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END OF SECTION

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- 1.1 Description of Work
- .1 In general, work under this contract consist of:
 - .1 Removal of existing roof assembly down to structural deck.
 - .2 Remove and reinstall existing equipment, and vent stacks as indicated on drawings. Patch and repair openings of structure as required for new roof assembly.
 - .3 Install new modified bitumen roof assembly as outlined in contract documents.
 - .4 Repair existing finishes disturbed during execution of the Work.
 - .2 Site of Work is at: Bedford Institute of Oceanography in Dartmouth, NS.
- 1.2 Familiarization With Site
- .1 Before submitting a bid, it is recommended that bidders visit the site to review and verify the form, nature and extent of the work, materials needed, the means of access and the temporary facilities required to perform the Work.
 - .2 Obtain prior permission from the Departmental Representative before carrying out such site inspection.
- 1.3 Codes and Standards
- .1 Perform work in accordance with the 2010 National Building Code of Canada and any other code of provincial or local application, including all amendments up to bid closing date, provided that in any case of conflict or discrepancy, the more stringent requirement shall apply.
 - .2 Materials and workmanship must meet or exceed requirements of specified standards, codes and referenced documents.
- 1.4 Interpretation of Documents
- .1 Supplementary to the Order of Precedence article of the General Conditions of the Contract, the Division 01 sections take precedence over the technical specification sections in other Divisions of the Specification Manual.

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- 1.5 Setting Out Work .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .2 Provide devices needed to lay out and construct work.
- .3 Supply such devices as straight edges and templates required to facilitate Departmental Representative's inspection of work.
- .4 Supply stakes and other survey markers required for laying out work.
- 1.6 Cost Breakdown .1 Before submitting first progress claim submit breakdown of Contract price in detail as directed by Departmental Representative and aggregating contract price. Required forms will be provided for application of progress payment.
- .2 List items of work numerically following the same division/section number system of the specification manual and thereafter sub-divide into major work components and building systems as directed by Departmental Representative.
- .3 Upon approval, cost breakdown will be used as basis for progress payment.
- 1.7 Documents Required .1 Maintain at job site, one copy each of the following:
- .1 Contract Drawings
 - .2 Specifications
 - .3 Addenda
 - .4 Reviewed Shop Drawings
 - .5 List of outstanding shop drawings
 - .6 Change Orders
 - .7 Other modifications to Contract
 - .8 Field Test Reports
 - .9 Copy of Approved Work Schedule
 - .10 Health and Safety Plan and other safety related documents
 - .11 Other documents as stipulated elsewhere in the Contract Documents.

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- 1.8 Permits
- .1 In accordance with the General Conditions, obtain and pay for any certificates, licenses and permits required by authorities having jurisdiction.
 - .2 Provide appropriate notifications of project to municipal and provincial inspection authorities.
 - .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 forms and approval documents received from above referenced authorities.
- 1.9 Alterations, Additions or Repairs to Existing Building
- .1 Execute work with least possible interference or disturbance to building operations, occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.
 - .2 Where security has been reduced by work of Contract, provide temporary means to maintain security.
 - .3 Material transportation within elevators will not be permitted.
 - .4 Access to work areas is limited to exterior only. Temporary stair access to be provided and maintained by the contractor. Location to be approved by Departmental Representative.
 - .5 Provide temporary dust screens, barriers, warning signs in locations where renovation and alteration work is adjacent to areas which will be operative during such work.
- 1.10 Cutting, Fitting and Patching
- .1 Ensure that cutting and patching required by all trades is included in total bid price submitted for the work.

- .2 Execute cutting including excavation, fitting and patching required to make work fit properly.
- .3 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.
- .4 Do not cut, bore, or sleeve load-bearing members, except where specifically approved by Departmental Representative.
- .5 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.
- .6 Fit work airtight to pipes, sleeves ducts and conduits.

1.11 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 pedestrian, vehicular traffic 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 active service or facility. This includes disconnection of electrical power and communication services to tenant's operational areas. Adhere to approved schedule and provide notice to affected parties.
- .4 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.

- .5 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
 - .6 Protect, relocate or maintain existing active services as required. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction over service. Record locations of maintained, re-routed and abandoned service lines.
- 1.12 Building Smoking Environment
- .1 Comply with smoking restrictions.
 - .2 Zero tolerance policy in full effect for smoking on the roof or within 15 meters of any structure or contract boundary.

END OF SECTION

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- 1.1 Submittals .1 Upon acceptance of bid and prior to commencement of work, submit to Departmental Representative the following work management documents:
- .1 Work Schedule as specified herein.
 - .2 Shop Drawing Submittal Schedule specified in Section 01 33 00 - Submittal Procedures.
 - .3 Waste Management Plan specified in Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .4 Health and Safety Plan specified in section 01 35 29 - Health and Safety Requirements.
 - .5 Hot Work Procedures specified in Section 01 35 24 - Special Procedures On Fire Safety Requirements.
 - .6 Lockout Procedures specified in Section 01 35 25 - Special Procedures On Lockout Requirements.
 - .7 Dust Control Plan specified in Section 01 50 00 - Temporary Facilities.
 - .8 List of workers requiring security clearance and those to be placed on Site Security Control list as specified in Section 01 35 54 - Site Security Requirements.
- 1.2 Work Schedule .1 Upon acceptance of bid submit:
- .1 Work schedule within seven (7) calendar days of contract award.
 - .2 Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted bid.
 - .3 Provide sufficient details in schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.

