 18 x 14
 - .2 Fasteners: tamper proof
 - .3 Screen frames: aluminum, colour to match window frames
 - .4 Mount screen frames for exterior replacement.

2.2 WINDOW TYPE AND CLASSIFICATION

- .1 Types: as indicated on drawings.
 - .1 Casement: with insulating glass.
 - .2 Fixed: with insulating glass.
 - .3 Screens: on all operable units.
- .2 Classification rating: to CSA-A440/A440.1 for various regions of Newfoundland and Labrador as follows:
 - .1 Gander: A3, B4, C3, I40, F1, S1

2.3 FABRICATION

- .1 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows.
- .2 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less and plus or minus 3.0 mm for units with a diagonal measurement over 1800 mm.
- .3 Face dimensions detailed are maximum permissible sizes.
- .4 Brace frames to maintain squareness and rigidity during shipment and installation.

2.4 VINYL FINISHES

- .1 Vinyl finishes: in accordance with CSA-A440/A440.1, including appendices.

2.5 GLAZING

- .1 Glaze windows in accordance with CSA-A440/A440.1 and Section 08 80 50 - Glazing.

2.6 HARDWARE

- .1 Window Hardware:
 - .1 Stainless steel or white bronze trimline camlocks to provide security and permit easy operation of units.
 - .2 Counter balance: stainless steel coil balance hardware.
- .2 Where windows latching devices are located in excess of 1600 mm above finished floor level:
 - .1 Equip vertical sliding units with ring pull at top sash. Provide operating pole of length required, complete with appropriate tip to suit ring pull. Provide one (1) pole for each room where vent sash occurs.

2.7 AIR BARRIER AND VAPOUR RETARDER

- .1 Provide low expanding, single component polyurethane foam sealant installed at head, jamb and sill perimeter of window for sealing to building air barrier, vapour retarder and window frame. Foam sealant width to be adequate to provide required air tightness and vapour diffusion control to building air barrier and vapour retarder foam interior. Refer to Section 07 21 20 - Low Expanding Foam Sealant.

PART 3 EXECUTION**3.1 WINDOW INSTALLATION**

- .1 Install in accordance with CSA-A440.
- .2 Arrange components to prevent abrupt variation in colour.
- .3 Install shims between windows and building frame at each installation screw location. Shim and fasten

windows in accordance with manufacturer's recommendations and CAN/CSA A440.4.

3.2 CAULKING

- .1 Seal joints between windows and window sills with sealant. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.
- .2 Apply sealant in accordance with Section 07 92 00 - Joint Sealants. Conceal sealant within window units except where exposed use is permitted by Owner's Representative.

END OF SECTION

PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
 - .1 ANSI/BHMA A156.1, American National Standard for Butts and Hinges.
 - .2 ANSI/BHMA A156.2, Bored and Preassembled Locks and Latches.
 - .3 ANSI/BHMA A156.5, Cylinders and Input Devices for Locks.
 - .4 ANSI/BHMA A156.6, Architectural Door Trim.
 - .5 ANSI/BHMA A156.13, Mortise Locks and Latches Series 1000.
 - .6 ANSI/BHMA A156.14, Sliding and Folding Door Hardware.
 - .7 ANSI/BHMA A156.18, Materials and Finishes.
- .2 Canadian Steel Door and Frame Manufacturers'

1.2 **SUBMITTALS**

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet.
- .2 Samples:
 - .1 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
 - .2 After approval samples will be returned for incorporation in the Work.
- .3 Hardware List:
 - .1 Submit contract hardware list.
 - .2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.

- .4 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.
- .5 Closeout Submittals
 - .1 Provide operation and maintenance data for door closers, locksets, etc. for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.3 MAINTENANCE MATERIALS

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

1.4 WARRANTY

- .1 Provide a written manufacturer's warranty for work of this Section for failure due to defective materials for ten (10) years, dated from substantial completion certificate.
- .2 Provide a written Contractor's warranty for work of this Section for failure due to defective installation workmanship for one (1) year, dated from submittal completion certificate.

1.5 QUALITY ASSURANCE

- .1 Only products certified in accordance with ANSI/BHMA standards are acceptable. Items that are equal in design, function and quality will be accepted upon approval of the Owner's Representative.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each

PART 2 PRODUCTS

2.1 HARDWARE ITEMS

- .1 Only door locksets and latches listed on ANSI/BHMA Standards list are acceptable for use on this project.
- .2 Use only one manufacturer's products.
- .3 *All hardware to be "Best" hardware, Grade 1.*

2.2 DOOR HARDWARE

- .1 Locks and latches:
 - .1 Bored and preassembled locks and latches: to ANSI/BHMA A156.2, 4000 bored lock, grade 1, designed for function and keyed as stated in Hardware Schedule.
 - .2 Mortise locks and latches: to ANSI/BHMA A156.13, series 1000 mortise lock, designed for function and keyed as stated in Hardware Schedule.
 - .3 Lever handles: design as indicated in hardware groups.
 - .4 Roses: round.
 - .5 Normal strikes: box type, lip projection not beyond jamb.
 - .6 Cylinders: key into keying system as directed.
 - .7 Finished as indicated in Hardware Groups.

.2 Butts and hinges:

- .1 Butts and hinges: to ANSI/BHMA A156.1, designated by letter A and numeral identifiers, followed by size and finish, listed in Hardware Schedule.
- .2 Interior hinges of steel, unless otherwise indicated.
- .3 Quantity, size and width of hinges in accordance with manufacturer's recommendations and ANSI/BHMA 156.1.

2.3 FASTENINGS

- .1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Exposed fastening devices to match finish of hardware.

2.4 KEYING

- .1 Doors to be master keyed as directed. Prepare detailed keying schedule in conjunction with Owner's Representative and owner.
- .2 Provide keys in triplicate for every lock in this Contract.

2.5 HARDWARE GROUPS

- .1 Exterior Door
 - .1 Door and door box, complete pre-assembled unit.
 - .2 Hardware: Camelot trim keypad deadbolt paired with camelot trim front entry handle and accent lever BE365 CAM 619 + FE285 CAM 619 ACC, satin nickel finish, by Schlage, or approved equal.
 - .3 Accessories: floor door stop, satin nickel finish, 436-619 by Schlage, or approved equal.
 - .4 Key and/or code all exterior locks alike.

PART 3 EXECUTION**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 INSTALLATION

- .1 Install door hardware in accordance with manufacturer's instructions, using special tools and jigs. Fit accurately and apply securely. Ensure that hardware is installed correctly.
- .2 No operating hardware shall be installed at a height of more than 1200 above the finished floor (NBC 3.4.6.16).
- .3 Installation to be done by a qualified tradesman. Technical assistance provided by door hardware supplier where required.
- .4 Use only manufacturer's supplied fasteners. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .5 Remove construction cores and locks when directed by Owner's Representative; install permanent cores and check operation of locks.
- .6 Installation of all Automatic Operator items to be performed by AAADM certified and manufacturer authorized personnel, including connections to hardware products installed by others.
- .7 Installation of Access Control items to be performed by manufacturer certified authorized personnel, including connections to hardware products installed by others.

3.3 EXAMINATION

- .1 Visit site prior to start of installation of hardware.

- .2 Visit will include examination of openings, site conditions and materials for conditions that prevent proper application of finish hardware.
- .3 Report to General Contractor, in writing, defects of work prepared by other trades and other unsatisfactory site conditions. Commencement of installation will imply acceptance of prepared work by others.

3.4 ADJUSTING

- .1 Adjust door hardware for optimum, smooth operating condition, safety and for weather tight closure.
- .2 Lubricate hardware, operating equipment and other moving parts.
- .3 Adjust door hardware to provide tight fit at contact points with frames.
- .4 Where hardware is found defective, repair or replace or correct as desired by inspection reports.

3.5 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacture's instructions.
- .3 Remove protective material from hardware items where present.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.6 PROTECTION

- .1 All hardware shall be protected against damage from paint, plaster or other defacing materials. Whenever possible manufacturers protective covering when applied, shall not be removed until final project cleaning takes place. Material not protected by

manufacture shall be covered or removed from door during painting or any other adjustments that can cause damage to hardware.

3.7 DEMONSTRATION

- .1 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

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PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM F2034, Standard Specification for Sheet Linoleum Floor Covering.

1.2 **SUBMITTALS**

- .1 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base, feature strips, edge strips.

1.3 **CLOSEOUT SUBMITTALS**

- .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 **ENVIRONMENTAL REQUIREMENTS**

- .1 Maintain air temperature and structural base temperature at flooring installation area at 18° C to 30° C for 48 hours before, during and for 72 hours after installation, and at a relative humidity not greater than 60%.
- .2 After installation, gradually lower temperature of room over a 72 hour period. Temperature of room should never go below 1° C.

1.5 **QUALIFICATIONS**

- .1 Resilient Sheet flooring installers: minimum 5 years proven experience.

1.6 **QUALITY ASSURANCE**

- .1 Provide Certificate of Quality Compliance from sheet flooring manufacturer.

- .2 Provide Certificate of Quality Compliance from flooring installer upon satisfactory completion of installation.

1.7 WARRANTY

- .1 Flooring materials shall be warranted by the manufacturer against defects in materials and workmanship for a period of five (5) years from the date of Substantial Completion.
- .2 Contractor shall provide a two (2) year warranty from the date of substantial completion against defects in workmanship.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Resilient flooring must:
 - .1 Meet or exceed all applicable governmental and industrial safety and performance standards; and
 - .2 Be manufactured and transported in such a manner that all steps of the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the Fisheries Act and the Canadian Environmental Protection Act (CEPA).
- .2 Linoleum Sheet Flooring: to ASTM F2034.
 - .1 Type I.
 - .2 Nominal thickness: 2.5 mm.
 - .3 Backing: jute fabric backing.
 - .4 Wear surface: homogeneous mixture of linoleum cement (linseed oil, natural tree resins, drying oil catalysts), wood flour, cork flour, color pigments and filler.
 - .5 Colors and pattern: shall be dispersed throughout the thickness of the wear layer.
 - .6 Colour: selected by Owner's Representative.

- .7 Provide solid color linoleum weld rod intended for heat welding of linoleum seams. Color shall be compatible with field color of flooring or as selected by Owner's Representative to contrast with field color of flooring.
- .8 Flooring shall be supplied in rolls of uniform thickness, 2.0 m wide.
- .3 Primers and adhesives: waterproof, solvent-free, recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.
- .4 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste as recommended by flooring manufacturer for use with their product.
- .5 Metal edge strips:
 - .1 Aluminum extruded, smooth, with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .6 Sealer and wax: type recommended by resilient flooring material manufacturer for material type and location.

PART 3 EXECUTION

3.1 APPLICATION: FLOORING

- .1 Provide a high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to the outside. Do not let contaminated air recirculate through a district or whole building air distribution system. Upon completion of work, maintain ventilation at maximum capacity until building occupation.
- .2 To minimize emissions from adhesives, use water-based, solvent-free styrene-butadiene-rubber adhesive for linoleum. Butadiene exposure may cause eye and nose irritation, headaches, dizziness, and vomiting.

- .3 Apply water based adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .4 Lay flooring with seams parallel to building lines to produce a minimum number of seams. Border widths minimum 1/3 width of full material.
- .5 Run sheets in direction of traffic. Double cut sheet joints and continuously heat weld according to manufacturer's printed instructions.
- .6 Heat weld seams of resilient sheet flooring in accordance with manufacturer's printed instructions.
- .7 As installation progresses, and after installation roll flooring with 45 kg minimum roller to ensure full adhesion.
- .8 Cut flooring neatly around fixed objects.
- .9 Continue flooring over areas which will be under built-in furniture.
- .10 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.
- .11 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.2 CLEANING

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Clean floor and apply 2 coats of an approved floor finish plus one wear layer of floor finish to flooring and base surface in accordance with manufacturer's instructions.

3.3 PROTECTION

- .1 Protect new floors from time of final set of adhesive until final inspection.

- .2 Prohibit traffic on floor for 48 hours after installation.
- .3 Do not expose newly installed flooring to rolling load traffic for at least 72 hours after installation to allow setting and drying of the adhesive.

3.4 COMMISSIONING

- .1 Train area staff in the care, cleaning and sealing of resilient sheet flooring.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 Environmental Protection Agency (EPA)
 - .1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
- .2 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual.
- .3 Society for Protective Coatings (SSPC)
 - .1 SSPC Painting Manual, Volume Two, Systems and Specifications Manual.
- .4 National Fire Code of Canada.

1.2 QUALITY ASSURANCE

- .1 Contractor shall have a minimum of five years proven satisfactory experience. When requested, provide a list of last three comparable jobs including, job name and location, specifying authority, and project manager.
- .2 Qualified journeymen shall be engaged in painting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.
- .3 Conform to latest MPI requirements for interior painting work including preparation and priming.

1.3 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

- .1 Provide paint products meeting MPI "Environmentally Friendly" E2 or E3 ratings based on VOC (EPA Method 24) content levels.
- .2 Where indoor air quality (odour) is a problem, use only MPI listed materials having a minimum E2 or E3 rating.

1.4 SCHEDULING

- .1 Submit work schedule for various stages of painting to Owner's Representative for approval. Submit schedule minimum of four (4) working days in advance of proposed operations.
- .2 Obtain written authorization from Owner's Representative for any changes in work schedule.
- .3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.5 SUBMITTALS

- .1 Submit product data and manufacturer's installation/application instructions for each paint and coating product to be
- .2 Submit product data for the use and application of paint thinner.
- .3 Submit WHMIS MSDS - Material Safety Data Sheets. Indicate VOCs during application and curing.
- .4 Upon completion, submit records of products used, records to be included in Operating and Maintenance Manuals. List products in relation to finish system and include the following:
 - .1 Product name, type and use
 - .2 Manufacturer's product number
 - .3 Colour numbers
 - .4 MPI Environmentally Friendly Classification System Rating
 - .5 Manufacturer's Material Safety Data Sheets (MSDS)
- .5 Submit full range colour sample chips to indicate where colour availability is restricted.
- .6 Submit duplicate 200 x 300 mm sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:

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- .1 13 mm birch plywood for finishes over wood surfaces.
- .7 When approved, sample panels shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

1.6 QUALITY CONTROL

- .1 When requested by Owner's Representative, prepare and paint designated surface, area, room or item (in each colour scheme) to requirements specified herein, with specified paint or coating showing selected colours, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

1.7 EXTRA MATERIALS

- .1 Submit maintenance materials from same product run as products installed in accordance with Section 01 78 00 - Closeout Submittals. Package products with protective covering and identify with descriptive labels.
- .2 Submit one - four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish formula.
- .3 Deliver to Owner's Representative and store where directed.
- .4 Provide certificate signed by staff that extra materials have been received in order.

1.8 DELIVERY, HANDLING AND STORAGE

- .1 Deliver and store materials in original containers, sealed, with labels intact.
- .2 Labels shall clearly indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.

- .3 Compliance with applicable standard.
- .4 Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from site.
- .4 Provide and maintain dry, temperature controlled, secure storage.
- .5 Observe manufacturer's recommendations for storage and handling.
- .6 Store materials and supplies away from heat generating devices.
- .7 Store materials and equipment in a well ventilated area with temperature range 7° C to 30° C.
- .8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Owner's Representative. After completion of operations, return areas to clean condition to approval of Consultant.
- .10 Remove paint materials from storage only in quantities required for same day use.
- .11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .12 Fire Safety Requirements:
 - .1 Provide minimum one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
 - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.9 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Ensure emptied containers are sealed and stored safely.
- .4 Unused paint, coating materials must be disposed of at official hazardous material collections site as approved by Owner's Representative.
- .5 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal.
- .6 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .7 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .8 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).

1.10 SITE CONDITIONS

- .1 Heating, Ventilation and Lighting:
 - .1 Ventilate enclosed spaces.
 - .2 Perform no painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10°C for 24 hours before, during and after paint application until paint has cured sufficiently.
 - .3 Where required, provide continuous ventilation for seven days after completion of application of paint.
 - .4 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities shall be provided by General Contractor.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Unless specifically pre-approved by the specifying body, Paint Inspection Agency and the applied product manufacturer, perform no painting work when:
 - .1 Ambient air and substrate temperatures are below 10°C.
 - .2 Substrate temperature is over 32°C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
 - .4 The relative humidity is above 60% or when the dew point is less than 3°C variance between the air/surface temperature.
 - .2 Perform no painting work when the maximum moisture content of the substrate exceeds:
 - .1 12% for concrete and masonry (clay and concrete brick/block).
 - .2 15% for wood.
 - .3 12% for plaster and gypsum board.

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- .3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".
- .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
 - .1 Apply paint finish only 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 only to adequately prepared surfaces and to surfaces within moisture limits noted herein.
 - .3 Apply paint only when previous coat of paint is dry or adequately cured.
- .4 Additional Interior Application Requirements:
 - .1 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
 - .2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Owner's Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Paint materials for paint systems shall be products of a single manufacturer.
- .3 Low odor products. Whenever possible, select products exhibiting low odor characteristics. If two products are otherwise equivalent, select the product with the lowest odor. Only qualified products with E2 or E3"

Environmentally Friendly" rating are acceptable for use on this project.

- .4 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, shall:
 - .1 be water-based, water soluble, water clean-up.
 - .2 be non-flammable.
 - .3 be manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
 - .4 be manufactured without compounds which contribute to smog in the lower atmosphere.
 - .5 do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
- .5 Water-borne surface coatings must be manufactured and transported in a manner that steps of process, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).
- .6 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .7 Water-borne surface coatings must have a flash point of 61.0°C or greater.
- .8 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:
 - .1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
 - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.

- .9 Water-borne paints and stains, and water borne varnishes must meet a minimum "Environmentally Friendly" E2 rating.

2.2 COLOURS

- .1 Owner's Representative will provide Colour Schedule after contract award.
- .2 Selection of colours will be from manufacturers full range of colours.
- .3 Where specific products are available in a restricted range of colours, selection will be based on the limited range.
- .4 Second coat in a 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. On-site tinting of painting materials is allowed only with Owner's Representative written permission.
- .2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.
- .3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.
- .4 Thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Owner's Representative.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

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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 finish	max. 5	max. 10
G2 - velvet finish	max. 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	min. 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	

- .2 Gloss level ratings of painted surfaces shall be as specified herein.

2.5 INTERIOR PAINTING SYSTEMS

- .1 The following paint formulas requires a three coat finish as indicated in the MPI Architectural Painting Specifications Manual.
- .2 Concrete Horizontal Surfaces: floors and stairs
- .1 INT 3.2B Alkyd floor enamel low gloss finish.
- .3 Dimension Lumber: columns, beams, exposed joists, underside of decking, etc.
- .1 INT 6.2D Latex G5 finish (over latex primer).
- .4 Dressed Lumber: including doors, door and window frames casings, mouldings, etc.
- .1 INT 6.3T Latex G5 finish (over latex primer).
- .5 Wood Paneling and Casework: partitions, panels, shelving, millwork, etc.
- .1 INT 6.4C Semi-transparent stain finish.
- .6 Wood Floors and Stairs: including flooring, etc.
- .1 INT 6.5B Polyurethane varnish gloss finish (over stain).
- .2 INT 6.5C Polyurethane varnish gloss finish.

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 Painting Specifications Manual except where specified otherwise.
- .2 Apply all paint materials in accordance with paint manufacturer's written application instructions.

3.3 **PROTECTION**

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage. If damaged, clean and restore such surfaces as directed by Owner's Representative.
- .2 Cover or mask floors, windows and other ornamental hardware adjacent to areas being painted to prevent damage and to protect from paint drops and splatters. Use non-staining coverings.
- .3 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .4 Protect factory finished products and equipment.
- .5 Protect passing pedestrians, building occupants and general public in and about the building.
- .6 Remove electrical cover plates, light fixtures, surface hardware on doors, door stops, bath accessories and other surface mounted fittings and fastenings prior to undertaking any painting operations. Store for re-installation after painting is completed.

- .7 As painting operations progress place "WET PAINT" signs in occupied areas to approval of Owner's Representative.

3.4 EXAMINATION

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Owner's Representative all damage, defects, unsatisfactory or unfavorable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Owner's Representative. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
 - .1 Plaster and wallboard: 12%
 - .2 Masonry/Concrete: 12%
 - .3 Wood: 15%

3.5 CLEANING AND PREPARATION

- .1 Clean and prepare surfaces in accordance with MPI Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
 - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly.

- .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
 - .6 Use trigger operated spray nozzles for water hoses.
 - .7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or any such organic solvents to clean up water-based paints.
- .2 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
 - .3 Sand existing surfaces with intact, smooth, high gloss coatings to provide adequate adhesion for new finishes.
 - .4 Where possible, prime surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
 - .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
 - .2 Apply wood filler to nail holes and cracks.
 - .3 Tint filler to match stains for stained woodwork.
 - .5 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.
 - .6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air, or vacuum cleaning.
 - .7 Touch up of shop primers with primer as specified in applicable section. Major touch-up including cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and

rusted areas, shall be by supplier of fabricated material.

- .8 Do not apply paint until prepared surfaces have been accepted by Owner's Representative.

3.6 APPLICATION

- .1 Method of application to be as approved by Owner's Representative. Apply paint by brush, roller, air sprayer, airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple.
 - .4 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
 - .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
 - .4 Brush out immediately all runs and sags.
 - .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.

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- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Owner's Representative.
- .5 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects.
- .8 Finish tops of cupboards, cabinets and projecting ledges, both above and below sight lines as specified for surrounding surfaces.
- .9 Finish closets and alcoves as specified for adjoining rooms.
- .10 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.7 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 In finished areas: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.
- .2 In boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
- .3 In other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

- .5 Do not paint over nameplates.
- .6 Keep sprinkler heads free of paint.
- .7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .8 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- .9 Paint all fire protection piping red.
- .10 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- .11 Do not paint interior transformers and substation equipment.

3.8 FIELD QUALITY CONTROL

- .1 Field inspection of interior painting operations to be carried out by Owner's Representative.
- .2 Advise Owner's Representative when each applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .3 Co-operate with Owner's Representative and provide access to all areas of the work.
- .4 Standard of Acceptance:
 - .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.

3.9 RESTORATION

- .1 Clean and re-install all 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 to approval of Owner's Representative. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Owner's Representative.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES .1 Manually operated, roll-up fabric interior window shades including mounting and operating hardware.

1.2 RELATED SECTIONS .1 Section 06 10 00 - Rough Carpentry
.2 Section 07 92 00 - Joint Sealants

1.3 SUBMITTALS .1 Submit under provisions of Section 01 33 00 - Submittal Procedures:
.2 Product Data: Manufacturer's data sheets on each product specified, including:
1. Preparation instructions and recommendations.
2. Installation and maintenance instructions.
3. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
4. Storage and handling requirements and recommendations.
5. Mounting details and installation methods.
6. Typical wiring diagrams including integration of motor controllers with building management system, audiovisual and lighting control systems as applicable.
.3 Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, and relationship to adjacent work.
.4 Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings, field verified window dimensions, quantities, type of shade, controls, fabric, and color, and

include opening sizes and key to typical mounting details.

- .5 Selection Samples: For each finish product specified, two complete sets of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.
- .6 Verification Samples: For each finish product specified, two complete sets of shade components, unassembled, demonstrating compliance with specified requirements. Shade fabric sample and aluminum finish sample as selected, representing actual product, color, and patterns. Mark face of material to indicate interior faces.
- .7 Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.
- .8 Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.
- .2 NFPA Flame-Test: Passes NFPA 701. Materials tested shall be identical to products proposed for use.
- .4 Mock-Up: Provide a mock-up of one of each type roller shade assembly specified for evaluation of mounting, appearance and

accessories.

- .1 Locate mock-up in window(s) designated by Architect.
- .2 Do not proceed with remaining work until mock-up is accepted by Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Do not deliver window shades until building is enclosed and construction within spaces where shades will be installed is substantially complete.
- .2 Deliver products in manufacturer's original, unopened, undamaged containers with labels intact.
- .3 Label containers and shades according to Window Shade Schedule.
- .4 Store products in manufacturer's unopened packaging until ready for installation.

1.6 SEQUENCING

- .1 Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
- .2 Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

- #### 1.7 PROJECT CONDITIONS.
- .1 Install roller shades after finish work and ambient temperature, humidity and ventilation conditions are maintained at levels recommended for project upon completion.

1.8 WARRANTY

- .1 Hardware and Shade Fabric: Twenty-five year limited warranty.

PART 2 - PRODUCTS

2.1 MANUALLY OPERATED
WINDOW SHADES .1

Manually Operated Window Shades with Independent Control:
Manually operated, vertical roll-up, fabric window shade with components necessary for complete installation.

1. Operation: Bead chain and clutch operating mechanism allowing shade to stop when chain is released. Designed never to need adjustment or lubrication. Provide limit stops to prevent shade from being raised or lowered too far.
2. Clutch mechanism: Fabricated from high carbon steel and molded fiberglass reinforced polyester or injected molded nylon.
3. Bead chain loop: Stainless steel bead chain hanging at side of window.
4. Idler Assembly: Provide roller idler assembly of molded nylon with adjustable length idler pin to facilitate easy installation, and removal of shade for service.

.1 Mounting:

- .1 Mounting brackets.
- .2 Endcaps and fascia.
- .3 Roller Tube: Fabricated from extruded aluminum, galvanized steel, or enameled steel. Diameter, wall thickness, and material selected by manufacturer to accommodate shade type and size. Fabric connected to the roller tube with LSE (low surface energy) double sided adhesive specifically developed to attach coated textiles to metal. Adhesive attachment

- to eliminate horizontal impressions in fabric.
- .4 Brackets: Plated stamped steel. Provide size compatible with roller size.
 - 1. Mounted to ceiling.
- .5 Shade slat: Slat encased in heat seamed hem.
- .6 Fascia: L shaped aluminum extrusion to conceal shade roller and hardware.
 - 1. Attachment: Snaps onto endcaps without requiring exposed fasteners of any kind. Fascia can be mounted continuously across two or more shade bands.
 - 2. Finish: Clear anodized.

2.2 FABRIC

- .1 Color and pattern: As selected by Architect from manufacturer's standard range.
- .2 3% Average openness.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Do not begin installation until substrates have been properly prepared.
- .2 If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- .1 Coordinate requirements for blocking and structural supports to ensure adequate means for installation of window shades.

3.3 INSTALLATION

- .1 Install in accordance with manufacturer's instructions.

- .2 Install roller shades level, plumb, square, and true. Allow proper clearances for window operation hardware.

3.4 TESTING AND DEMONSTRATION

- .1 Test window shades to verify that operating mechanism, fabric retainer, and other operating components are functional. Correct deficiencies.
 - .1 Chain and clutch.
 - .2 Demonstrate operation of shades to Owner's designated representatives.

3.5 PROTECTION

- .1 Protect installed products until completion of project.
- .2 Touch-up, repair or replace damaged products before Substantial Completion.

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PART 1 GENERAL

1.1 SUBMITTALS

- .1 Submittals: in accordance with Division 01.
- .2 Shop drawings; submit drawings stamped and signed for approval by Departmental Representative.
- .3 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .4 Shop drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify current model production.
 - .5 Certification of compliance to applicable codes.
- .5 In addition to transmittal letter referred to in Division 01: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.
- .6 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Division 01.
 - .2 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
 - .3 Operation data to include:
 - .1 Control schematics for systems including environmental controls.
 - .2 Description of systems and their controls.
 - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
 - .4 Operation instruction for systems and component.

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- .5 Description of actions to be taken in event of equipment failure.
 - .6 Valves schedule and flow diagram.
 - .7 Colour coding chart.
 - .4 Maintenance data to include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.
 - .5 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.
 - .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
 - .6 Approvals:
 - .1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
 - .2 Make changes as required and re-submit as directed by Departmental Representative.
 - .7 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
 - .8 Site records:
 - .1 Departmental Representative will provide 1 set of reproducible mechanical drawings or AutoCAD files. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur.

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- Include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .3 Use different colour for each service.
 - .4 Make available for reference purposes and inspection.
 - .9 As-built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Departmental Representative for approval and make corrections as directed.
 - .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.
 - .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
 - .10 Submit copies of as-built drawings for inclusion in final TAB report.

1.2 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Division 01.
- .2 Health and Safety Requirements: do construction occupational health and safety in accordance with Division 01.

1.3 MAINTENANCE

- .1 Furnish spare parts in accordance with Division 01 as follows:
 - .1 One set of packing for each pump.
 - .2 One casing joint gasket for each size pump.
 - .3 One glass for each gauge glass.

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- .2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Division 01.
- .3 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.4 DELIVERY,
STORAGE, AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Division 01.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 All materials used on this project shall be new and CSA approved unless noted otherwise.

PART 3 EXECUTION

3.1 PAINTING, REPAIRS
AND RESTORATION

- .1 Do painting in accordance with Section 09 91 23 - Interior Painting.
- .2 Prime and touch up marred finished paintwork to match original.
- .3 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

- .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.3 FIELD QUALITY CONTROL

- .1 Site Tests: conduct following tests in accordance with Division 01 and submit report as described in PART 1 - SUBMITTALS.
 - .1 Perform tests as specified in other sections of this specification.
- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of

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Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

- .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 DEMONSTRATION

- .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Contractor to supply labour, material, and instruments required for testing.
- .2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .4 Instruction duration time requirements as specified in appropriate sections.
- .5 Departmental Representative may record these demonstrations on video tape for future reference.

3.5 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

Part 1 GENERAL1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 28 - Health and Safety Requirements.
- .3 Section 01 78 00 - Closeout Submittals.
- .4 Section 21 05 01 - Common Work Results - Mechanical.
- .5 Section 22 05 00 - Common Work Results for Plumbing.
- .6 Section 23 05 05 - Installation of Pipework.
- .7 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI B16.1, Cast Iron Pipe Flanges and Flange Fittings, Class 25, 125, 250 and 800.
- .2 Canadian Standard Association (CSA)
 - .1 CSA B137.5, Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications.
 - .2 CSA B137.6, CPVC Pipe, Tubing and Fittings for Both Hot and Cold Water Distribution Systems.
- .3 National Sanitation Foundation (NSF)
 - .1 NSF61 Potable Water Listing.
- .4 Underwriters Listing of Canada (ULC)
 - .1 CAN/ULC S101, Fire Endurance Tests of Buildings Construction and Materials.
 - .2 CAN/ULC S102.2, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.
 - .3 CAN/ULC S115, Standard Method of Fire Tests of Firestop Systems.
- .5 American Society for Testing and Materials International, (ASTM).

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- .1 ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .2 ASTM B88M, Standard Specification for Seamless Copper Water Tube (Metric).
 - .3 ASTM D1784 Standard Specification for Rigid Poly (Vinyl Chloride) PVC Compounds and Chlorinated Poly (Vinyl Chloride) CPVC compounds.
 - .4 ASTM D2467, Standard Specification for Poly (Vinyl Chloride) PVC Plastic Pipe Fittings, Schedule 80.
 - .5 ASTM F437 Standard Specification for Threaded Chlorinated Poly (Vinyl Chloride) CPVC Plastic Pipe Fittings Schedule 80.
 - .6 ASTM F439 Standard Specification for Chlorinated Poly (Vinyl Chloride) CPVC Plastic Pipe Fittings Schedule 80.
 - .7 ASTM F441/441M Standard Specification for Chlorinated Poly (Vinyl Chloride) CPVC Plastic Pipe Schedules 40 and 80.
 - .8 ASTM F876 Standard Specification for Crosslinked Polyethylene (PEX) Tubing.
 - .9 ASTM F877 Standard Specification for Crosslinked Polyethylene (PEX) Hot and Cold Water Distribution System.
 - .6 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act (CEPA).
 - .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
 - .8 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
 - .1 MSS-SP-67, Butterfly Valves.
 - .2 MSS-SP-70, Cast Iron Gate Valves, Flanged and Threaded Ends.
 - .3 MSS-SP-71, Cast Iron Swing Check Valves, Flanged and Threaded Ends.
 - .4 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.
 - .5 MSS-SP-110 Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends
 - .9 National Research Council (NRC)/Institute for Research in Construction.

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- .1 NRCC, National Plumbing Code of Canada (NPC).
 - .10 Transport Canada (TC).
 - .1 Transportation of Dangerous Goods Act (TDGA).