- .4 Work schedule content to include as a minimum the following:
 - .1 Bar (GANTT) Charts, indicating all work activities, tasks and other project elements, their anticipated durations, planned dates for achieving key activities and major project milestones supported with;
 - .2 Written narrative on key elements of work illustrated in bar chart, providing sufficient details to demonstrate a reasonable implementation plan for completion of project within designated time.
 - .3 Generally Bar Charts derived from commercially available computerized project management system are preferred but not mandatory.
- .5 Schedule work in cooperation with the Departmental Representative. Incorporate within Work Schedule, items identified by Departmental Representative during review of schedule.
- .6 Completed schedule shall be approved by Departmental Representative. When approved, take necessary measures to complete work within scheduled time. Do not change schedule without Departmental Representative's approval.
- .7 Ensure that all subtrades and subcontractors are made aware of the work restraints and operational restrictions specified.
- .8 Schedule Updates:
 - .1 Submit when requested by Departmental Representative.
 - .2 Provide information and pertinent details explaining reasons for necessary changes to implementation plan.
 - .3 Identify problem areas, anticipated delays, impact on schedule and proposed corrective measures to be taken.

- .9 Departmental Representative will make interim reviews and evaluate progress of work based on approved schedule. Frequency of such reviews will be as decided by Departmental Representative. Address and take corrective measures on items identified by reviews and as directed by Departmental Representative. Update schedule accordingly.
- .10 In every instance, change or deviation from the Work Schedule, no matter how minimal the risk or impact on safety or inconvenience to tenant or public might appear, will be subject to prior review and approval by the Departmental Representative.
- 1.3 Project Phasing .1 Be aware that Facility and tenants must be kept operational for the full duration of work of this contract. Building services to areas under use by tenants must also be maintained at all times during the Facility's operational hours and as specifically defined in operational restrictions specified in this section.
- .2 Unless indicated or approved otherwise, complete all work of a particular phase prior to commencement of another phase.
- 1.4 Operational Restrictions .1 The Contractor must recognize that building occupants will be affected by implementation of this contract. The Contractor must perform the work with utmost regard to the safety and convenience of building occupants and users. All work activities must be planned and scheduled with this in mind. The Contractor will not be permitted to disturb any portion of the building without providing temporary facilities as necessary to ensure safe and direct passage through disturbed or otherwise affected areas.
- .2 Contractor to meet with the Departmental Representative on a weekly basis to identify intended work areas, activities and scheduling for the coming week.

- .3 Off Hours: means a period of time which is outside the daily operational hours of the tenants of the Facility. For the purposes of this contract, Off-Hours are defined as follows:
 - .1 Weeknight Off-Hours: between the hours of 18:00 and 07:00 for each weekday Monday to Thursday inclusive.
 - .2 Weekend Off-Hours: between the hours of 18:00 Friday evening to 07:00 Monday morning.
 - .3 Dependent on the nature and location of the construction activity and due to an unanticipated operational requirement of the Tenant, certain off-hour periods may be redefined by adjusting the start and end time periods or cancellation of a specific off-hour work shift during the course of the Work.
- .4 Departmental Representative reserves the right to stop certain daytime work activities, if the nature of that activity generates excessive noise or dust and have Contractor re-schedule that particular work to be performed during the Off-Hour period.
- .5 Facility circulation maintained:
 - .1 Ensure that entrances, corridors, stairwells, fire exits and other circulation routes are maintained free and clear providing safe and uninterrupted passage for Facility users and public at all times during the entire work.
 - .2 Maintain those areas clean and free of construction materials and equipment. Provide temporary dust barriers and other suitable enclosures to ensure users are not exposed to construction activities and are protected from exposure to dust, noise and hazardous conditions.

- .3 Provide temporary corridors, walkways, passageways, access to offices, etc. when required due to nature of work. Such circulation routes must be constructed to barrier free requirements unless approved otherwise by Departmental Representative.
- .4 Maintain fire escape routes accessible and firefighting access open all times for the duration of the project.
- .5 Do not under any circumstances block fire exit doors. Do not leave construction materials or debris in corridors, stairwells building entrances and exits.
- .6 Safety Signage:
 - .1 Provide on site, and erect as required during progress of work, proper bilingual signage, mounted on self-supporting stands, warning the public and building occupants of construction activities in progress and alerting need to exercise caution in proceeding through disturbed areas of the facility, and directing building occupants through any detours which may be required.
 - .2 Signage to be professionally printed and mounted on wooden backing, coloured and to express messages as directed by the Departmental Representative.
 - .3 Generally maximum size of sign should be in the order of 1.0 square meters. Number of signs required will be dependent on number of areas in facility under renovation at any one time.
 - .4 Include costs for the supply and installation of these signs in the bid price.

- .7 Cleaning of tenant occupied areas used by Contractor:
 - .1 Clean lobbies, corridors, stairs and other circulation routes used by workers to gain access to work by conducting cleaning, vacuuming and washing of floors, walls and other soiled surfaces.

- 1.5 Project Meetings .1 Departmental Representative will schedule project meetings on a bi-weekly basis and will minute minutes.

- 1.6 Work Coordination .1 The General Contractor is responsible for coordinating the work of the various trades and predetermining where the work of such trades interfaces with each other.
 - .1 Designate one person from own employ having overall responsibility to review contract documents and shop drawings, plan and manage such coordination.

- .2 The General Contractor shall 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.
 - .1 Provide each trade with the plans and specs of the interfacing trade, as required, to assist them in planning and carrying out their respective work.
 - .2 Develop coordination drawings when deemed required illustrating potential interference between work of various trades and distribute to all affected parties including structural trade.
 - .1 Pay particularly close attention to overhead work above ceilings and within or near to building structural elements.
 - .2 Coordination drawings to identify all building elements, services lines, rough-in points and indicate from where various services are coming.

- .3 Review coordination drawings at purposely called meetings. Have subcontractors sign-off on drawings and publish minutes of each meeting.
 - .4 Plan and coordinate work in such a way to minimize quantity of service line offsets.
 - .5 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.
- .3 Submission of shop drawings and ordering of prefabricated equipment or prebuilt components shall only occur once coordination meeting for such items has taken place between trades and all conditions affecting the work of the interfacing trades has been made known and accounted for.
- .4 Work Cooperation:
- .1 Ensure cooperation between trades in order to facilitate the general progress of the work and avoid situations of spatial interference.
 - .2 Ensure that each trade provides all other trades reasonable opportunity for the completion of the work and in such a way as to prevent unnecessary delays, cutting, patching and the need to remove and replace completed work.
- .5 No extra costs to the Contract will be considered by the Departmental Representative as a result of Contractor's failure to effectively coordinate all portions of the 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 to be resolved at own cost.

END OF SECTION

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- 1.1 Related Requirements .1 Section 01 78 00 - Closeout Submittals.
- 1.2 Submittal General Requirements .1 Submit to Departmental Representative for review requested submittals specified in various sections of the specifications including shop drawings, samples, permits, compliance certificates, test reports, work management plans and other data required as part of the work.
- .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 have been reviewed.
- .4 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .5 Where items or information is not produced in SI Metric units, provide soft converted values.
- .6 Review submittals prior to submission. Ensure that necessary requirements have been determined and verified and that each submittal has been checked and coordinated 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 Verify field measurements and affected adjacent Work are coordinated.
- .8 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

- .9 Contractor's responsibility for errors, omissions or deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative's review.
 - .10 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.
 - .11 Make changes or revision to submissions which Departmental Representative may require, consistent with Contract Documents and resubmit as directed by Departmental Representative. When resubmitting, identify in writing of any revisions other than those requested.
 - .12 Keep one reviewed copy of each submittal document on site for duration of Work.
- 1.3 Shop Drawings and Product Data
- .1 The term "shop drawings" means fabrication drawings, erection drawings, diagrams, illustrations, schedules, performance charts, technical product data, brochures, specifications, test reports installation instructions and other data which are to be provided by Contractor to illustrate compliance with specified materials and details of a portion of work.
 - .2 Shop Drawing Submittal Schedule:
 - .1 Submit within seven (7) working days of acceptance of bid a schedule listing all shop drawings to be submitted for project.
 - .2 Schedule shall be in format acceptable to Departmental Representative and indicate proposed submission date for each item, status of review and anticipated product delivery date to site. Track all submissions for entire project.

- .3 Revise schedule as work progresses. Identify items which have been reviewed and finalized and indicating those outstanding.
- .4 Update schedule at stipulated dates or project time intervals predetermined and agreed upon with Departmental Representative at commencement of Work.

- .3 Shop Drawing Quantities: submit one electronic PDF copy.

- .4 Shop Drawings Format:
 - .1 High resolution scan or print-to-PDF.
 - .2 Drawing to be original drawings or standard drawings modified to clearly illustrate work specific to project requirements.
 - .3 Product Data from manufacturer's standard catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products, to be full colour, clearly marked indicating applicable data and deleting information not applicable to project.
 - .4 Non or poorly legible submissions/ information will not be accepted and will be returned not reviewed.

- .5 Shop Drawings Content:
 - .1 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where items or equipment attach or connect to other items or equipment, confirm that all interrelated work have been coordinated, regardless of section or trade from which the adjacent work is being supplied and installed.

- .2 Supplement manufacturer's standard drawings and literature with additional information to provide details applicable to project.
- .3 Delete information not applicable to project on all submittals.
- .6 Allow 14 calendar days for Departmental Representative's review of each submission.
- .7 Adjustments or corrections made on shop drawings 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.
- .8 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 shop drawings are rejected and noted to be Resubmitted, do not proceed with that portion of work until resubmission and review of corrected shop drawings, through same submission procedures indicated above.
- .9 Be advised that costs and expenses incurred by Departmental Representative to conduct more than one review of incorrectly prepared shop drawing submittal for a particular material, equipment or component of work may be assessed against the Contractor in the form of a financial holdback to the Contract.
- .10 Accompany each submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and project number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.

- .11 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 shop drawing submission addresses.
 - .6 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .12 After Departmental Representative's review, distribute copies.

- .13 The review of shop drawings by the Departmental Representative or by an authorized Consultant or designate is for sole purpose of ascertaining conformance with general concept. This review shall not mean that Canada approves the detail design inherent in the shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting 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 Samples

- .1 Submit for review samples as specified in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples to Departmental Representative's office or to other address as directed. Do not drop off samples at construction site except for pre-approved circumstances previously approved by Departmental Representative.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments will result in a cost increase to the Contract notify Departmental Representative in writing prior to proceeding with Work.

- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

END OF SECTION

- 1.1 Related Requirements .1 Section 01 35 29 - Health and Safety Requirements
- 1.2 References .1 Fire Protection Standards issued by Fire Protection Services, Labour Program Division of Service Canada:
.1 FCC No. 301-June 1982 Standard for Construction Operations.
.2 FCC No. 302-June 1982 Standard for Welding and Cutting.
.2 FCC standards may be viewed at:
.1 <http://www.hrsdc.gc.ca/en/lp/lo/fp/standards/commissioner.shtml>
- 1.3 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.
.4 Use of open flame torches such as for roofing work.
- 1.4 Submittals .1 Submit copy of Hot Work Procedures and sample of Hot Work permit to Departmental Representative for review, within 14 calendar days of acceptance of bid.
.2 Submit in accordance with section 01 33 00 - Submittal Procedures.
- 1.5 Fire Safety Requirements .1 Implement and follow fire safety measures during Work. Comply with following:
.1 National Fire Code.
.2 Fire Protection Standards FCC 301 and FCC 302.
.3 Federal and Provincial Occupational Health and Safety Acts and Regulations.
.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 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 and followed during performance of hot work, Departmental Representative will give authorization to proceed as follows:
 - .1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;
 - .2 Subdivide the work into pre-determined, individual activities, each activity requiring a separately written authorization to proceed.
- .4 Requirement for individual authorization will be 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.
- .6 In tenant occupied Facility, coordinate performance of Hot Work with Facility Manager through the Departmental Representative. When directed, perform Hot Work only during non-operative hours of the Facility. Follow Departmental Representative's directives in this regard.