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit product data for following: valves.
- .3 Submit WHMIS MSDS - Material Safety Data Sheets.
- .4 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 HEALTH AND SAFETY

- .1 Do construction occupational health and safety in accordance with Section 01 35 28 - Health and Safety Requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Division 01.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Separate for reuse and recycling and place in designated containers Steel, Metal, Plastic waste in accordance with Waste Management Plan.
- .4 Place materials defined as hazardous or toxic in designated containers.
- .5 Handle and dispose of hazardous materials in accordance with CEPA , TDGA , Regional and Municipal regulations.
- .6 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 PRODUCTS

2.1 PIPING

- .1 Domestic hot, cold and recirculation systems, within building.

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- .1 Above ground: NPS ½ to 4 CPVC to SDR11 with IPS outside dimensions: CSA B 137.6, ASTM D1784 cell class of 24448 and NSF 61. NPS ½ to 3 PEX to SDR9: CSA B137.5, ASTM F876 and ASTM F877..
- .2 Buried or embedded:
 - .1 Copper tube, soft annealed, type K: to ASTM B88M, in long lengths and with no buried joints.
 - .2 UO to NPS 3: PEX Tubing to ASTM F876 and F877 and certified to NSF61 rated at 93° at 551kPa, 82°C at 690 kPa, 23°C at 1100 kPa, certified to be used for hot or cold water service.

2.2 FITTINGS

- .1 CPVC Fittings: to CSA B137.6, ASTM D1784 Cell Class of 23447 and NSF 61.
- .2 CPVC Flanges: to ASTM F1970 and ASTM D2467.
 - .1 Flanged CPVC: 1034 kPa at 23⁰C, 517 kPa at 60⁰C not to be used above 60⁰C.
 - .2 Bolt hole patterns to ANSI B16.1 class 125, threads to be tapered iron pipe size threads to ANSI B2.1
- .3 Transition points: as recommended by manufacturer.
- .4 PEX fittings certified to CSA B137.5, ASTM F876 and ASTM F877, and certified to be used with PEX tubing.

2.3 JOINTS

- .1 Rubber gaskets, elastomeric, full face, hardness of 50 to 70 durometer.
- .2 Bolts, nuts, hex head and washers: to ASTM A307, heavy series.
- .3 Solder: 95/5 tin copper alloy lead free for copper pipe.
- .4 Teflon tape: for threaded joints.
- .5 Solvent weld with primer to ASTM F493.
 - .1 Pressure rating 690 kPa at 82⁰C, 2760 kPa at 23⁰C

2.4 GATE VALVES

- .1 NPS2 and under, soldered:

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- .1 Rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc as specified Section 23 05 23.01 - Valves - Bronze.
- .2 NPS2 and under, screwed:
 - .1 Rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc as specified Section 23 05 23.01 - Valves - Bronze.
- .3 NPS2-1/2 and over, in mechanical rooms, flanged:
 - .1 Rising stem: to MSS-SP-70, Class 125, 860 kPa, flat flange faces, cast-iron body, OS&Y bronze trim specified Section 23 05 23.02 - Valves - Cast Iron.
- .4 NPS2-1/2 and over, other than mechanical rooms, flanged:
 - .1 Non-rising stem: to MSS-SP-70, Class 125, 860 kPa, flat flange faces, cast-iron body, bronze trim, bolted bonnet specified Section 23 05 23.02 - Valves - Cast Iron.

2.5 GLOBE VALVES

- .1 NPS2 and under, soldered:
 - .1 To MSS-SP-80, Class 125, 860 kPa, bronze body, renewable composition disc, screwed over bonnet as specified Section 23 05 23.01 - Valves - Bronze.
 - .2 Lockshield handles: as indicated.
- .2 NPS2 and under, screwed:
 - .1 To MSS-SP-80, Class 150, 1 MPa, bronze body, screwed over bonnet, renewable composition disc as specified Section 23 05 23.01 - Valves - Bronze.
 - .2 Lockshield handles: as indicated.

2.6 SWING CHECK VALVES

- .1 NPS 2 and under, soldered:
 - .1 To MSS-SP-80, Class 125, 860 kPa, bronze body, bronze swing disc, screw in cap, regrindable seat as specified Section 23 05 23.01 - Valves - Bronze.
- .2 NPS2 and under, screwed:

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- .1 To MSS-SP-80, Class 125, 860 kPa, bronze body, bronze swing disc, screw in cap, regrindable seat as specified Section 23 05 23.01 - Valves - Bronze.
- .3 NPS2-1/2 and over, flanged:
 - .1 To MSS-SP-71, Class 125, 860 kPa, cast iron body, flat flange faces, or renewable seat, bronze disc, bolted cap specified Section 23 05 23.02 - Valves - Cast Iron.

2.7 BALL VALVES

- .1 NPS2 and under:
 - .1 As specified Section 23 05 23.01 - Valves - Bronze.
 - .2 CPVC to ASTM D 1784 Cell Class of 23447 and NSF 61.
 - .1 Rating 1599 kPa at 23° C and 717 kPa at 60° C
 - .2 O-rings: EPDM
 - .3 ENDS: socket, flanged, threaded
 - .4 Seats: Teflon PTFE
 - .5 Seals: EPDM
 - .6 Full port, downstream union nut for full blocking
 - .7 Ball: CPVC

2.8 BUTTERFLY VALVES

- .1 NPS2 1/2 and over lug:
 - .1 To MSS-SP-67, Class 200, 1.4 MPa.
 - .2 As specified in Section 23 05 23.05 - Butterfly Valves.
- .2 NPS2 1/2 and over, grooved ends:
 - .1 Class 300, 2.1 MPa as specified in Section 23 05 23.05 - Butterfly Valves.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Install in accordance with Canadian Plumbing Code and local authority having jurisdiction.

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- .2 Install pipe work in accordance with Section 23 05 05 - Installation of Pipework and manufacturers' recommendations by certified journey person supplemented as specified herein.
 - .3 Assemble piping using fittings manufactured to ANSI standards.
 - .4 Install CWS piping below and away from HWS and HWR and other hot piping so as to maintain temperature of cold water as low as possible.
 - .5 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.
 - .6 Buried Tubing
 - .1 Lay in well compacted washed sand in accordance with AWWA Class B bedding.
 - .2 Bend tubing without crimping or constriction. Minimize use of fittings.
 - .7 Do not install in vertical shafts.
- 3.2 VALVES
- .1 Isolate equipment, fixtures and branches with butterfly or ball valves.
 - .2 Balance recirculation system using lockshield globe valves. Mark settings and record on as-built drawings on completion.
- 3.3 PRESSURE TESTS
- .1 Conform to requirements of Mechanical Division.
 - .2 Test pressure: greater of 1 ½ times maximum system operating pressure or 860 kPa.
- 3.4 FLUSHING AND CLEANING
- .1 Flush entire system for 8 h. Ensure outlets flushed for 2 h. Let stand for 24 h, then draw one sample off longest run. Submit to testing laboratory for bacteriological testing to verify that system is clean to Provincial potable water guidelines. Let system flush for additional 2 h, then draw off another sample for testing.

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3.5 PRE-START-UP INSPECTIONS

- .1 Systems to be complete, prior to flushing, testing and start-up.
- .2 Verify that system can be completely drained.
- .3 Ensure that pressure booster systems are operating properly.
- .4 Ensure that air chambers, expansion compensators are installed properly.

3.6 DISINFECTION

- .1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction and approval of Owner's Representative.
- .2 Coordinate with Division 33.
- .3 Upon completion, provide laboratory test reports on water quality to Owner's Representative.

3.7 START-UP

- .1 Timing: Start up after:
 - .1 Pressure tests have been completed.
 - .2 Disinfection procedures have been completed.
 - .3 Water treatment systems operational.
- .2 Provide continuous supervision during start-up.
- .3 Start-up procedures:
 - .1 Establish circulation and ensure that air is eliminated.
 - .2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.
 - .3 Bring HWS storage tank up to design temperature slowly.
 - .4 Monitor HWS and HWR piping systems for freedom of movement, pipe expansion as designed.
 - .5 Check control, limit, safety devices for normal and safe operation.
- .4 Rectify start-up deficiencies.

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3.8 PERFORMANCE VERIFICATION

- .1 Timing:
 - .1 After pressure and leakage tests and disinfection completed, and certificate of completion has been issued by authority having jurisdiction.
- .2 Procedures:
 - .1 Verify that flow rate and pressure meet Design Criteria.
 - .2 TAB HWR in accordance with Section 23 05 93 - Testing Adjusting and Balancing for HVAC.
 - .3 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.
 - .4 Sterilize HWS and HWR systems for Legionella control.
 - .5 Verify performance of temperature controls.
 - .6 Verify compliance with safety and health requirements.
 - .7 Check for proper operation of water hammer arrestors. Run one outlet for 10 seconds, then shut off water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for outlets and flush valves.
 - .8 Confirm water quality consistent with supply standards, verifying that no residuals remain as a result of flushing and/or cleaning.
- .3 Reports:
 - .1 In accordance with Division 01.
 - .2 Include certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

END OF SECTION

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PART 1 GENERAL

1.1 SUMMARY

- .1 Section includes:
 - .1 The installation of drainage waste and vent piping - plastic.

1.2 RELATED SECTIONS

- .1 Section 01 35 28 - Health and Safety Requirements.
- .2 Section 23 05 05 - Installation of Pipework.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D2235, Specification for Solvent Cement for Acrylonitrille-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
 - .2 ASTM D2564, Specification for Solvent Cements for Poly(Vinyl-Chloride) (PVC) Plastic Piping Systems.
- .2 Canadian Standards Association (CSA)
 - .1 CSA-B1800 Series, ABS Drain, Waste and Vent Pipe and Pipe Fittings.
 - .2 CSA-B181.2, PVC Drain, Waste and Vent Pipe and Pipe Fittings.
 - .3 CSA-B182.1, Plastic Drain and Sewer Pipe and Pipe Fittings.
- .3 Underwriters Laboratory of Canada (ULC)
 - .1 CAN/ULC-S102.2 Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies.

1.4 DELIVERY STORAGE AND DISPOSAL

- .1 Waste Management and Disposal:
 - .1 Separate and recycle waste materials in accordance with Division 01.
 - .2 Collect and separate for disposal, paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

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1.5 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit product data for following: valves.
- .3 Submit WHMIS MSDS - Material Safety Data Sheets.
- .4 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .5 Submit all unique fire stop listing diagrams.

PART 2 PRODUCTS

2.1 PIPING AND FITTINGS

- .1 For buried DWV piping to:
 - .1 CSA-B181.1.
 - .2 CSA-B181.2.
 - .3 CSA-B182.1.
- .2 For aboveground DWV piping for non-combustible construction, except vertical services shafts and downstream of kitchen equipment:
 - .1 Flame spread rating less than 25 and smoke developed classification less than 50.
 - .2 CSA B181.2
 - .3 Third party certified to CAN/VLC S102.2

2.2 JOINTS

- .1 Solvent weld for PVC: to ASTM D2564.
 - .1 NPS 1 ½ to 6: one step or two step cement
 - .2 NPS 8 and above: two step cement.
- .2 Solvent weld for ABS: to ASTM D2235.

2.3 FIRE STOPS

- .1 At all fire rated penetrations provide ULC listed firestop systems as per ULC/CAN S115.
- .2 Firestop to be selected to suit piping material and base wall material to meet assembly rating.

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PART 3 EXECUTION

3.1 INSTALLATION

- .1 In accordance with Section 23 05 05 - Installation of Pipework and certified journeyperson.
- .2 Install in accordance with National Plumbing Code and local authority having jurisdiction.

3.2 TESTING

- .1 Pressure test buried systems before backfilling in accordance with National Plumbing Code.
- .2 Hydraulically test to verify grades and freedom from obstructions.

3.3 PERFORMANCE VERIFICATION

- .1 Cleanouts:
 - .1 Ensure accessible and that access doors are correctly located.
 - .2 Open, cover with linseed oil and re-seal.
 - .3 Verify cleanout rods can probe as far as the next cleanout, at least.
- .2 Test to ensure traps are fully and permanently primed.
- .3 Ensure fixtures are properly anchored, connected to system and effectively vented.
- .4 Affix applicable label (sanitary, vent, pump discharge etc.) c/w directional arrows.
- .5 Provide copies of test reports for Commissioning Manuals.

END OF SECTION

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PART 1 GENERAL

1.1 SUMMARY

- .1 Section includes:
 - .1 The supply and installation of plumbing fixtures and trim.
- .2 Products installed but not supplied under this section as indicated elsewhere in the contract:
 - .1 Install rough-in for equipment supplied by others, complete with valves on hot and cold water supplies, waste and vent.
 - .2 Equipment installed by others.
 - .1 Connect with unions.
 - .3 Equipment not installed.
 - .1 Capped for future connection by others.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 28 - Health and Safety Requirements
- .3 Section 01 78 00 - Closeout Submittals.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-B45 Series, Plumbing Fixtures.
 - .2 CAN/CSA-B125, Plumbing Fittings.
 - .3 CAN/CSA-B651, Barrier-Free Design.
- .2 Province of Newfoundland and Labrador Building Accessibility Regulations.

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 62 00.01 - Hazardous Materials.

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- .1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Indicate, for all fixtures and trim:
 - .1 Dimensions, construction details, roughing-in dimensions.
- .3 Closeout Submittals:
 - .1 Submit maintenance data in accordance with Section 01 78 00 - Closeout Submittals
 - .2 Include:
 - .1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.
 - .2 Details of operation, servicing maintenance.
 - .3 List of recommended spare parts.

1.5 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 28 - Health and Safety Requirements.

1.6 DELIVERY STORAGE AND DISPOSAL

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Waste Management and Disposal.
 - .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
 - .3 Fold up metal and plastic banding, flatten and place in designated area for recycling.

1.7 ACCEPTABLE PRODUCT

- .1 Fixtures:
 - American Standard

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Crane
Eljer
Kindred
Fiat
Architectural Metal Industries
ELKAY

- .2 Trim:
Cambridge Brass
Chicago Faucet
Powers Crane
Sloan

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

- .1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.
- .2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.
- .3 Exposed plumbing brass to be chrome plated.
- .4 Number, locations: Architectural drawings to govern.
- .5 Fixtures in any one location to be product of one manufacturer and of same type.
- .6 Trim in any one location to be product of one manufacturer and of same type.
- .7 Provide fixtures in accordance with the "Plumbing Fixture Schedule" as shown on the drawings. Supply fixtures complete with all required trim and accessories including supplies, faucets, straps, drains, traps, etc.

2.2 FIXTURE PIPING

- .1 Hot and cold water supplies to each fixture:
- .1 Chrome plated flexible supply pipes each with screwdriver handwheel stop, reducers, escutcheon for exposed supplies.
- .2 Waste:
- .1 Brass P trap with cleanout on each fixture not having integral trap.
- .2 Chrome plated in all exposed places.

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PART 3 EXECUTION

3.1 INSTALLATION

- .1 Mounting heights:
 - .1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.
 - .2 Wall-hung fixtures: as indicated, measured from finished floor.
 - .3 Physically handicapped: to comply with most stringent of either NBCC or CAN/CSA B651, or Provincial Buildings Accessibility Act and Regulations.

3.2 ADJUSTING

- .1 Conform to water conservation requirements specified this section.
- .2 Do adjustments prior to pre-commissioning.
- .3 Adjustments.
 - .1 Adjust water flow rate to design flow rates.
 - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
- .4 Checks.
 - .1 Aerators: operation, cleanliness.
 - .2 Vacuum breakers, backflow preventers: operation under all conditions.
 - .3 Wash fountains: operation of flow-actuating devices.
- .5 Thermostatic controls.
 - .1 Verify temperature settings, operation of control, limit and safety controls.
- .6 Report verification checks in Commissioning Manual.

END OF SECTION

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PART 1 GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and installation procedures for electric heating controls.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 29.06 - Health and Safety Requirements.
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4 Section 01 91 13 - Commissioning (Cx) Requirements.

1.3 REFERENCES

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

1.4 SUBMITTALS

- .1 Product Data:
 - Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.
 - .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

- .1 Health and Safety Requirements: do construction occupational health and safety in accordance

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with Section 01 35 29.06 - Health and Safety Requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Waste Management and Disposal:
 - .1 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.