1.7 Hot Work
Procedures

- .1 Develop and implement safety procedures and work practises to be followed during the performance of Hot Work.
- .2 Hot Work Procedures to include:
 - .1 Requirement to perform hazard assessment of site and immediate work area beforehand for each hot work event in accordance with Safety Plan specified in section 01 35 29 - Health and Safety Requirements.
 - .2 Use of a Hot Work Permit system with individually issued permit by Contractor's Superintendent to worker or subcontractor granting permission to proceed with Hot Work.
 - .3 Permit required for each Hot Work event.
 - .4 Designation of a person on site as a Fire Safety Watcher responsible to conduct a fire safety watch for a minimum duration of 60 minutes immediately following the completion of the Hot Work.
 - .5 Compliance with fire safety codes, standards and occupational health and safety regulations specified.
 - .6 Site specific rules and procedures in force at the site as provided by the Facility Manager.
- .3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Label document as being the Hot Work Procedures for this contract.
- .4 Procedures shall clearly establish responsibilities of:
 - .1 Worker performing hot work,
 - .2 Person issuing the Hot Work Permit,
 - .3 Fire Safety Watcher,
 - .4 Subcontractor(s) and Contractor.
- .5 Brief all workers and subcontractors on Hot Work Procedures and of Permit system. Stringently enforce compliance.

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- 1.8 Hot Work Permit .1 Hot Work Permit to include the following:
- .1 Project name and project number;
 - .2 Building name and specific room or area where hot work will be performed;
 - .3 Date of issue;
 - .4 Description of hot work type needed;
 - .5 Special precautions to be followed, including type of fire extinguisher needed;
 - .6 Name and signature of permit issuer.
 - .7 Name of worker to which the permit is issued.
 - .8 Permit validity period not to exceed 8 hours. Indicate start time/date and termination time/date.
 - .9 Worker's signature with time/date of hot work completion.
 - .10 Stipulated time period of safety watch.
 - .11 Fire Safety Watcher's signature with time/date.
- .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, signed and returned to Contractor's Superintendent for safe keeping on site.
- 1.9 Fire Protection and Alarm Systems .1 Fire protection and alarm systems shall not be:
- .1 Obstructed.
 - .2 Shut-off, unless approved by Departmental Representative.
 - .3 Left inactive at the end of a working day or shift.
- .2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.

- .3 Costs incurred, from the fire department, Facility owner and tenants, resulting from negligently setting off false alarms will be charged to the Contractor in the form of financial progress payment reductions and holdback assessments against the Contract.

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.

END OF SECTION

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- 1.1 Related Requirements .1 Section 01 35 29 - Health and Safety
- 1.2 References .1 Canadian Standards Association (CSA).
.1 CSA C22.1-06 - Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
.2 CAN/CSA C22.3 No.1-06 - Overhead Systems.
.3 CSA C22.3 No.7-06 - Underground Systems.
- .2 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.
- 1.3 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 has been 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 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.
- 1.4 Compliance Requirements
- .1 Comply with the following in regards to isolation and lockout of electrical facilities and equipment:
 - .1 Canadian Electrical Code
 - .2 Federal and Provincial Occupational Health and Safety Acts and Regulations.
 - .3 Regulations and code of practise 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.
- 1.5 Submittals
- .1 Submit copy of lockout procedures, sample of lockout permit and lockout tags proposed for use in accordance with Section 01 33 00 - Submittal Procedures. Submit within 14 calendar days of acceptance of bid.
- 1.6 Isolation of Existing Services
- .1 Obtain Departmental Representative's written authorization prior to working on existing live or active electrical facilities and equipment and before proceeding with isolation of such item.

- .2 To obtain authorization, submit to Departmental Representative the following documentation:
 - .1 Written request to isolate the particular 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, as follows:
 - .1 Fill-out standard form in current use at the Facility as provided by Departmental Representative or;
 - .2 Where no form exist, make written request indicating:
 - .1 The equipment, system or service to be isolated and its location;
 - .2 Duration of isolation period (i.e.: start time & date and completion time & date).
 - .3 Voltage of service feed to system or equipment being isolated.
 - .4 Name of person making the request.
- .4 Do not proceed with isolation until receipt of written notification from Departmental Representative granting the Isolation Request and authorizing to proceed with the work.
 - .1 Note that Departmental Representative may designate another person at the Facility being authorized to grant the Isolation Request.
- .5 Conduct safe, orderly shutdown of equipment or facility. De-energize, isolate and lockout power and other sources of energy feeding the equipment or facility.
- .6 Determine in advance, as much as possible, in cooperation with the Departmental Representative, the type and frequency of situations which will require isolation of existing services.

- .7 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. Follow Departmental Representative's directives in this regard.
 - .8 Conduct hazard assessment as part of the process in accordance with health and safety requirements specified Section 01 35 29 - Health and Safety Requirements.
- 1.7 Lockouts
- .1 De-energize, isolate and lockout electrical facility, mechanical equipment and machinery from all potential sources of energy prior to working on such items.
 - .2 Develop and implement clear and specific lockout procedures to be followed as part of the Work.
 - .3 Prepare typed written Lockout Procedures describing safe work practices, procedures, worker responsibilities and sequence of activities to be followed on site by workforce to safely isolate an active piece of equipment or electrical facility and effectively lockout and tagout it's sources of energy.
 - .4 Include as part of the Lockout Procedures a system of lockout permits managed by Contractor's Superintendent or other qualified person designated by him/her as being "in-charge" at the site.
 - .1 A lockout permit shall be issued to specific worker providing a Guarantee of Isolation before each event when work must be performed on a live equipment or electrical facility.
 - .2 Duties of person managing the permit system to include:
 - .1 Issuance of permits and lockout tags to workers.
 - .2 Determining permit duration.

- .3 Maintaining record of permits and tags issued.
 - .4 Making a Request for Isolation to Departmental Representative when required as specified above.
 - .5 Designating a Safety Watcher, when one is required based on type of work.
 - .6 Ensuring equipment or facility has been properly isolated.
 - .7 Collecting and safekeeping lockout tags returned by workers as a record of the event.
- .5 Clearly establish, describe and allocate responsibilities of:
 - .1 Workers.
 - .2 Person managing the lockout permit system.
 - .3 Safety Watcher.
 - .4 Subcontractor(s) and General Contractor.
 - .6 Generic procedures, if used, must be edited and supplemented with pertinent information to reflect specific project requirements.
 - .1 Incorporate site specific rules and procedures in force at site as provided by the Departmental Representative.
 - .2 Clearly label the document as being the Lockout procedures applicable to work of this contract.
 - .7 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.
 - .8 Use industry standard lockout tags.
 - .9 Provide appropriate safety grounding and guards as required.
- 1.8 Conformance
- .1 Brief all workers and subcontractors on requirements of this section. Stringently enforce use and compliance.
- 1.9 Documents On Site

- .1 Post Lockout Procedures on site in common location for viewing by workers.
- .2 Keep copies of Request for Isolation forms and lockout permits and tags issued to workers on site for full duration of Work.
- .3 Upon request, make available to Departmental Representative or to authorized safety Representative for inspection.

END OF SECTION

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- 1.1 Related Requirements
- .1 Section 01 35 24 - Special Procedures on Fire Safety Requirements.
 - .2 Section 01 35 25 - Special Procedures on Lockout 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 - Submittal Procedures.
 - .2 Submit site-specific Health and Safety Plan prior to commencement of Work.
 - .1 Submit within five (5) work days of notification of Bid Acceptance. Provide three (3) copies.
 - .2 Departmental Representative will review Health and Safety Plan and provide comments.

- .3 Revise the Plan as appropriate and resubmit within five (5) work days after receipt of comments.
- .4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.
- .5 Submit revisions and updates made to the Plan during the course of Work.

- .3 Submit name of designated Health & Safety Site Representative and support documentation specified in the Safety Plan.
- .4 Submit building permit, compliance certificates and other permits obtained.
- .5 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other department of labour organization.
 - .1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.
- .6 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .7 Submit copies of incident reports.
- .8 Submit WHMIS MSDS - Material Safety Data Sheets.

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

- .2 Comply with Canada Labour Code - Part II (entitled Occupational Health and Safety) and the Canada Occupational Health and Safety Regulations (COSH) as well as any other regulations made pursuant to the Act.
 - .1 The Canada Labour Code can be viewed at:
[www.http://laws.justice.gc.ca/en/L-2/](http://laws.justice.gc.ca/en/L-2/)
 - .2 COSH can be viewed at:
[www.http://laws.justice.gc.ca/eng/SOR-86-304/n_e.html](http://laws.justice.gc.ca/eng/SOR-86-304/n_e.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 above specified requirements, the more stringent shall apply.
 - .5 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.
 - .6 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.
- 1.5 Responsibility
- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons and environment adjacent to the site to extent that they may be affected by conduct of Work.

- .2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.
- 1.6 Site Control and Access
- .1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.
 - .1 Departmental Representative will provide names of those persons authorized by Departmental Representative to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.
 - .2 Isolate Work Site from other areas of the premises by use of appropriate means.
 - .1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment. See Section 01 50 00 - Temporary Facilities for minimum acceptable requirements.
 - .2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.
 - .3 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.

- .3 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site.
 - .4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.
 - .5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm.
- 1.7 Protection
- .1 Give precedence to safety and health of persons and protection of environment over cost and schedule considerations for Work.
 - .2 Should unforeseen or peculiar safety related hazard or condition become evident during performance of Work, immediately take measures to rectify situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.
- 1.8 Filing of Notice
- .1 File Notice of Project with pertinent provincial health and safety authorities prior to beginning of Work.
 - .1 Departmental Representative will assist in locating address if needed.
- 1.9 Permits
- .1 Post permits, licenses and compliance certificates, specified in Section 01 10 10 - General Instructions, at Work Site.
 - .2 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.
- 1.10 Hazard Assessments
- .1 Perform site specific health and safety hazard assessment of the Work and its site.

- .2 Carryout initial assessment prior to commencement of Work with further assessments as needed during progress of work, including when new trades and subcontractors arrive on site.
- .3 Record results and address in Health and Safety Plan.
- .4 Keep documentation on site for entire duration of the Work.

1.11 Project/Site Conditions

- .1 Following are potential safety hazards at the site for which Work may involve contact with:
 - .1 Know latent site and environmental conditions
 - .1 Working from heights.
 - .2 Roof fastening coordination with existing electrical conduit below the roof deck.
 - .3 Coordination/alterations to existing gas line.
 - .4 Remove and reinstallation of existing equipment.
 - .2 Above items shall not be construed as being complete and inclusive of potential health and safety hazards encountered during work.
 - .3 Include above items in the hazard assessment of the Work.
 - .4 MSDS Data sheets of pertinent hazardous and controlled products stored on site can be obtained from Departmental Representative.

1.12 Meetings

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

1.13 Health and
Safety Plan

- .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 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, marshalling areas. Details on alarm notification methods, fire drills, location of firefighting equipment and other related data.
 - .3 Name, duties and responsibilities of persons designated as Emergency Warden(s) and deputies.

- .4 Emergency Contacts: name and telephone number of officials from:
 - .1 General Contractor and subcontractors.
 - .2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.
 - .3 Local emergency resource organizations.
- .5 Harmonize Plan with Facility's Emergency Response and Evacuation Plan. Departmental Representative will provide pertinent data including name of PWGSC and Facility Management contacts.
- .4 On-site Communication Plan:
 - .1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.
 - .2 List of critical work activities to be communicated with Facility Manager which have a risk of endangering health and safety of Facility users.
- .5 Address all activities of the Work including those of subcontractors.
- .6 Review Health and Safety Plan regularly during the Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at Work Site.
- .7 Departmental Representative will respond in writing, where deficiencies or concerns are noted and may request re-submission of the Plan with correction of deficiencies or concerns.
- .8 Post copy of the Plan, and updates, prominently on Work Site.
- 1.14 Safety Supervision
 - .1 Employ Health & Safety Site Representative responsible for daily supervision of health and safety of the Work.