PART 2 PRODUCTS

2.1 THERMOSTAT
(LINE VOLTAGE)

- .1 Line voltage electronic wall mounted electric heating thermostat:
 - .1 White in color.
 - .2 4 wire, double pole electronic thermostat.
 - .3 240 V rated.
 - .4 Precision: $\pm 0.5^{\circ}\text{C}$.
 - .5 5°C to 30°C .
 - .6 Digital display screen.
 - .7 Displays ambient temperature, heating level indicator and setpoint temperature.
 - .8 Mount 1200 mm above finished floor.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Install control devices.
- .2 On outside wall, mount thermostats on bracket or insulated pad 25 mm from exterior wall.

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- .3 Supply and install all control wiring and conduit for complete heating system.
 - .4 All wiring to be installed in conduit.

3.3 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 Heavy duty baseboard heaters, controls and installation.

1.2 RELATED SECTIONS

- .1 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Section 01 91 13 - Commissioning (Cx) Requirements.
- .3 Section 23 09 33 - Electric and Electronic Control System for Electric Heating.
- .4 Section 26 05 00 - Common Work Results - Electrical.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No.46, Electric Air-Heaters.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.
 - .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit product data sheets for baseboard heaters. Include:
 - .1 Product characteristics.
 - .2 Performance criteria.
 - .3 Mounting methods.
 - .4 Physical size.
 - .5 kW rating, voltage, phase.
 - .6 Cabinet material thicknesses.

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- .7 Limitations.
- .8 Colour and finish.
- .2 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions.
- .3 Closeout Submittals:
 - .1 Submit operation and maintenance data for baseboard heaters in accordance with Section 01 78 00 - Closeout Submittals

1.5 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29 06 - Health and Safety Requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
 - .1 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.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- .1 Acceptable Product:
 - .1 Ouellet
 - .2 Dimplex
 - .3 Chromalox
 - .4 Stelpro.

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2.2 HEAVY DUTY
BASEBOARD HEATERS

- .1 Wall mounted cabinet: to CSA C22.2 No.46, pre-drilled back for securing to wall:
 - .1 White in color.
 - .2 240 V rated.
 - .3 Epoxy/polyester powder paint.
 - .4 16 gauge steel front.
 - .5 18 gauge steel cabinet.
 - .6 Full length built in wireway.
 - .7 Louvre grille.
 - .8 Linear high-limit temperature control with automatic reset.
 - .9 Stainless steel tubular heating element with aluminum fins.
 - .10 Floating heating element on high-temperature nylon bushings.

2.3 CONTROLS

- .1 Wall mounted thermostats: line voltage, Energy Star certified, to Section 23 09 33 - Electric and Electronic Control System for Heating.
- .2 Division 26 to supply and install all control wiring and conduit for heating system.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Install heaters as indicated.
- .2 Install wall mounted thermostats in locations indicated.
- .3 Make power and control connections.

3.3 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus

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materials, excess materials, rubbish, tools and equipment.

3.4 COMMISSIONING TESTS

- .1 Perform tests in accordance with Section 26 05 00- Common Work Results - Electrical and Section 01 91 13 -Commissioning (Cx) Requirements.

END OF SECTION

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PART 1 General

1.1 GENERAL

- .1 This Section covers items common to Sections of Division 26. This section supplements requirements of Division 1 and Division 23.

1.2 REFERENCES

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

1.3 CARE, OPERATION AND START-UP

- .1 Instruct Owner's Representative and operating personnel in the operation, care and maintenance of systems, system equipment and components.
- .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
 - .3 Safety precautions.
 - .4 Procedures to be followed in event of equipment failure.
 - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.

1.4 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

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1.5 SUBMITTALS

- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada as required.
- .2 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
- .3 Quality Control: in accordance with Section 01 45 00 - Quality Control.
 - .1 Provide CSA certified equipment and material. Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for approval before delivery to site.
 - .2 Submit test results of installed electrical systems and instrumentation.
 - .3 Submit, upon completion of Work, load balance report as described in sentence 3.4.6.
 - .4 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Owner's Representative.
- .4 Manufacturer's Field Reports: submit to Owner's Representative within seven (7) working days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in paragraph 3.6- FIELD QUALITY CONTROL.

1.6 PERMITS, FEES AND INSPECTION

- .1 Submit to Electrical Inspection Division and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.
- .2 Pay associated fees.
- .3 Owner's Representative will provide drawings and specifications required by Electrical Inspection Division and Supply Authority at no cost.
- .4 Notify Owner's Representative of changes required by Electrical Inspection Division prior to making changes.

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- .5 Furnish Certificates of Acceptance from Electrical Inspection Division or authorities having jurisdiction on completion of work to Owner's Representative.

1.7 CO-ORDINATION

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

1.8 CUTTING AND PATCHING

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

1.9 PROTECTION

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

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locked except when under direct supervision of electrician.

1.10 RECORD DRAWINGS

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

1.11 INSPECTION OF WORK

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

1.12 SCHEDULING OF WORK

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

1.13 FIRE RATING OF PENETRATIONS

- .1 Maintain fire ratings around conduits passing through floors, ceilings and fire rated walls.

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

PART 2 PRODUCTS

2.1 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

- .1 Supplier and installer responsibility is indicated on electrical drawings and related mechanical responsibility is indicated on Mechanical Equipment Schedule on mechanical drawings, where applicable.

2.2 MATERIALS AND EQUIPMENT

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

2.3 FINISHES

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

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2.4 WARNING SIGNS

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

2.5 WIRING TERMINATIONS

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

2.6 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates and labels as follows:
 - .1 Nameplates: Lamicoid 3 mm thick plastic engraving sheet, black white face, black white core, mechanically attached with self tapping screws.
 - .2 Sizes as follows:

NAMEPLATE SIZES

Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

- .2 Labels:
 - .1 Embossed plastic labels with 6 mm high letters unless specified otherwise.
- .3 Wording on nameplates and labels to be approved by Owner's Representative prior to manufacture.
- .4 Allow for average of twenty-five (25) letters per nameplate and label.
- .5 Identification to be English (and French where applicable).
- .6 Nameplates for terminal cabinets and junction boxes to indicate system name and voltage characteristics.

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- .7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .8 Terminal cabinets and pull boxes: indicate system name and voltage.
- .9 Transformers: indicate capacity, primary and secondary voltages and transformer number.

2.7 WIRING IDENTIFICATION

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

2.8 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

<u>Conduit System</u>	<u>Prime Color</u>	<u>Auxiliary Color</u>
up to 250 V	Yellow	
up to 600 V	Yellow	Green

PART 3 EXECUTION

3.1 NAMEPLATES AND LABELS

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

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3.2 LOCATION OF OUTLETS

- .1 Locate outlets in accordance with Section 26 27 26 - Wiring Devices.
- .2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.
- .3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.
- .4 Locate light switches on latch side of doors. Locate disconnect devices in mechanical and elevator machine rooms on latch side of door.

3.3 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm.
- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .3 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

3.4 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install electrical at following heights unless indicated otherwise.
 - .1 Local switches: 1200 mm.
 - .2 Wall receptacles:
 - .1 General: 300 mm.
 - .2 Above top of continuous baseboard heater: 200mm.
 - .3 Above top of counters or counter splash backs: 175 mm.
 - .4 In mechanical rooms: 1400 mm.

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- .3 Panelboards: as required by Code or as indicated.
- .4 Exit lights: 2400 mm.
- .5 Emergency lighting heads: 2400 mm.

3.5 CO-ORDINATION OF PROTECTIVE DEVICES

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

3.6 FIELD QUALITY CONTROL

- .1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks - the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.
- .2 The work of this division to be carried out by a contractor who holds a valid Code 1 Electrical Contractor License as issued by the Province.
- .3 Perform tests in Accordance with this section as noted and Section 01 91 13 - Commissioning (Cx) Requirements.
- .4 Load Balance:
 - .1 Measure phase current to panelboard with normal loads (lighting) operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
 - .2 Submit, at completion of work, report listing phase and neutral currents on panelboards, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.
- .5 Conduct and pay for following tests:
 - .1 Distribution system including phasing, voltage, grounding and load balancing.
 - .2 Circuits originating from branch distribution panels.

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- .3 Lighting and its control.
 - .4 Motors, heaters and associated control equipment including sequenced operations of systems where applicable.
 - .6 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
 - .7 Insulation resistance testing.
 - .1 Megger and record circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - .2 Megger and record 350 - 600 V circuits, feeders and equipment with a 1000 V instrument.
 - .3 Check resistance to ground before energizing and record value.
 - .8 Carry out tests in presence of Owner's Representative.
 - .9 Provide instruments, meters, equipment and personnel required to conduct tests during and conclusion of project.
 - .10 Submit test results for Owner's Representative's review and include in Commissioning Manuals specified in Section 01 91 13 - Commissioning (Cx) Requirements.

3.7 CLEANING

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

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Materials and installation for wire and box connectors.

1.2 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-C22.2 No.18, Outlet Boxes, Conduit Boxes and Fittings.
 - .2 CAN/CSA-C22.2 No.65, Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).
- .2 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)

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.
- .2 Fixture type splicing connectors to: 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 stranded copper conductors.
 - .2 Clamp for copper bar.
 - .3 Stud clamp bolts.
 - .4 Bolts for copper bar.
 - .5 Sized for conductors and bars as indicated.

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- .4 Clamps or connectors for armoured cable, flexible conduit, non-metallic sheathed cable as required to: CAN/CSA-C22.2 No.18.

PART 3 EXECUTION

3.1 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 CSA C22.2 No.65.
 - .2 Install fixture type connectors and tighten. Replace insulating cap.
 - .3 Install bushing stud connectors in accordance with EEMAC 1Y-2.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 26 05 20 - Wire and Box Connectors
 - 0 - 1000 V.
- .2 Refer to drawings for wiring type required
 under different applications.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No .0.3, Test Methods for
 Electrical Wires and Cables.

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 and RWU90 XLPE as indicated.
 Used for electrical service and
 distribution only.
- .3 Copper conductors: size as indicated, with
 thermoplastic insulation type TWH rated at
 600 V, typically used for insulated ground
 wires.

2.2 ARMOURED CABLES

- .1 Conductors: insulated, copper, size as
 indicated.
- .2 Type: AC90.
- .3 Armour: interlocking type fabricated from
 aluminum strip.
- .4 Connectors: standard as required, complete
 with double split rings.
- .5 Used for branch circuit wiring only.

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PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform tests using method appropriate to site conditions and to approval of Owner's Representative and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.
- .4 No splices permitted in panel board feeders in new construction.

3.2 GENERAL CABLE INSTALLATION

- .1 Cable Colour Coding: to Section 26 05 00 Common Work Results for Electrical.
- .2 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, Fastenings and Fittings.

3.4 INSTALLATION OF
ARMOURED CABLES (AC-90)

- .1 Group cables wherever possible.
- .2 Use for branch circuit wiring only. All wiring to be concealed in walls and ceilings.

END OF SECTION

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PART 1 **GENERAL (NOT APPLICABLE)**

PART 2 **PRODUCTS**

2.1 SUPPORT CHANNELS

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

PART 3 **EXECUTION**

3.1 INSTALLATION

- .1 Secure equipment to hollow or solid masonry, tile and plaster surfaces with lead anchors or nylon shields.
- .2 Secure equipment to poured concrete with expandable inserts.
- .3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- .4 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.
- .5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .6 Fasten exposed conduit or cables to building construction or support system using straps.
 - .1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
 - .2 Two-hole steel straps for conduits and cables larger than 50 mm.
 - .3 Beam clamps to secure conduit to exposed steel work.
 - .4 Strap AC-90 cable at box location plus every 900 mm.
- .7 Suspended support systems.
 - .1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.

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- .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.
- .8 For surface mounting of two or more conduits use channels at 1.5 m on centre spacing.
- .9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .11 Do not use wire lashing, wood blocking, plastic strap or perforated strap to support or secure raceways or cables.
- .12 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Owner's Representative.
- .13 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations

END OF SECTION

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PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 91 13 - Commissioning (Cx) Requirements.
- .3 Section 26 05 00 - Common Work Results - Electrical.

1.2 SUBMITTALS

- .1 Submit shop drawings and product data for cabinets.
- .2 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Provide drawings stamped and signed by professional engineer registered or licensed in the Province of Newfoundland and Labrador, Canada as required.

PART 2 PRODUCTS

2.1 SPLITTERS

- .1 Sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.
- .2 Main and branch lugs to match required size and number of incoming and outgoing conductors as indicated.
- .3 At least three spare terminals on each set of lugs in splitters less than 400 A.

2.2 JUNCTION AND PULL BOXES

- .1 Welded steel construction with screw-on flat covers for surface mounting.
- .2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.

2.3 CABINETS

- .1 Type E: sheet steel, hinged door and return flange overlapping sides, handle, lock and catch, for surface mounting.

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- .2 Type T: sheet steel cabinet, with hinged door, latch, lock, 2 keys, containing 19 mm fir plywood backboard for surface flush mounting.

PART 3 EXECUTION

3.1 SPLITTER INSTALLATION

- .1 Install splitters and mount plumb, true and square to the building lines.
- .2 Extend splitters full length of equipment arrangement except where indicated otherwise.

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

- .1 Install pull boxes in inconspicuous but accessible locations.
- .2 Mount cabinets with top not higher than 2 m above finished floor.
- .3 Install terminal block as indicated in Type T cabinets.
- .4 Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed 30 m of conduit run between pull boxes.

3.3 IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Install size 2 identification labels indicating system name voltage and phase.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.
- .2 Section 26 05 29 - Hangers and Supports for Electrical Systems.
- .3 Section 26 05 34 - Conduits, Conduit Fastenings and Fittings.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.1, Canadian Electrical Code, Part 1.

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 for special devices.
- .3 Gang boxes where wiring devices are grouped.
- .4 Blank cover plates for boxes without wiring devices.
- .5 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 GALVANIZED STEEL OUTLET BOXES

- .1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.
- .2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted

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EMT conduit, minimum size 102 x 54 x 48 mm.

- .3 102 mm square or octagonal outlet boxes for lighting fixture outlets.
- .4 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished plaster walls.

2.3 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 32 mm and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.
- .5 Double split rings for AC-90 terminations.

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, and armoured cable connections. Reducing washers are not allowed.
- .5 Vacuum clean interior of outlet boxes before installation of wiring devices.
- .6 Identify systems for outlet boxes as required.

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PART 1 GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware, a National Standard of Canada.
 - .2 CSA C22.2 No. 45, Rigid Metal Conduit.
 - .3 CSA C22.2 No. 56, Flexible Metal Conduit.
 - .4 CSA C22.2 No. 83, Electrical Metallic Tubing.
 - .5 CSA C22.2 No. 211.2, Rigid PVC (Unplasticized) Conduit.

1.2 SUBMITTALS

- .1 Product data: submit manufacturer's printed product literature, specifications and datasheets.
 - .1 Submit cable manufacturing data.
- .2 Quality assurance submittals:
 - .1 Test reports: submit certified test reports.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Instructions: submit manufacturer's installation instructions.

PART 2 PRODUCTS

2.1 CONDUITS

- .1 Rigid metal conduit: to CSA C22.2 No. 45, hot dipped galvanized steel threaded.
- .2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .3 Rigid PVC conduit: to CSA C22.2 No. 211.2.
- .4 Flexible metal conduit: to CSA C22.2 No. 56.

2.2 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.

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- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits at 1.5 m oc.
- .4 Threaded rods, 6 mm dia., to support suspended channels.

2.3 CONDUIT FITTINGS

- .1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.
- .2 Factory "ells" where 90°, 45 ° or 22.5 ° bends are required for 25 mm and larger conduits.
- .3 Ensure conduit bends other than factory "ells" are made with an approved bender. Making offsets and other bends by cutting and rejoining 90 degree bends are not permitted.
- .4 Connectors and couplings for EMT. Steel set-screw type, size as required.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.
- .3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.5 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 all conduit, conduit fittings and accessories in accordance with the latest edition of the Canadian Electrical Code in a manner that does not alter, change or violate

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- any part of the installed system components or the CSA/UL certification of these components.
- .2 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
 - .3 Conceal all conduits and wiring in Kiosk and Concessions Buildings.
 - .4 Use rigid PVC conduit underground and buried in or under concrete slab on grade.
 - .5 Use flexible metal conduit for connection to motors in dry areas, connection to recessed light fixtures without a prewired outlet box, connection to surface or recessed light fixtures and work in movable metal partitions.
 - .6 Use AC-90 for vertical power supply drops to light fixtures and wiring devices.
 - .7 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
 - .8 Mechanically bend steel conduit over 21 mm dia.
 - .9 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
 - .10 Install fish cord in empty conduits.
 - .11 Run 2 - 27 mm spare conduits up to ceiling space and 2 - 27 mm spare conduits down to ceiling space from each flush panel. Terminate these conduits in 152 x 152 x 102 mm junction boxes in ceiling space or in case of an exposed concrete slab, terminate each conduit in flush concrete type box.
 - .12 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
 - .13 Dry conduits out before installing wire.

3.3 CONDUITS IN CAST-IN-PLACE SLABS ON GRADE

- .1 Run conduits 25 mm and larger below slab and encased in 75 mm concrete envelope. Provide 50 mm of sand over concrete envelope below floor slab.

3.4 CONDUITS UNDERGROUND

- .1 Slope conduits to provide drainage.
- .2 Waterproof joints (PVC excepted) with heavy coat of bituminous paint.

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3.5 CLEANING

- .1 Proceed in accordance with Section 01 74 11 -
Cleaning.
- .2 On Completion and verification of performance
of installation, remove surplus materials,
excess materials rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Service equipment and installation.

1.2 RELATED SECTIONS

- .1 Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.
- .2 Section 26 24 16.01 - Panelboards Breaker Type.
- .3 Section 26 28 16.02 - Moulded Case Circuit Breakers.

PART 2 PRODUCTS

2.1 EQUIPMENT

- .1 Panelboard breaker type: in accordance with Section 26 24 16.01 - Panelboards Breaker Type.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Install service equipment.
- .2 Connect to incoming service.
- .3 Connect to outgoing load circuits.
- .4 Make grounding connections in accordance with Division 26.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Materials and installation for standard and custom breaker type panelboards.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 91 13 - Commissioning (Cx) Requirements.
- .3 Section 06 10 00 - Rough Carpentry.
- .4 Section 26 05 00 - Common Work Results - Electrical.
- .5 Section 26 28 16.02 - Moulded Case Circuit Breakers.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No.29, Panelboards and enclosed Panelboards.

1.4 SUBMITTALS

- .1 Drawings to include electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

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 14,000 A (symmetrical) minimum interrupting capacity or as indicated on electrical drawings.
- .3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number

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identification as to circuit number and phase.

- .4 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated.
- .5 Two keys for each panelboard and key panelboards alike.
- .6 Tin plated aluminum bus with neutral of same ampere rating as mains.
- .7 Mains: suitable for bolt-on breakers.
- .8 Trim with concealed front bolts and hinges.
- .9 Trim and door finish: baked grey enamel.
- .10 Complete with main breaker.
- .11 Service entrance rated.

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 Main breaker: separately mounted on top or bottom of panel to suit cable entry. When mounted vertically, down position should open breaker.
- .4 Lock-on devices for 10% of 15 to 30 A breakers installed as indicated. Turn over unused lock-on devices to Departmental Representative.
- .5 Lock-on devices for exit and night light circuits as indicated.

2.3 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Nameplate for each panelboard size 4 engraved as indicated.
- .3 Nameplate for each circuit in distribution panelboards size 2 engraved as indicated.
- .4 Complete circuit directory with typewritten legend showing location and load of each circuit.

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PART 3 EXECUTION

3.1 INSTALLATION

- .1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.
- .2 Install surface mounted panelboards on plywood backboards in accordance with Section 06 10 00 - Rough Carpentry. Where practical, group panelboards on common backboard.
- .3 Mount panelboards to height specified in Section 26 05 00 - Common Work Results - Electrical or as indicated.
- .4 Connect loads to circuits.
- .5 Connect neutral conductors to common neutral bus with respective neutral identified.

END OF SECTION

PART 1 GENERAL1.1 SECTION INCLUDES

- .1 Switches, receptacles, wiring devices, cover plates and their installation.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 91 13 - Commissioning (Cx) Requirements.
- .3 Section 26 05 00 - Common Work Results - Electrical.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA-C22.2 No.42, General Use Receptacles, Attachment Plugs and Similar Devices.
 - .2 CSA-C22.2 No.42.1, Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).
 - .3 CSA-C22.2 No.55, Special Use Switches.
 - .4 CSA-C22.2 No.111, General-Use Snap Switches (Bi-national standard, with UL 20, twelfth edition).

PART 2 PRODUCTS2.1 SWITCHES

- .1 15 A, 120 V, single pole, double pole, three-way, four-way switches as indicated to: CSA-C22.2 No.55 and CSA-C22.2 No.111.
- .2 Manually-operated general purpose ac switches with following features:
 - .1 Terminal holes approved for No. 10 AWG wire.
 - .2 Silver alloy contacts.
 - .3 Urea or melamine moulding for parts subject to carbon tracking.
 - .4 Suitable for back and side wiring.
 - .5 White toggle.
 - .6 Specification grade.

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- .3 Toggle operated fully rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads.
- .4 Switches of one manufacturer throughout project.
- .5 Acceptable products:
 - .1 Hubbel HBL 1201 W,
 - .2 Leviton 1201-2W,
 - .3 Pass and Seymour.

2.2 RECEPTACLES

- .1 Duplex receptacles, CSA type 5-15 R, 125 V, 15 A, U ground, to: CSA-C22.2 No.42 with following features:
 - .1 White thermoplastic moulded housing.
 - .2 Suitable for No. 10 AWG for back and side wiring.
 - .3 Break-off links for use as split receptacles.
 - .4 Eight back wired entrances, four side wiring screws.
 - .5 Triple wipe contacts and rivetted grounding contacts.
 - .6 Specification grade.
- .2 Other receptacles with ampacity and voltage as indicated.
- .3 Receptacles of one manufacturer throughout project.
- .4 Acceptable products:
 - .1 Hubbel 5262-W,
 - .2 Leviton 5262-W,
 - .3 Pass and Seymour 5262-W.

2.3 COVER PLATES

- .1 Cover plates for wiring devices to: CSA-C22.2 No.42.1.
- .2 Cover plates from one manufacturer throughout project.
- .3 Stainless steel cover plates as indicated, thickness 2.5 mm for wiring devices mounted in flush-mounted outlet box.
- .4 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.

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- .5 Weatherproof spring-loaded cast aluminum cover plates complete with gaskets for single receptacles or switches.
- .6 All wiring device cover plates to be labeled using clear adhesive strips with black type identifying panel and circuit number for each device.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Switches:
 - .1 Install single throw switches with handle in "UP" position when switch closed.
 - .2 Install switches in gang type outlet box when more than one switch is required in one location.
 - .3 Mount toggle switches at height in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Receptacles:
 - .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
 - .2 Mount receptacles at height in accordance with Section 26 05 00 - Common Work Results - Electrical.
 - .3 Where split receptacle has one portion switched, mount vertically and switch upper portion.
- .3 Cover plates:
 - .1 Protect cover plate finish with paper or plastic film until painting and other work is finished.
 - .2 Install suitable common cover plates where wiring devices are grouped.
 - .3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

END OF SECTION

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PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 91 13 - Commissioning (Cx) Requirements.
- .3 Section 26 05 00 - Common Work Results - Electrical.

1.2 SUBMITTALS

- .1 Include time-current characteristic curves for breakers with ampacity of 600 A and over or with interrupting capacity of 22,000 A symmetrical (rms) and over at system voltage.

PART 2 PRODUCTS

2.1 BREAKERS GENERAL

- .1 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.
- .2 Common-trip breakers: with single handle for multi-pole applications.
- .3 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting. Trip settings on breakers with adjustable trips to range from 3-8 times current rating.
- .4 Circuit breakers with interchangeable trips as indicated.
- .5 Circuit breakers to have minimum of 14,000 A 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.

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PART 3 EXECUTION

3.1 INSTALLATION

- .1 Install circuit breakers as indicated.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Equipment and installation for ground fault circuit interrupters (GFCI).

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 01 91 13 - Commissioning (Cx) Requirements.
- .4 Section 26 05 00 - Common Work Results - Electrical.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-C22.2 No.144, Ground Fault Circuit Interrupters.
- .2 National Electrical Manufacturers Association (NEMA)
 - .1 NEMA PG 2.2, Application Guide for Ground Fault Protection Devices for Equipment.

1.4 SUBMITTALS

- .1 Submit product data and shop drawings.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Equipment and components for ground fault circuit interrupters (GFCI): to CAN/CSA-C22.2 No.144.
- .2 Components comprising ground fault protective system to be of same manufacturer.

2.2 BREAKER TYPE
GROUND FAULT INTERRUPTER

- .1 Single or two pole ground fault circuit interrupter for 15-20 A, 120 V, 1 phase circuit c/w test and reset facilities.
 - .1 Neutral.

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PART 3 EXECUTION

3.1 INSTALLATION

- .1 Do not ground neutral on load side of ground fault relay.
- .2 Pass phase conductors including neutral through zero sequence transformers.
- .3 Connect supply and load wiring to equipment in accordance with manufacturer's recommendations.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical and Section 01 91 13 -Commissioning (Cx) Requirements.
- .2 Demonstrate simulated ground fault tests.

END OF SECTION

PART 1 GENERAL1.1 REFERENCES

- .1 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 ANSI/IEEE C62.41, Surge Voltages in Low-Voltage AC Power Circuits.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM F1137, Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .3 United States of America, Federal Communications Commission (FCC)
 - .1 FCC (CFR47) EM and RF Interference Suppression.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 01 91 13 -Commissioning (Cx) Requirements.

1.3 SUBMITTALS

- .1 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Owner's Representative.
- .2 Photometric data to include: VCP Table and spacing criterion and luminaire coefficient of utilization (CU) tables.
- .3 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .4 Quality assurance submittals: provide the 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,

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cleaning procedures and relamping
schedule.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Divert unused metal materials from landfill to metal recycling facility.

1.5 ACCEPTABLE PRODUCTS

- .1 Luminaires described in the Lighting Fixture Schedule identify quality, performance criteria and other parameters, as indicated for this project. Named fixtures are acceptable with modifications and accessories, as indicated.
- .2 Fixtures from other manufacturers may be acceptable provided:
 - .1 Appearance and lighting performance are similar.
 - .2 Quality is equal or better.
 - .3 LED criteria remain the same.
 - .4 The fixture is provided with modifications and accessories to provide a complete product in keeping with the intent of the project.
 - .5 Approval in writing is obtained from the Owner's Representative to the supplier/manufacturer 5 days prior to tender closing date.

PART 2 PRODUCTS

2.1 FIXTURES

- .1 Supply and install LED fixtures as indicated.

2.2 FINISHES

- .1 Light fixture finish and construction to meet ULC listings and CSA certifications related to intended installation.

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2.3 OPTICAL CONTROL DEVICES

- .1 As indicated in luminaire schedule on drawings.

PART 3 EXECUTION3.1 INSTALLATION

- .1 Locate and install luminaires as indicated.
 - .1 Provide adequate support to suit ceiling system.

3.2 WIRING

- .1 Connect luminaires to lighting circuits.
 - .1 Install flexible conduit for vertical power supply drop to luminaires as indicated. Horizontal wiring using flexible conduit is not permitted.

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 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical and Section 01 91 13 -Commissioning (Cx) Requirements.

END OF SECTION

PART 1 GENERAL1.1 SECTION INCLUDES

- .1 Materials and installation for emergency lighting systems.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 91 13 - Commissioning (Cx) Requirements.
- .3 Section 26 05 00 - Common Work Results - Electrical.
- .4 Section 26 05 21 - Wires and Cables (0-1000 V).
- .5 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No.141, Unit Equipment for Emergency Lighting.

1.4 SUBMITTALS

- .1 Data to indicate system components, mounting method, source of power and special attachments.

1.5 WARRANTY

- .1 For batteries, the ten years warranty period is extended to 120 months, with no-charge replacement during the first 5 years and pro-rate charge on the second 5 years from the date of Substantial Completion.

PART 2 PRODUCTS2.1 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: 90 minutes.
- .5 Battery: sealed, maintenance free.

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- .6 Charger: solid state, multi-rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01V 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'.
- .10 Lamp heads: integral on unit and remote, 345 degrees horizontal and 180 degrees vertical adjustment. Lamp type: LED as indicated.
- .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: standard.
- .13 Auxiliary equipment:
 - .1 Test switch.
 - .2 Time delay relay.
 - .3 Battery disconnect device.
 - .4 AC input and DC output terminal blocks inside cabinet.
 - .5 Shelf.
 - .6 Cord and single twist-lock plug connection for AC.
 - .7 RFI suppressors.

2.2 WIRING OF REMOTE HEADS

- .1 Conduit: type EMT, in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
- .2 Conductors: RW90 type in accordance with Section 26 05 21 - Wires and Cables (0-1000 V) sized as indicated in accordance with manufacturer's recommendations.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Install unit equipment and remote mounted fixtures.

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- .2 Direct heads.
- .3 Connect exit lights to unit equipment.
- .4 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical and in accordance with Section 01 91 13 - Commissioning (Cx) requirements.

END OF SECTION

PART 1 GENERAL1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 - Cleaning.
- .3 Section 01 91 13 - Commissioning (Cx) Requirements.
- .4 Section 26 05 00 - Common Work Results - Electrical.

1.2 REFERENCES

- .1 Atomic Energy Control Board Regulations
- .2 Canadian Code for Preferred Packaging
- .3 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No.141, Unit Equipment for Emergency Lighting.
 - .2 CSA C860, Performance of Internally-Lighted Exit Signs.
- .4 National Fire Protection Association (NFPA)
 - .1 NFPA 101, Life Safety Code.

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures and disposal.

PART 2 PRODUCTS2.1 SELF-POWERED UNITS

- .1 Exit lights: to CSA C22.2 No.141-10 and CSA C860, packaged in accordance with the Canadian Code for Preferred Packaging guidelines.
- .2 Durable, extruded, one piece aluminum housing and face plates.
- .3 White LED light source.

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- .4 Provide two pictogram films per face, for direction selection.
- .5 Energy efficient - consume less than 2.5 Watts in AC or DC mode.
- .6 Running Man.
- .7 Supply voltage: 120 V, ac.
- .8 Output voltage: 12 V dc.
- .9 Operating time: minimum 90 minutes.
- .10 Battery: sealed, maintenance free, warranty to Section 26 52 00 - Emergency Lighting, 1.5 - Emergency Lights.
- .11 Signal lights: solid state, for 'AC Power ON'.
- .12 Mounting: suitable for universal mounting directly on junction box and c/w knockouts for conduit. Removable or hinged front panel for easy access to batteries.
- .13 Cabinet: finish: standard.
- .14 Auxiliary equipment:
 - .1 Test switch.

2.2 DESIGN X1

- .1 Recessed, wall, end to wall, ceiling mounting as indicated.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Install exit lights to manufacturer's recommendations, listing requirements, NFPA standard and local regulatory requirements.
- .2 Connect fixtures to exit light circuits using Bx cable.
- .3 Connect emergency lamp sockets to emergency circuits.
- .4 Ensure that exit light circuit breaker is locked in on position.
- .5 Provide tests in accordance with Section 26 05 00 - Common Work Results - Electrical and Section - General Commissioning (Cx) Requirements.

3.2 CLEANING

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

EXIT SIGNS

Section 26 53 00

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

END OF SECTION

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PART 1 GENERAL

1.1 SCOPE OF WORK

- .1 Testing and commissioning are called for throughout the individual specifications. This does not relieve this trade from providing all testing and commissioning necessary to ensure that systems and equipment operate as required and that they interface with other systems and equipment as required.

1.2 SECTION INCLUDES

- .1 Commissioning of all building electrical systems and component including:
 - .1 Testing and adjustment.
 - .2 Demonstrations and Training.
 - .3 Instructions of all procedures for Owner's personnel.
 - .4 Updating as-built data.
 - .5 Co-ordination of Operation and Maintenance material.

1.3 RELATED SECTION

- .1 Section 01 77 00 - Closeout Procedures.
- .2 Section 01 91 13 -Commissioning (Cx) Requirements.
- .3 Section 26 05 00 - Common Work Results - Electrical.

1.4 REFERENCES

- .1 CSA (Canadian Standards Association).
- .2 Underwriters Laboratories of Canada.

1.5 QUALITY ASSURANCE

- .1 Provide qualified trades persons, certified testing agencies, factory trained and approved by the Commissioning Team Leader.
- .2 Submit the names of all personnel to be used during the Commissioning activities for Owner Approval.