- .2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority to:
 - .1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work
 - .2 Monitor and enforce Contractor's site-specific Health and Safety Plan.
 - .3 Conduct site safety orientation session to persons granted access to Work Site.
 - .4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.
 - .5 Stop the Work as deemed necessary for reasons of health and safety.
- .3 Health & Safety Site Representative 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 bi-weekly basis. Record deficiencies and remedial action taken.
 - .2 Conduct Formal Inspections on a minimum monthly basis. Use standardized safety inspection forms. Distribute to subcontractors.
 - .3 Follow-up and ensure corrective measures are taken.

- .6 Cooperate with Facility's Occupational Health and Safety representative should one be designated by Departmental Representative.
 - .7 Keep inspection reports and supervision related documentation on site.
- 1.15 Training
- .1 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task.
 - .2 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.
 - .3 When unforeseen or peculiar safety-related hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.
- 1.16 Minimum Site Safety Rules
- .1 Notwithstanding requirement to abide by federal and provincial health and safety regulations; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:
 - .1 Wear appropriate PPE pertinent to the Work or assigned task; minimum being hard hat, safety footwear, safety glasses and hearing protection.
 - .2 Immediately report unsafe condition at site, near-miss accident, injury and damage.
 - .3 Maintain site and storage areas in a tidy condition free of hazards causing injury.
 - .4 Obey warning signs and safety tags.
 - .2 Brief persons of disciplinary protocols to be taken for 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,
 - .4 Interruptions to Facility operations resulting in an operational lost to a Federal department in excess of \$5000.00.
- .2 Submit report in writing.

1.19 Hazardous
Products

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).
- .2 Keep MSDS data sheets for all products delivered to site.
 - .1 Post on site.
 - .2 Submit copy to Departmental Representative.
 - .3 For interior work in an occupied Facility, post additional copy in one or more publically accessible locations.

1.20 Powder Actuated
Devices

- .1 Use powder actuated fastening devices only after receipt of written permission from Departmental Representative.

- 1.21 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.
- 1.22 Posting of Documents
- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Work Site in accordance with Acts and Regulations of Province having jurisdiction.
 - .2 Post other documents as specified herein, including:
 - .1 Site specific Health and Safety Plan
 - .2 WHMIS data sheets
 - .3 Other pertinent information.

END OF SECTION

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- 1.1 Related Requirements .1 Section 01 74 21 - Construction/
Demolition Waste Management and
Disposal.
- 1.2 Definitions .1 Hazardous Material: 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.
- 1.3 Fires .1 Fires and burning of rubbish on site not
permitted.
- 1.4 Hazardous Material Handling .1 Store and handle hazardous materials in
accordance with applicable federal and
provincial laws, regulations, codes and
guidelines. Store in location that will
prevent spillage into the environment
- .2 Label containers to WHMIS requirements
and keep MSDS data sheets on site for
all hazardous materials.
- .3 Maintain inventory of hazardous
materials and hazardous waste stored on
site. List items by product name,
quantity and date when storage began.
- .4 Store and handle flammable and
combustible materials in accordance with
National Fire Code.
- .5 Transport hazardous materials in
accordance with federal Transportation
of Dangerous Goods Regulations and
applicable Provincial regulations.
- 1.5 Disposal of Wastes .1 Do not bury rubbish and waste materials
on site. Dispose in accordance with
project waste management requirements
specified in Section 01 74 21 -
Construction/Demolition Waste Management
and Disposal.
- .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.

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- .3 Dispose of hazardous waste in accordance with applicable federal and provincial laws, regulations, codes and guidelines.
- 1.6 Drainage
- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with governing regulations and requirements.
- 1.7 Work Adjacent to Waterways
- .1 Do not operate construction equipment in waterways.
- .2 Do not use waterway beds for borrow material without Departmental Representative's approval.
- .3 Do not dump excavated fill, waste material or debris in waterways.
- .4 Do not refuel any type of equipment within 100 meters of a water body. Maintain equipment in good working condition with no fluid leaks, loose hoses or fittings.
- 1.8 Pollution Control
- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads and around entire construction site.

- .5 Have appropriate emergency spill response equipment and rapid clean-up kit on site located adjacent to hazardous materials storage area. Provide personal protective equipment required for clean-up.
- .6 Report, spills of petroleum and other hazardous materials as well as accidents having potential of polluting the environment to Federal and Provincial Department of the Environment.
 - .1 Notify Departmental Representative and submit a written spill report to Departmental Representative within 24 hours of occurrence.

END OF SECTION

1.1 General

- .1 Due to nature of this Facility, and client operations therein, security regulations pertaining to site will be in place during the work resulting in need for:
 - .1 Control and limit movement of construction workers at the site and inside building;
 - .2 Escort and continuous supervision of workers by security personnel within facility;
 - .3 Workers shall undergo a security clearance process if they have to enter building for any length of time;
 - .4 Specific rules and regulations as specified in this section and as directed by the Departmental Representative to be stringently followed.
- .2 It is the Contractor's responsibility to:
 - .1 Submit necessary documentation required and obtain security clearances for all workers;
 - .2 Become familiar with and abide by security rules and regulations;
 - .3 Brief all workers and subcontractors in respect of the security regulations and ensure that they abide by all rules and directives.
- .3 The Departmental Representative will coordinate a pre-construction meeting between Contractor, Facility Management and Security Personnel who will provide details and directives on control and movement on site.
 - .1 Note that building's custodial responsibilities are currently being managed by PWGSC.