1.6 COMMISSIONING

- .1 The purpose of the commissioning process is to fully test all building systems including architectural, mechanical and electrical components and operating procedures by

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challenging these systems to realistic operation conditions.

- .2 The Commissioning activities shall be co-ordinated by the General Contractor.
- .3 Commissioning activities for the electrical systems must have available up to date as-built drawing information and accurate Operations and Maintenance Manuals. These documents shall be a major part of this activity.
- .4 Contractor shall be responsible to update all documentation with information and any changes duly noted during the Commissioning exercise.
- .5 Contractor shall arrange for all outside suppliers, equipment manufacturers, test agencies and others as identified in the commissioning sections of this specification. The cost associated with this requirement shall be included as part of the tender price.

1.7 SUBMITTALS

- .1 The electrical sub-contractor shall be responsible for ensuring all activities are properly documented and co-ordinated through the General Contractor.
- .2 As-built drawings and data books must be available two weeks prior to commissioning for review and use by the consultant and Commissioning Team prior to the start of the commissioning activities.

1.8 PREPARATION

- .1 Provide test instruments required for all activities as defined in the manufacturer's installation manual.
- .2 Verify all systems are in compliance with the requirements of the manufacturer's installation manual prior to the precommissioning check out operation.
- .3 Confirm all scheduled activities have identified personnel available.
- .4 Where systems or equipment do not operate as required, make the necessary corrections or modifications, re-test and re-commission.

1.9 SYSTEM DESCRIPTION

- .1 Perform all start up operations, control adjustment, trouble shooting, servicing and maintenance of each item of equipment as

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defined in the manufacturer's installation manual.

- .2 Owner will provide list of personnel to receive instructions and will co-ordinate their attendance at agreed upon times.
- .3 Prepare and insert additional data in the operations and maintenance manuals and update as-built drawings when need for additional data becomes apparent during the commissioning exercise.
- .4 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.
- .5 Conduct presentation on Owner's premises. Owner will provide space.

1.10 FINAL REPORT

- .1 This trade shall assemble all testing data and commissioning reports and submit them to the Owner.
- .2 Each form shall bear signature of recorder, and that of supervisor of reporting organizer.

1.11 SCHEDULE OF ACTIVITIES

- .1 Commissioning activities shall be conducted based on pre-established schedule with all members of the commissioning team, refer to Section 01 91 13 - General Commissioning (Cx) Requirements.
- .2 Adhering to the established schedule is very important as the co-ordination and scheduling of the participants will be difficult to alter once this is established. Close co-ordination of this schedule is important.
- .3 In the event project cannot be commissioned in the allotted time slot, the contractor shall pay for all costs associated with assembling the Commissioning Team at a later date. If the contractor has not performed his duties to reach commissioning stage as outlined earlier, he will incur all expenses of other trades and the Commissioning Team due to his non-compliance.

END OF SECTION

PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 American Society for Testing and Materials (ASTM).
 - .1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .5 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .6 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CA/CGSB-8.2, Sieves, Testing, Woven Wire, Metric

1.2 **DEFINITIONS**

- .1 Unclassified excavation: excavation of deposits of whatever character encountered in work.
- .2 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .3 Waste material: excavated material unsuitable for use in work or surplus to requirements.
- .4 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of work.
- .5 Unsuitable materials:
 - .1 Weak and compressible materials under excavated areas.
 - .2 Frost susceptible materials under excavated areas.

.3 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.

<u>Sieve Designation</u>	<u>%Passing</u>
2.00 mm	100
0.10 mm	45-100
0.02 mm	10-80
<u>0.005 mm</u>	<u>0-45</u>

- .2 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.

1.3 SUBMITTALS

- .1 Inform Departmental Representative at least 4 weeks prior to commencing work, of proposed source of fill materials and provide access for sampling.
- .2 Submit 70 kg samples of type of fill specified including representative samples of excavated material.
- .3 Ship samples as directed by Departmental Representative/Architect in tightly closed containers to prevent contamination.

1.4 QUALITY ASSURANCE

- .1 Submit design and supporting data at least 2 weeks prior to commencing work.
- .2 Design and supporting data submitted to bear stamp and signature of qualified professional Departmental Representative registered or licensed in the province of Newfoundland and Labrador.
- .3 Keep design and supporting data on site.
- .4 Do not use soil material until written report of soil test results are reviewed and approved by Departmental Representative/Architect.

1.5 EXISTING CONDITIONS

- .1 Buried services:
- .1 Before commencing work verify 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 commencing excavation work, notify applicable Owner or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Owners or authorities having jurisdiction 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/Architect before removing or re-routing.
- .9 Record location of maintained, re-routed and abandoned underground lines.
- .10 Confirm locations of recent excavations adjacent to area of excavation.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Backfill Type 3 material: properties to the following requirements:
 - .1 Crushed, pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.

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Sieve Designation	%Passing	
	<u>Type1</u>	<u>Type2</u>
75 mm	-	100
50 mm	-	-
37.5 mm	-	-
25 mm	100	-
19 mm	75-100	-
12.5 mm	-	-
9.5 mm	50-100	-
4.75 mm	30-70	22-85
2.00 mm	20-45	-
0.425 mm	10-25	5-30
0.180 mm	-	-
<u>0.075 mm</u>	<u>3-8</u>	<u>0-10</u>

PART 3 EXECUTION

3.1 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

3.2 PREPARATION/PROTECTION

- .1 Keep excavations clean, free of standing water, and loose soil.
- .2 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative's approval.
- .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. Protect buried services that are required to remain undisturbed.

3.3 STOCKPILING

- .1 Stockpile fill materials in areas designated by Departmental Representative. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

3.4 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

- .1 Obtain permit from authority having jurisdiction for temporary diversion of water course.

3.5 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while work is in progress.
- .2 Submit for Departmental Representative's review details of proposed dewatering
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. 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 manner not detrimental to public and private property, or any portion of work completed or under construction.
- .6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, water courses or drainage areas.

3.6 EXCAVATION

- .1 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .2 Keep excavated and stockpiled materials a safe distance away from edge of trench as directed by Departmental Representative.
- .3 Restrict vehicle operations directly adjacent to open trenches.
- .4 Dispose of surplus and unsuitable excavated material off site.
- .5 Do not obstruct flow of surface drainage or natural watercourses.
- .6 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .7 Notify Departmental Representative when bottom of excavation is reached.
- .8 Obtain Departmental Representative approval of completed excavation.
- .9 Remove unsuitable material from trench bottom to extent and depth as directed by Departmental Representative.

3.7 BACKFILLING

- .1 Vibratory compaction equipment: approved by Departmental Representative.
- .2 Where possible, areas to be backfilled to be free from debris, snow, ice, water and frozen ground. Coordinate with Departmental Representative.
- .3 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

3.8 RESTORATION

- .1 Upon completion of work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.

3.9 APPROVALS

- .1 For all topsoil and aggregate source material, note that TNNP approvals are required, as only TNNP approved sources will be permitted. Sources are to be approved at the discretion of the Departmental Representative and written acceptance by the Departmental Representative is to be received prior to use.

END OF SECTION

PART 1 GENERAL1.1 SECTION INCLUDES

- .1 Materials and installation for precast concrete septic tanks.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .3 Section 31 05 16 - Aggregate Materials.
- .4 Section 31 23 33.01 - Excavating Trenching and Backfilling.
- .5 Section 33 36 33 - Utility Drainage Fields

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³(600 kN-m/m³
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association, (CSA International)
 - .1 CAN/CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
 - .2 CAN/CSA-A23.4/A251, Precast Concrete-Materials and Construction/Qualification Code for Architectural and Structural Precast Concrete Products.
 - .3 CAN/CSA-B66, Prefabricated Septic Tanks and Sewage Holding Tanks.

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- .4 CSA B1800, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
 - .1 CSA B182.2, PVC Sewer Pipe and Fittings (PSM Type).

1.4 DESIGN REQUIREMENTS

- .1 Design precast concrete septic tank in accordance with CAN/CSA-B66, and to carry handling stresses and indicated service loads.
- .2 Tank to have minimum total working capacity as indicated.

1.5 SUBMITTALS

- .1 Shop drawings to indicate:
 - .1 Design calculations for items designed by manufacturer.
 - .2 Tables and bending diagrams of reinforcing steel.
 - .3 Camber.
 - .4 Formwork.
 - .5 Finishing schedules.
 - .6 Methods of handling and erection.
 - .7 Storage facilities.
 - .8 Openings, sleeves, inserts and related reinforcement.

1.6 QUALIFICATIONS

- .1 Manufacturers and erectors of precast concrete elements shall be certified by CSA as meeting requirements of CAN/CSA-A23.4/A251, for Category SC and SP products.

PART 2 PRODUCTS

2.1 CONCRETE MIXES AND MATERIALS

- .1 Concrete mixes and materials: to CAN/CSA-B66 and CAN/CSA-A23.1/A23.2.
- .2 Use type 10 cement.

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2.2 MANUFACTURE

- .1 Manufacture units in accordance with CAN/CSA-A23.4/A251, except where specified otherwise. Piping as indicated on drawings.

2.3 FINISHES

- .1 Finish tanks to commercial grade to CAN/CSA-A23.4/A251.

2.4 SIPHON CHAMBER

- .1 Siphon chamber to meet design requirements specified for septic tanks.
- .2 Provide siphon chamber vents.

2.5 ACCESS

- .1 Provide access holes to surface to facilitate cleaning inspection.

2.6 TANK BEDDING AND SURROUND MATERIAL

- .1 Granular material to Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Crushed or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.

.3 Table

Sieve Designation	% Passing
200 mm	-
75 mm	-
50 mm	-
37.5 mm	-
25 mm	-
19 mm	-
12.5 mm	100
9.5 mm	-
4.75 mm	80-100
2.00 mm	50- 90
0.425 mm	10- 50
0.180 mm	-
0.075 mm	0- 10

2.7 BACKFILL MATERIAL

- .1 As indicated.
- .2 Type 3, in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

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2.8 MODULAR WALL SEALS

- .1 Provide modular wall seals.

2.9 EFFLUENT FILTER

- .1 Consists of primary and secondary filter to permit removal of primary filter for servicing. Filter material to be non-corrosive PVC, ABS and polyethylene.
- .2 Filter container complete with primary and secondary pull rods, inlet and outlet, leg bosses to accept either NPS 32 mm or 38 mm SCH 40 PVC pipe and septic tank riser with cover.
- .3 Capacity: filter area, slot diameter and flow rate as indicated.
- .4 Filters manifold together as indicated.

PART 3 EXECUTION3.1 INSTALLATION

- .1 Place bedding and surround material in unfrozen condition.
- .2 Do excavation in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .3 Place tank bedding material in accordance with details as indicated. Compact to 95% maximum dry density to ASTM D698.
- .4 Make inlet and outlet joints of septic tank watertight, using modular wall seals.
- .5 Conduct leakage test on septic tank in presence of Owner's Representative, before backfilling. Fill tank to level of effluent pipe, and allow to stand for 24 hours. Allowable leakage is zero.
- .6 Do backfilling in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
 - .1 Compact to 90% maximum dry density to ASTM D698.

END OF SECTION

PART 1 GENERAL1.1 SECTION INCLUDES

- .1 Materials and installation for trench type septic tank disposal fields.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .3 Section 31 05 16 - Aggregate Materials.
- .4 Section 31 23 33.01 - Excavating Trenching and Backfilling.
- .5 Section 33 36 00 - Utility Septic Tanks.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422, Standard Method for Particle-Size Analysis of Soils.
 - .4 ASTM D4318, Standard Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA B1800, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
 - .1 CSA B182.2, PVC Sewer Pipe and Fittings (PSM Type).

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1.4 SUBMITTALS

- .1 Submit to Departmental's Representative 20 kg samples of granular materials at least 4 weeks prior to beginning Work.
- .2 Submit to Departmental's Representative copy of certification or licence of approved installers.

1.5 QUALITY ASSURANCE

- .1 Use certified, licenced installers who comply with local authority having jurisdiction.

PART 2 PRODUCTS

2.1 GRANULAR MATERIALS

- .1 Granular material to Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Pit run crushed or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.
 - .3 Table

Sieve Designation	% Passing	
	Sand	Stone
200 mm	-	-
75 mm	-	-
50 mm	-	-
38.1 mm	-	-
25 mm	-	80-100
19 mm	-	0-5
12.5 mm	100	-
9.5 mm	-	-
4.75 mm	80-100	-
2.00 mm	50-90	-
0.425 mm	10-50	-
0.180 mm	-	-
0.075 mm	0-5	-

2.2 IMPORTED FILTER MATERIAL

- .1 Washed stone conforming to requirements of local authority having jurisdiction.

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2.3 PIPE FOR DISPOSAL FIELDS

- .1 Straight PVC pipe and fittings to CAN/CSA-B182.2. Perforated or unperforated as indicated.

2.4 DISTRIBUTION BOX

- .1 Concrete: as indicated and to Section 33 36 00 - Utility Septic Tanks.

2.5 SOURCE QUALITY CONTROL

- .1 If requested, provide Departmental's Representative with 3 certified copies of factory tests of pipe material.

PART 3 EXECUTION3.1 TRENCH TYPE DISPOSAL FIELD INSTALLATION

- .1 Excavate to lines and depths as indicated and in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Scarify trench base and walls under dry conditions.
- .3 Obtain Departmental's Representative approval to operate construction equipment across disposal field.
- .4 Place minimum 150 mm of stone material in bottom of trench.
- .5 Install distribution box between septic tank and absorption trenches. Installation to be water-tight construction.
- .6 Distribution box: set level as indicated. Provide access with removable cover for inspection of distribution box.
- .7 Connect lengths and place distribution pipe on stone material as indicated and cover with minimum 50 mm of stone material.
- .8 Connect each distribution pipe individually to distribution box.
- .9 Cap or plug free ends of distribution lines.
- .10 Maintain pipe elevations within 5 mm of inverts indicated.
- .11 Do not backfill trenches until pipe grade and alignment have been approved by Departmental's Representative and authority having jurisdiction.

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.12 Backfill trenching with material as indicated. Material to be approved by Departmental's Representative. Do not compact. Overfill to allow for settlement.

END OF SECTION

APPENDIX A:

PARKS CANADA BASIC IMPACT ANALYSIS



Parks Canada Basic Impact Analysis

1. PROJECT TITLE & LOCATION: Malady Head Concession Area Development

2. PROPONENT INFORMATION:

Jerry Feltham – Manager, FII - 709 533 3122

Gonzo Wells – Project Manager (PDS) – 709 533 3150

Rod Cox – Resource Management Officer – 709 533 3155

3. PROPOSED PROJECT DATES

Planned commencement: 2017-04-03

Planned completion: 2017-05-31

4. INTERNAL PROJECT FILE #: TN-2016-20

5. PROJECT DESCRIPTION

The objective of this project is to initiate the development of a small concession area for the Malady Head Campground within Terra Nova National Park (TNNP). This project would see the design of a small concession area on site, requiring an extension of the parking area and the construction of 3 small concession booths – equipped with electricity. An extension will also be added to the Kiosk for a staff washroom. The addition of the washroom will require a new septic tank and disposal which will be installed directly behind the kiosk (Figure 1).

The campground currently has no concession capabilities at all. All services (groceries, firewood, etc.) must be obtained through driving to the nearby town of Traytown. As a highly visited/utilized campground the availability of basic amenities/services is essential to maintaining a high level of visitor satisfaction during the camping season. These structures would be located adjacent to the entrance kiosk and provide services around the provision of basic groceries (bread, milk, etc.), firewood, and the availability of third party operators to run recreational based opportunities (i.e. kayak, canoe/rental).

Project activities include:

1. *Minimal clearing and grubbing of vegetation along parking lot and behind kiosk with chainsaw/brush saw.*
2. *Installation of backfill material to widen parking area to accept new concession booths.*
3. *Installation of 2300 liter septic tank and 14x25 meter disposal field according to provincial standards.*
4. *Installation of 1.5 meters of fill material on top of ground level for disposal field.*
5. *Construction of 3 - 3.5x4.5 m concession booths (constructed off-site)*
6. *Construction of a 2x3.5 m extension to existing kiosk.*
7. *Removal and proper disposal of project wastes.*

The project site is located adjacent to Route 310 and Malady Head campground. The campground has 66 campsites with associated infrastructure such as roads, washroom facilities, kitchen shelter, playground and group tenting area. The campground normally operates from the end of June until the end of September.

The terrestrial biological environment within the project limit is typical of most biological environments in Newfoundland with minimal disturbance. The terrestrial vegetation existing at the site location can be described as typical, comprising primarily of spruce, fir, birch, aspen, maple, pin cherry and alder. The ground cover is typically mosses, shrubs (kalmia) and grasses. Wildlife resources typically found in this environment includes songbirds,





spruce and ruffed grouse, foxes, snowshoe hare, squirrel, bear, and moose. Aquatic mammals (otters, mink and beaver) may also inhabit the project area. Species at risk that could inhabit the surrounding area include the Newfoundland marten (*Martes americana atrata*), Little brown bat (*Myotis lucifugus*), Northern myotis (*Myotis septentrionalis*), Boreal felt lichen (*Erioderma pedicellatum*), Blue felt Lichen (*Degelia plumbea*), Red crossbill (*Loxia curvirostra perna*), Olive sided flycatcher (*Contopus cooperi*) and Rusty blackbird (*Euphagus carolinus*).



Figure 1. Map of Malady Head kiosk area showing locations for concession booths, septic field and kiosk extension.

6. VALUED COMPONENTS LIKELY TO BE AFFECTED

Potential interactions between the project and the surrounding environment are identified in the Effects Identification Matrix ([Appendix 1](#)).

7. EFFECTS ANALYSIS

Natural Resources

Air - During construction activity air quality may be reduced due to air borne dust particles. Heavy equipment exhaust may also affect air quality during construction. Significant effects are not likely.

Soil and landforms - Impacts are expected to be minimal aside from the potential for erosion of soils during construction activities. There are also the potential impacts from soil compaction and contamination due to accidental spills and improperly disposed of waste material. Significant effects are not likely.

Water – The closest water body is Northeast Arm approx. 40 meters from the site. Significant effects to Northeast Arm and other water resources are not likely. The septic tank and disposal field will be installed to meet Newfoundland and Labrador provincial standards so that sewage or effluent shall not emit, discharge, seep, leak or otherwise escape from the sewage system or a part of that system into a piped water supply, well water supply, a freshwater watercourse or surface water.

Flora (including species at risk) – compaction and removal of vegetation (approximately 50 trees of various caliper and shrubs) around the construction area (Figure 2). The proposed construction area was





surveyed on November 16, 2016 for Boreal felt lichen (*Erioderma pedicullatum*) and Blue felt lichen (*Degelia plumbea*). Individuals of these species were not located. Significant effects to flora not likely.

Fauna (including species at risk) - The temporary operation of equipment and increased human presence and noise may lead to a temporary displacement of wildlife. Malady Head campground is a previously disturbed area and fragmented with campsites, roads and open common areas. The minimal amount of vegetation that will be removed for the project will not significantly alter the amount of critical habitat for marten on the landscape. The area will be inspected for individuals or nesting/roosting members of avian and mammalian species at risk before the project commences. Significant effects to fauna not likely.

Cultural Resources

The Cultural Resource Values Statement for TNNP has been reviewed for the project. An Archaeological Overview Assessment (AOA) has also been conducted. Given the low archaeological potential and the disturbed nature of much of the project area, an **Archaeological Impact Assessment (AIA) is not required.**

Visitor Experience

Altered views, noise and temporary area closures during construction activities.

The aesthetic and noise impacts and the presence of machinery during construction are expected to be minimal due to the size of equipment, timing and duration of the project.

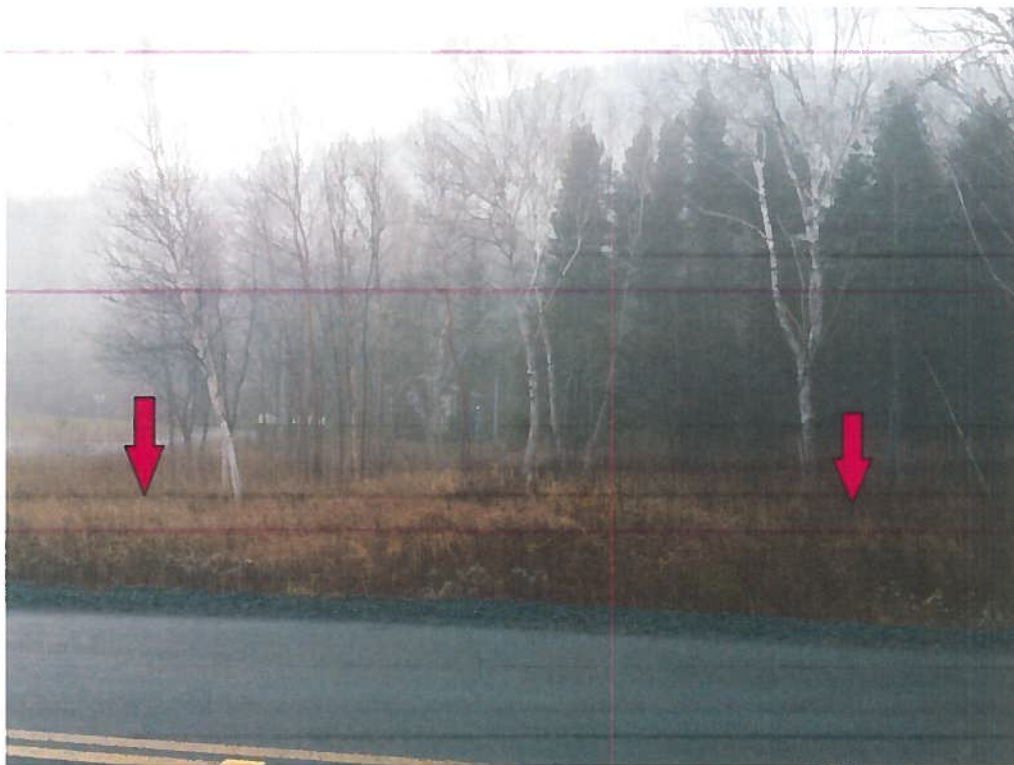


Figure 2. Location of septic field behind kiosk and adjacent to route 310. The area between the red arrows will require clearing, excavation and in-filling.





8. MITIGATION MEASURES

1. Main vehicular access routes and staging areas will be restricted to present-day roadways and parking lots. If this is not possible, the use of protective covering such as geotextile protective mats with a wood chip lift or granular "A" gravel is required. All protective measures employed must be removed following construction and the area restored to a pre-construction state. Excavation is not permitted during installation or removal of protective covering;
2. Construction work must stop immediately if cultural resources are encountered in the immediate area during the course of the project; Parks Canada staff responsible for the project must be notified immediately, so that the park is made aware of the potential discovery. A Parks Canada archaeologist will be contacted for further direction.
3. Clearing of vegetation will be kept to a minimum and approved by Parks Canada staff to the start of the project.
4. Prior to initiating construction, park staff will complete a survey of all terrestrial habitat to be disturbed during construction to look for roosts or residences (dens) of small mammals and nesting sites of birds (including species at risk). If any individuals, residences (dens) and/or nesting sites are encountered during construction the contractor shall contact Parks Canada. This could result in a delay in scheduling of the construction.
5. The breeding season for most birds within the park area occurs between May 1st and July 15th. Clearing should not take place within this time frame. However, some species protected under the *Migratory Birds Convention Act* nest outside these timeframes. Under section 6 of the *Migratory Birds Regulations*, it is forbidden to disturb, destroy or take a nest or egg of a migratory bird; or to be in possession of a live migratory bird or its carcass, skin, nest or egg except under authority of a permit. If a migratory bird nest is identified, an area of 20 m radius will be implemented and left undisturbed until nesting is completed (i.e., at least after the young have fledged)
6. All personnel should be aware of the potential for encounters with wildlife and they will be instructed to immediately report any sightings. No attempt to harass or disturb wildlife will be made by any worker.
7. Machine operators/workers will be briefed on proper food and garbage disposal and other wildlife issues before work begins.
8. Tree clearing limits will be approved by Parks Canada before any cutting takes place.
9. Grubbing of the organic vegetation mat and/or the upper soil horizons will be restricted to the minimum area required. It will be spread, in a manner to cover inactive exposed areas or retained for use in rehabilitation efforts.
10. During grubbing/excavation, grubbed/excavated material will not be pushed into areas that are to be left undisturbed.
11. Only clean fill/topsoil from an approved source will be accepted for backfill or grading.
12. Reclamation techniques will emphasize the re-vegetation of the sloped and cleared areas of the site with topsoil, local plants, shrub, trees, sod or grass seed mixtures approved by Parks Canada.
13. Cleared vegetation will be removed from the site in a manner approved by Parks Canada. Burning and chipping of vegetation on site is not permitted.
14. Laydown and storage areas no longer required for construction and operations activities will be rehabilitated.
15. The handling and storage of hazardous materials will follow all applicable federal legislation/regulations. All relevant current Material Safety Data Sheets (MSDS) will be readily available for the site.
16. The contractor is responsible to take all necessary precautions to ensure there are no safety concerns related to visitors of the Park.
17. All vehicles and equipment will yield to people, if present, and reduced speeds will be maintained on all roadways.





18. All equipment (e.g., diesel generators, etc.) shall meet the requirements of applicable federal legislation/regulations.
19. Dust from operating activities will be controlled using water. In the event of excessive dust, water will be applied to travel and work surfaces.
20. All vehicles and generators will have exhaust systems regularly inspected and mufflers will be operating properly to meet emission standards.
21. All solid waste will be handled according to and in compliance with applicable federal/provincial regulations.
22. All solid waste materials shall be considered, prior to disposal, for reuse, resale or recycling, and then disposed at an approved facility.
23. Unused cement shall not be deposited within the park and disposed of in an approved manner.
24. Waste accumulated on site prior to disposal will be confined, so that it does not pose an environmental or health hazard.
25. Work areas will be kept clear of waste and litter to reduce the potential for attracting wildlife and reducing potential interactions with wildlife. Any waste that may attract animals (i.e., food) will be stored in covered, wildlife-proof containers.
26. Heavy equipment (e.g., dump trucks and front-end loaders) will only be used in work areas. Travel in areas outside designated work areas will not be permitted.
27. Surface water shall be directed away from work areas by ditching. Runoff from these areas shall have sediment removed by filtration or other suitable methods and shall be directed away from wetlands and watercourses.
28. Machinery is to arrive on-site in a clean condition and should be free of soils and vegetation and maintained free of fluid leaks. For all contractors, Spill Response Kits (absorbent materials, etc.) must be on-site at all times. In the event of any spill of deleterious substances (e.g., petroleum hydrocarbons, hydraulic fluid), the contractor is responsible for containing and cleaning up the spill; the spill is to be reported and sent to Parks Canada. In the event of a reportable spill on-land or a spill, regardless of size, in the freshwater/marine environment, applicable federal legislation/regulations will be followed.
29. Only minor repairs and maintenance (e.g., lubrication) of 'non-mobile' equipment such as flatbeds, shovel or drilling equipment will be performed on-site. All major repairs, where possible, are to be performed at an existing garage location outside of the project area.
30. All fuel and other hazardous materials will be handled following applicable federal legislation/regulations.
31. Handling and fuelling procedures will comply with the applicable federal legislation/regulations and any additional requirements in order to limit potential contamination of soil or water, and will not occur within 30 m of any water body.
32. The conditions presented in this basic impact analysis (BIA) will be considered part of the project and must be approved by the Field Unit Superintendent prior to the commencement of work.
33. All activities/construction must conform to relevant Occupational Health and Safety Guidelines and to all relevant Municipal, Provincial and Federal regulations.

9. PUBLIC/STAKEHOLDER ENGAGEMENT & ABORIGINAL CONSULTATION

- 9 a) Indicate whether public/stakeholder engagement was undertaken in relation to potential adverse effects of the proposed project:
- No
 - Yes (describe the process to involve relevant parties and indicate how comments were taken into consideration).





9 b) Indicate whether Aboriginal consultation was undertaken in relation to potential adverse effects of the proposed project:

No

Yes (describe the process to involve relevant parties and how the results were taken into consideration).

10. SIGNIFICANCE OF RESIDUAL ADVERSE EFFECTS

Residual effects not likely significant

11. SURVEILLANCE

Surveillance is not required

Surveillance is required – inspections by park staff to ensure mitigations are being followed.

12. FOLLOW-UP MONITORING

Follow-up monitoring is:

not required

required by legislation or policy (indicate basis of requirement – e.g. required by the *Species at Risk Act*; *Fisheries Act*, or the [Parks Canada Cultural Resource Management Policy](#))

required to evaluate effectiveness of mitigation measures and/or assess restoration success

13. SARA NOTIFICATION

Notification is:

not required

required under the *Species at Risk Act* (outline the nature of and response to any notification).

Almost the entire landscape within Terra Nova National Park has been identified as Marten Critical Habitat. According to the Recovery Strategy for the American Marten (Environment Canada, 2013), critical habitat is defined in terms of forested habitat types most used by marten and includes two of the more dominant types found within TNNP. Hearn et al. (2010) recommends in the Recovery Strategy that areas managed at the landscape (ie. home range) scale should include >24% mature and overmature forest, and not exceed 29% younger aged forest. A third total forest cover threshold of 25% has been used since marten select mainly forested landscapes in the park as part of their home range.

Parks Canada has a legal requirement to ensure that activities or projects within the park do not destroy critical habitat. Although this project activity is not listed in the Recovery Strategy as an activity that has the potential to destroy critical habitat of marten, a GIS analysis using the landscape thresholds above was conducted. It has been determined that the maximum total area of forest to be removed from the landscape in this project (0.35 ha – overestimated) does not result in the destruction of critical habitat for marten. While this project does not destroy critical habitat, cumulative effects of these types of projects may be destructive over time. Thus a landscape approach to management will be used to maintain these thresholds on the landscape. Areas to be cleared and excavated will be inspected for the presence of individual marten or dens prior to construction.

The Atlantic Population of the Boreal felt lichen (*Erioderma pedicullatum*), listed as Special Concern on Schedule 1 of the SARA and the Blue felt lichen (*Degelia plumbea*), listed as a Species of Special Concern by COSEWIC, are found within park boundaries. Vegetation identified for removal was inspected on November 16, 2016. Both species were not observed during this inspection.





The little brown bat or little brown myotis (*Myotis lucifugus*) and Northern myotis (*Myotis septentrionalis*) are present in the park and protected under the federal SARA. The presence of individuals or roosting sites for both species will be determined before the project commences.

Avian species protected under SARA that may be found in the park include the Red crossbill (*Loxia curvirostra percna*) - Endangered, Olive sided flycatcher (*Contopus cooperi*) - Threatened and Rusty blackbird (*Euphagus carolinus*) – Special Concern. The presence of individuals or nesting sites will be determined before the project commences.

14. EXPERTS CONSULTED

Include Parks Canada experts. Add as many entries as necessary for the project.

Department/Agency/Institution: Parks Canada		Date of Request: 2016-11-02
Expert's Name & Contact Information: Gonzo Wells		Title: Project Manager, Project Delivery Services
Expertise Requested: Adherence of Provincial standards for septic tank and field		
Response: Septic system will meet applicable standards and not impact any watercourses		
Department/Agency/Institution: Parks Canada		Date of Request: 2016-05-20
Expert's Name & Contact Information: Andre Miller		Title: FII Project Archaeologist, IACHD
Expertise Requested: Conduct Archaeological Overview Assessment of the area.		
Response: The footprint of the project will be confined to previously disturbed areas of low archaeological potential.		
Department/Agency/Institution: Parks Canada		Date of Request: 2017-01-16
Expert's Name & Contact Information: Dwayne Doucette		Title: Water and Wastewater Engineer Asset and Environmental Management
Expertise Requested: Are there any Federal guidelines pertaining to septic tanks and disposal fields?		
Response: Onsite sewage disposal falls under jurisdiction of each province. Refer to NL Private Sewage Disposal and Water Supply Standards		

15. DECISION

Taking into account implementation of mitigation measures outlined in the analysis, the project is:

- not likely to cause significant adverse environmental effects.**
- likely to cause significant adverse environmental effects.