- .4 Any infraction of site security regulations on the part of the Contractor, members of work force or any Subcontractor in his employ, could result in:
 - .1 Financial penalties in the form of progress payment reduction or holdback assessments being levied against the Contractor and;
 - .2 Demand immediate removal of offending party from the site.
- 1.2 Security Personnel
- .1 Security personnel required only when Contractor is inside building.
 - .2 Specific to work performed inside of building, contractor shall schedule activities such that one area of the interior of the building is accessed at a time, unless otherwise approved by the Departmental Representative.
 - .3 Departmental Representative will provide and pay for services of security personnel.
- 1.3 Security Passes
- .1 Visitor or worker ID Tags are required for all personnel requiring access inside the building, beyond the main public lobby or on site.
 - .2 ID Tags will be provided by the Facility Security, issued to Contractor for distribution to authorized workers which shall also be placed on the Security Control List specified below.
 - .3 All persons while on site, must wear the ID Tag issued to him regardless of daytime or nighttime work.
 - .4 Be responsible to obtain ID Tags before work commences, including those required by subcontractors, and continually control their distribution and use by workers. Submit request for tags as early as possible prior to commencement of work.
 - .5 For the duration of this contract, anyone not in possession of the ID Tag will not be allowed access on site.

- .6 At end of project, return to Departmental Representative all tags issued to workers and to subcontractors.
 - .1 The Departmental Representative will levy a financial penalty in the form of a holdback assessment against the Contract for each pass not returned regardless of the reason the pass is not returned.
- .7 Immediately report any lost, stolen or destroyed ID Tags to the Departmental Representative.

END OF SECTION

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- 1.1 Related Requirements .1 Section 07 52 00 - Modified Bituminous Membrane Roofing.
- 1.2 Inspection .1 Give timely notice requesting inspection of Work designated for special tests, inspections or approvals by Departmental Representative or by inspection authorities having jurisdiction.
- .2 In accordance with the General Conditions, Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.
- .3 If Contractor covers or permits to be covered Work designated for special tests, inspections or approvals before such is made, uncover Work until particular inspections or tests have been fully and satisfactorily completed and until such time as Departmental Representative gives permission to proceed.
- .4 Pay costs to uncover and make good work disturbed by inspections and tests.
- 1.3 Testing .1 Tests on materials, equipment and building systems as specified in various sections of the Specifications is the responsibility of the Contractor except where stipulated otherwise.
- .1 Provide all necessary instruments, equipment and qualified personnel to perform tests.
- .2 At completion of tests, turn over 2 sets of fully documented tests reports to the Departmental Representative. Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .1 Obtain additional copies for inclusion of a complete set in each of the maintenance manuals specified in Section 01 78 00 - Closeout Submittals.

.3 Unspecified tests may also be made by Departmental Representative, at the discretion of the Departmental Representative. The costs of these tests will be paid for by the Departmental Representative.

.4 Where tests or inspections reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests and inspections incurred by Departmental Representative as required to verify acceptability of corrected work.

1.4 Access to Work

.1 Facilitate Departmental Representative's access to Work. If part of Work is being fabricated at locations other than construction site, make preparations to allow access to such Work whenever it is in progress.

.2 Furnish labour and facility to provide access to the work being inspected and tested.

.3 Co-operate to facilitate such inspections and tests.

1.5 Rejected Work

.1 Remove and replace defective Work, whether result of poor workmanship, use of defective or damaged products and whether incorporated in Work or not, which has been identified by Departmental Representative as failing to conform to Contract Documents.

.2 Make good damages to new and existing construction and finishes resulting from removal or replacement of defective work.

END OF SECTION

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- 1.1 References .1 Canadian Standards Association (CSA).
.1 CSA Z797-09(2014), Code of Practice for Access Scaffold.
.2 CAN/CSA-Z321-96 (R2006), Signs and Symbols for the Workplace.
- 1.2 Site Access and Parking .1 The Departmental Representative will designate Contractor's access to project site as well as limited parking facilities for equipment and workers.
- 1.3 Building Access .1 Use only access doors, and circulation routes within building as designated by Departmental Representative to access interior work.
- 1.4 Contractor's Site Office .1 Be responsible for and provide own site office, if required, including electricity, heat, lights and telephone. Locate site office as directed by Departmental Representative.
- 1.5 Material Storage .1 Laydown area for materials and equipment will be provided.
- 1.6 Site Enclosures .1 Provide temporary fence to enclose various construction areas of work site.
.2 Erect steel fence using new 1200 mm high galvanized steel wire fence fabric supported by steel posts spaced at maximum 2.4 m oc.
.1 Provide one truck gate and one pedestrian gate.
.2 Maintain fence in good repair.
.3 Erect plastic mesh fence constructed as follows:
.1 1200 mm height, constructed of high density polyethylene mesh fence fabric, orange in color.
.2 Supported by steel T-bar posts or other similar framing, of sufficient quantity, adequate spacing and set firmly in ground to secure fence against sags.
.3 Inspect fence regularly, repairing sags and damaged sections.
.4 Incorporate within fence one operable truck gate and one pedestrian gate.

- .4 Make all gates lockable and provide keyed padlocks.
 - .5 Obtain Departmental Representative's approval beforehand of location and layout of all temporary fence enclosures.
 - .6 Provide battery powered lanterns around the perimeter of the site enclosure to clearly mark its location at night.
 - .7 Provide warning signs affixed to all fenced areas, identifying those enclosed areas as "Construction Zones" with access restricted to only those persons so authorized by General Contractor.
 - .8 Do not construe fencing as an acceptable replacement for pedestrian walkway and hoarding requirements specified below.
- 1.7 Pedestrian Walkways and Hoarding
- .1 Ensure maximum safety and security to facility users during the course of work.
 - .2 Maintain access and egress to building entrances and fire exits designated by Departmental Representative to remain in use. Provide enclosed walkways when work is adjacent to such doors as follows:
 - .1 Erect wooden pedestrian walkway complete with roof and side covers.
 - .2 Install walkways as soon as work is in the vicinity of entrance and exit doors and poses a potential danger to facility users.
 - .3 Construct to approximate size of 2.0 metre wide x 2.1 metre high x length as required to fully clear danger zone.
 - .4 Provide signage and lighting.
 - .5 Submit details of walkway size, location, layout and construction to Departmental Representative beforehand and obtain approval.
 - .3 Adequately frame and brace hoarding and walkways to resist wind, and other weather or site conditions.

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- .4 Erect such protective devices during Facility's non-operational off hour periods.
 - .5 Obtain Departmental Representative's concurrence prior to removal of hoarding and walkways.
- 1.8 Interior Dust Control and Dust Barriers
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- .1 Control creation and spread of dust and dirt to building interior and in particular to areas within premises still under use by occupants.
 - .2 Develop and implement a dust control plan, addressing effective measures to carry out work with least amount of dust being created and propagated.
 - .1 Carefully evaluate the type of work to be undertaken and the physical layout of each work area on site.
 - .2 Provide specifically tailored strategy for each work area.
 - .3 Pre-determine location and placement of dust barriers to confine resulting dust to immediate work area.
 - .4 Inform Departmental Representative of the proposed dust control measures to be followed at each work area and for each major dust generating activities. Obtain Departmental Representative's approval before proceeding with work.
 - .3 Dust control plan to incorporate as a minimum the following dust protection and cleaning requirements:
 - .1 Erect dustproof partitions completely around work area to fully isolate construction from other parts of the building.

- .2 Construct dust partitions as follows:
 - .1 Use 10 mil polyethylene installed and sealed tightly to abutting walls, ceilings and floor with continuous duct tape along all edges and seams. Support in position with 38 x 89 wood framing at 400 mm o.c. Locate seams only at framing members and overlap sheeting by minimum of 150 mm.
- .3 Provide a "dust-tight" and lockable access door(s) within dust partition or between rooms for worker entry into work area. This is of particular importance for situations where excessive dust will be generated.
- .4 Provide additional dust barriers, placed tightly to underside of the floor/roof deck above, in locations where existing walls are used as part of the dust barrier system but simply terminate at the finished ceiling level resulting in an open space above, or other similar condition, permitting dust to migrate beyond the construction areas.
- .5 Make all dust barriers airtight, effectively blocking and stopping all dust migration.
- .6 Inspect dust barriers at various intervals during each work shift. Immediately fix tears, unsealed edges and maintain barriers effectively sealed for the entire work duration.
- .7 Shut down existing ventilation system feeding construction space, or disconnect and seal-off supply and return air ducts to stop dust from contaminating other areas.
- .8 Immediately clean areas in use by occupants and public contaminated by work.
 - .1 Vacuum carpets, wash floors and walls. Remove accumulated dust from all surfaces. Clean and remove smears, scuffs and marks.

- .4 Meager attempts at controlling dust will not be tolerated. Failure to provide effective dust control during work and to perform satisfactory cleaning thereafter will result in Departmental Representative to proceed and obtain a separate cleaning service agency to perform cleaning to tenant's satisfaction with cost for such services being charged against this Contract in the form of financial holdbacks.
- .5 Obtain Departmental Representative's approval before erecting any dust partitions simply to underside of finish ceiling.
- .6 Construction of dust barriers, enclosures and placement of temporary protective devices to be performed during Facility non-operational off-hour periods.

1.9 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.

1.10 Enclosure of
Structure

- .1 Provide temporary weathertight enclosures and protection for exterior openings until permanently enclosed.
- .2 Provide heated enclosures at removals/openings impacted by Work.
- .3 Provide weathertight and heated enclosures to conduct exterior work during winter and other inclement weather conditions. Erect to allow accessibility for installation of materials and working inside of enclosure.

- .4 Design enclosures to withstand wind pressure and snow loading.
- 1.11 Power
 - .1 Power supply is available and will be provided for construction usage at no cost.
 - .1 Make arrangements for the use of such services through the Departmental Representative.
 - .2 Departmental Representative will designate and approve each location of existing power source to which connections can be made to obtain temporary power service.
 - .3 Connect to existing power supply in accordance with Canadian Electrical Code.
 - .2 Provide and maintain temporary lighting as required to conduct work. Ensure illumination level is not less than 162 lx in all locations.
- 1.12 Water Supply
 - .1 Water supply is available in existing building on site and will be provided for construction usage at no cost. Make arrangements for the use and transportation of such services to work area through the Departmental Representative.
- 1.13 Scaffolding
 - .1 Design, construct and maintain scaffolding in rigid, secure and safe manner in accordance with CSA Z797.
 - .2 Erect scaffolding independent of walls. Remove when no longer required.
- 1.14 Heating and Ventilating
 - .1 Supply, install and pay for costs of temporary heat and ventilation used during construction, including costs of installation, fuel, operation, maintenance and removal of equipment. Use of direct-fired heaters discharging waste products into work areas will not be permitted.
 - .2 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of work.
 - .2 Protect work and products against dampness and cold.

- .3 Prevent moisture condensation on surfaces.
- .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
- .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .3 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .4 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct-fired combustion units to outside.
- .5 Upon acceptance of bid, Departmental Representative may permit use of permanent system providing agreement can be reached on:
 - .1 Conditions of use, special equipment, protection and maintenance.
 - .2 Saving on Contract price.
 - .3 Provisions relating to warranties on equipment.

1.15 Construction
Sign and Notices

- .1 Upon request by Departmental Representative, erect a self-supporting project sign in location indicated.
- .2 Departmental Representative will provide a vinyl sign facing for installation by Contractor on sign framework. Sign frame to be plywood face of approximately 1200 mm x 2400 mm in size complete with required wood framing at 400 mm o.c. and support posts.
- .3 Install sign plumb and level in neat wood framework and securely anchor in ground by posts to withstand wind pressure of 160 km/h.
- .4 Contractor or subcontractor advertisement signboards are not permitted on site.
- .5 Safety and Instruction Signs and Notices:
 - .1 Signs and notices for safety and instruction shall be in both official languages or commonly understood graphic symbols conforming to CAN/CSA-Z321.
- .6 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.

1.16 Removal of
Temporary Facilities

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

END OF SECTION

1.1 General

- .1 Use new material and equipment unless otherwise specified.
- .2 Within three (3) days of written request by Departmental Representative, submit following information for any materials and products proposed for supply:
 - .1 Name and address of manufacturer.
 - .2 Trade name, model and catalogue number.
 - .3 Performance, descriptive and test data.
 - .4 Compliance to specified standards.
 - .5 