FOR SARA REQUIREMENTS:

- There are no residual adverse effects to species at risk and therefore the SARA-Compliant Authorization Decision Tool was not required**

OR, the SARA-Compliant Authorization Decision Tool (Appendix 2) was used and determined:

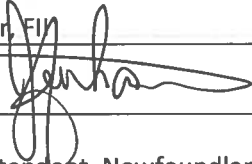

- There is no contravention of SARA prohibitions
- Project activities contravene a SARA prohibition and CAN be authorized under SARA
- Project activities contravene a SARA prohibition and CANNOT be authorized





16. RECOMMENDATION AND APPROVAL

(Add additional blocks as required)

Prepared by: EIA author: Rod Cox – Resource Management Officer	Date: 2017-01-16
Recommended by: Jerry Feltham – Manager, FI	Date: January 17, 2017
Signature: 	
Approved by: William Brake – Superintendent, Newfoundland East Field Unit	Date: January 17, 2017
Signature: 	

17. ATTACHMENTS

- *Archaeological Overview Assessment RPA 455: Malady Head Campground Concession Area Development Terra Nova National Park (Newfoundland and Labrador).*
- *Malady Head Concession Area Development - Plans*

18. NATIONAL IMPACT ASSESSMENT TRACKING SYSTEM

- Project registered in tracking system
- Not yet registered (*CEAA 2012 requires PCA submit a report to Parliament annually. EIAs must be entered in the tracking system **by the end of April** to enable reporting.*)

19. REFERENCES

Environment Canada. 2013. Recovery Strategy for the American Marten (*Martes Americana atrata*). Newfoundland Population, in Canada. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa, xi pp. + appendix.

Hearn, B.J., D.J. Harrison, A.K. Fuller, C.G. Lundrigan and W.J. Curran. 2010. Paradigm shifts in habitat ecology of threatened Newfoundland martens. *Journal of Wildlife Management* 74(4): 719-728.





Appendix 1 Environmental Impact Analysis Tools: Effects Identification Matrix

Section A focuses on direct effects of the project and **Section B** on indirect effects that are caused by changes to the environment.

A. Direct Effects									
<p><i>You may wish to change the components listed under the headings to specify the natural or cultural resources that are priority considerations for your PCA site or for the specific project being reviewed.</i></p>		Valued components potentially directly affected by the proposed project							
		Natural Resources					Cultural Resources		
		Air	Soil & landforms	Water (surface, ground, crossings, etc.)	Flora (specify, including SAR)	Fauna (specify, including SAR)	Archaeological Resources	Landscapes	
Phase	Examples of Associated Activities								
Project Components	Preparation / Construction / Operation / Decommissioning	Supply and storage of materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Burning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Clearing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		Demolition	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Disposal of waste	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Drainage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Excavation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		Grading	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		Backfilling	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Use of machinery	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Transport of materials/ equipment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





B. Indirect Effects (all phases)							
<p><i>You may wish to change the components listed under the headings to specify the natural or resources that are priority considerations for your PCA site or for the specific project being reviewed.</i></p>		Impacts as a result of changes to the environment					
		With respect to non-Aboriginal peoples:	With respect to Aboriginal peoples:		With respect to visitor experience		
		Health and socio-economic conditions	Health & socio-economic conditions	Current use of lands and resources for traditional purposes	Access & services	Recreation & accommod'n opportunities	Safety
Phase	Natural resource components affected by the project						
Preparation /construction operation/implementation/decommissioning	Could impacts to <u>air</u> lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Could impacts to <u>soils and landforms</u> lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Could impacts to <u>water</u> (e.g. surface, ground water and water crossings) lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Could impacts to <u>flora</u> (including SAR) lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Could impacts to <u>fauna</u> (including SAR) lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Other...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





**PARKS CANADA AGENCY
ARCHAEOLOGY AND HISTORY BRANCH
INDIGENOUS AFFAIRS AND CULTURAL HERITAGE DIRECTORATE**

**Archaeological Overview Assessment
RPA 455: Malady Head Campground Concession Area Development
Terra Nova National Park (Newfoundland and Labrador)**

André MILLER
FII Project Archaeologist, IAHC
National Office, Gatineau

1. Purpose

To conduct an Archaeological Overview Assessments (AOA) of area associated with the Malady Head Campground Concession Area Development project planned for Terra Nova National Park (Figure 1). In addition to summarizing the objectives of the project, this assessment will take into account existing archaeological data and the archaeological potential of the area to determine potential impacts on archaeological resources. Mitigation measures will be outlined, as needed.

2. Historical Background

Terra Nova National Park is situated on the northern coast of Newfoundland and has a cultural history stretching back more than 5000 years. As of June 2016, thirty-two known archaeological sites have been documented within the park limits (Higdon *in progress*). They represent Maritime Archaic, Paleoeskimo, Recent Indian occupations, as well as more recent European occupations, including numerous 20th century forestry/sawmill related sites. While these sites are predominately located along the coast, recent surveys have shown they there are also numerous sites in the interior of the park, along its rivers and ponds. A lack of known archaeological sites in a particular area does preclude the existence of archaeological sites in that area, it may simply be a function of whether or not that area had previously been systematically surveyed by an archaeologist.

3. RPA 455 - Malady Head Campground Concession Area Development

3.1. Project Introduction and Objectives

Located at the northern extent of the park, the Malady Head Campground is situated 4.0 km northeast of where Highway 30 intersects the Trans-Canada Highway and 2 km southeast of Traytown. According to the Request for Project Approval (RPA 455):

The objective of this project is to initiate the development of a small concession area for the Malady Head Campground. The campground currently has no concession capabilities at all. All services (groceries, firewood, etc.) must be obtained through driving to the nearby town of Traytown. As a highly visited/utilized campground the availability of basic amenities/services is essential to maintaining a high level of visitor satisfaction. This project would see the design of a small concession area on site, requiring the construction of 3 small concession booths – equipped with electricity and open for business



during the camping season. These structures would be located adjacent to the entrance kiosk and provide services around the provision of basic groceries (bread, milk, etc.), firewood, and the availability of third party operators to run recreational based opportunities (i.e. kayak, canoe/rental).

Resource Management Officer, Rod Cox, accompanied with PCA archaeologist John Higdon, did a visit to the project area in May 2016. Rod Cox indicated that Terra Nova NP will adding an area for three (3) small concession stand buildings next to the existing building. They would also like to add a bathroom to the admin building. This would also require the placement of a sewage tank or comparable system in the area north of the road, highlighted in red (Figure 2).

The small concession buildings would be built elsewhere and brought in and placed on site. They are not sure if they would be moved at the end of the field season. In order to minimize costs, they may opt to simply fill in a “small portion of the bank” to the west of the existing building. The buildings would then take up part of the wet area and extend into the current road. The bathroom addition to the building would also be added to the southern (road) side of the building, in order to minimize the amount of fill required to complete the project.

3.2. Assessment of Proposed Project Impact on Potential Archaeological Resources

According to the archaeological documentation available for this area of the park, including the Terra Nova National Park archaeological site inventory database, there are no known archaeological sites within 2 km radius of the project area. This is largely due to the fact that the area has not been systematically surveyed by archaeologists (Higdon 2016). Located approximately 85 m inland from the coast, this specific project area has low archaeological potential because the area of this project is already within the disturbed Zone 4 region of the campground (Parks Canada 2015). Construction of the concession buildings will occur on an existing asphalt surface, with minimal impact to the surrounding woodland environment (Figures 3-4). Impact on *in situ* archaeological resources would be minimal, as the planned disturbance to the ground surface and subsurface will largely be confined to areas close to the roadways which grounds have already been disturbed during the construction of the highway, the entrance road to Kiosk and the installation of the existing Kiosk and culverts (Figure 5). Also the area contains an underground power line, a telephone line and a water line (Figure 6).

3.3. Archaeological Requirements and Mitigation Measures

Given the low archaeological potential and the disturbed nature of much of the project area, an **Archaeological Impact Assessment (AIA) is not required**. However, since construction will be taking place in an area that has not previously been surveyed archaeologically, Parks Canada and construction staff involved with this project are required to adhere to the following mitigation measure:

- 1) Forward any additional information and construction drawings for the project to Parks Canada's Terrestrial Archaeology section for further review;
- 2) Main vehicular access routes and staging areas will be restricted to present-day roadways and parking lots. If this is not possible, the use of protective covering such as geotextile protective mats with a wood chip lift or granular “A” gravel is required. All protective



measures employed must be removed following construction and the area restored to a pre-construction state. Excavation is not permitted during installation or removal of protective covering;

- 3) Site restoration activities are restricted to the limits of excavation as presented in the design concept. If landscaping is required beyond these excavation limits, consult with Parks Canada's Terrestrial Archaeology section to determine if an additional AOA is required for these activities. Based on the AOA, an AIA and/or additional mitigation measures may be required prior to excavation activities;
- 4) Construction work must stop immediately if cultural resources are encountered in the immediate area during the course of the project; Parks Canada Resource Management Officer, Rod Cox or Parks Canada staff responsible for the project must be notified immediately, so that the park is made aware of the potential discovery. The archaeological resource find, as well as the area in which it was found should then be photographed and recorded with GPS coordinates, if possible. Staff are asked to not pick up/disturb any artifacts/features encountered during excavations, as preserving the context in which they are found are of utmost importance. Rod Cox or the designated Parks Canada staff member should then contact the Parks Canada archaeologist in Halifax to discuss how best to proceed. Construction can only resume following the development of an in-depth AIA and the implementation of the necessary mitigations measures.

4. Conclusions

This document provides an AOA for the Malady Head Campground Concession Area Development. Based on emails by Resource Management Officer, Rod Cox, and planning documents and archaeological site data available at the time of this assessment, it appears as though the footprint of the project will be confined to previously disturbed areas of low archaeological potential. **As such, an AIA will not be needed**, as long as the projects proceed as planned. It should be reiterated that if cultural resources are encountered during construction, all work must stop in the immediate area, so that a Parks Canada archaeologist can advise how best to proceed.

5. Contacts

Andre Miller, Archaeologist,
Archaeology and History Branch
Indigenous Affairs and Cultural Heritage Directorate
Parks Canada, Gatineau
andre.miller@pc/gc.ca / Tel: (819) 420-5030

John Higdon, Archaeologist,
Archaeology and History Branch
Indigenous Affairs and Cultural Heritage Directorate
Parks Canada, Halifax
John.higdon@canada.ca / Tel: (902) 401-6568



Virginia Sheehan, A/Manager Terrestrial Archaeology & FII Archaeologist
– National Coordinator
Archaeology and History Branch
Indigenous Affairs and Cultural Heritage Directorate
Parks Canada, Gatineau
virginia.sheehan@pc.gc.ca / Tel: (819) 420-9213

Anne Desgagné
Cultural Resources Policy Officer
Parks Canada, Québec
anne.desgagne@pc.gc.ca / Tel: (418) 648-4472

6. References cited

Higdon, John

2016 Archaeological Overview Assessment, RPA 601: Malady Head Campground Water Distribution System Recapitalization & RPA 617: Newman Sound Water Distribution System Recapitalization. Terra Nova National Park (Newfoundland and Labrador). Parks Canada, Halifax

Higdon, John

In Progress Archaeological Impact Assessments and Test Excavations in Terra Nova National Park 2016. Report on file Parks Canada, Halifax, NS.

Indian and Northern Affairs

1974 *'As Built' Alexander Bay Campgrounds*. Technical Drawings. Ref No. NATN 74/PRO/4. On file at Terra Nova National Park Field Unit, Parks Canada, Glovertown, NL.

Parks Canada

2015 Request for Project Approval (RPA). TNNP – Malady Head Campground Concession Area Development. Newfoundland East Field Unit, Parks Canada. (PCA on File).

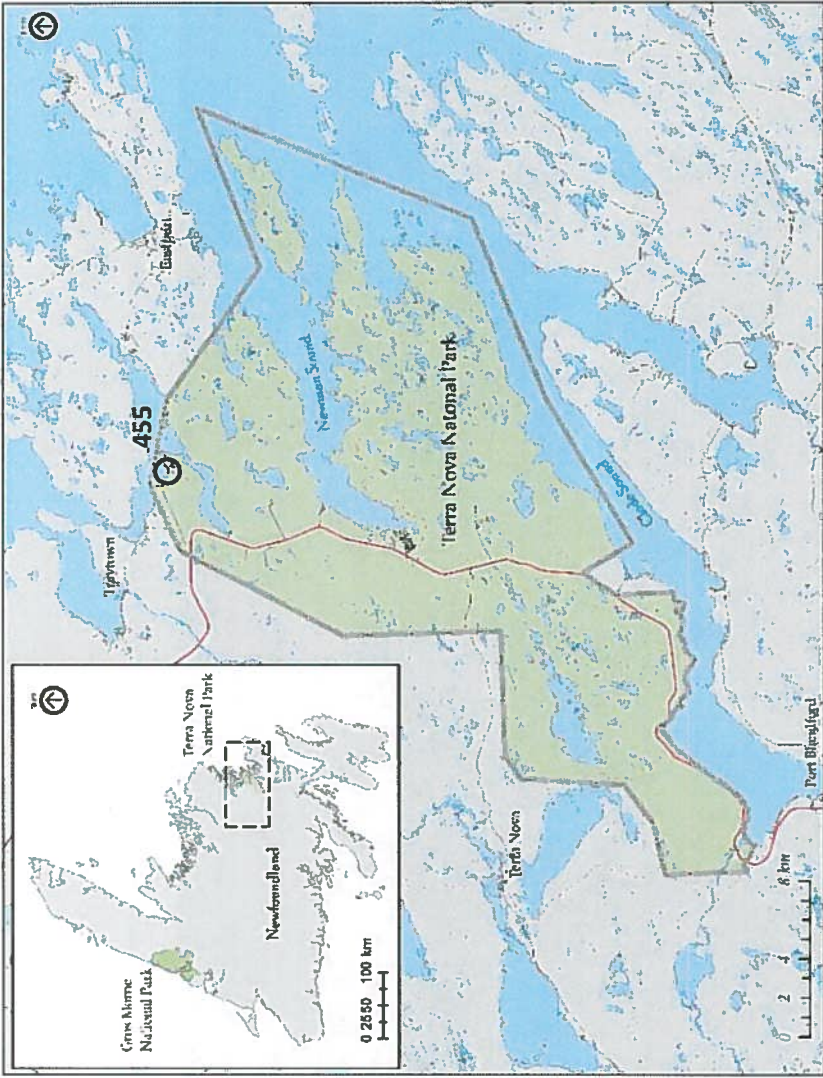


Figure 1. Map of Terra Nova National Park showing location of Project RPA 455



Figure 2. Malady Head Campground Concession Area Development (Infilling for Concession Booths, Kiosk Extension, Septic Field).



Figure 3. Location of Proposed Concession Boaths – West view from Kiosk

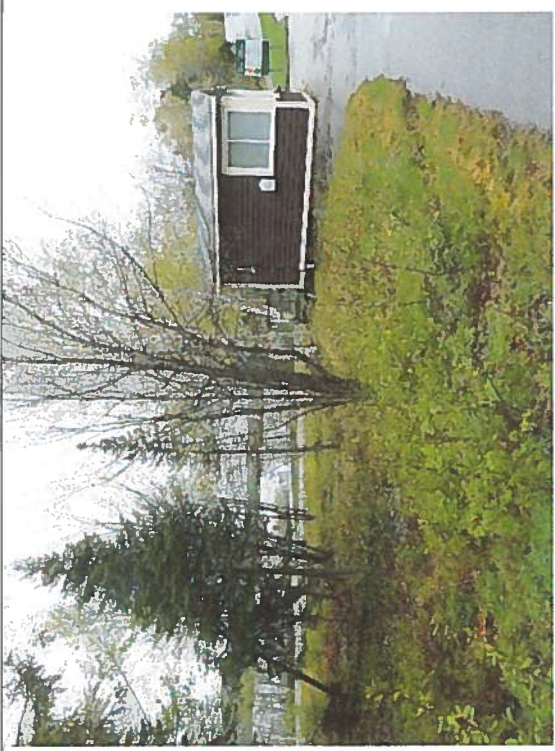


Figure 4. Kiosk Area – East View



Figure 5. Google Earth image - Yellow dotted lines indicate former highway, probably disturbed with leveling and fill activities during original construction. The blue line represent a wet area which is potentially the result of poor drainage in the area, as indicated by the Resource Management Officer. At the time this report was written, the culverts had recently been unclogged in a nearby area. Overall, the area seems to be, have been disturbed by surrounding roadways and Kiosk footprint (Rod Cox: Pers. Com. 2016).

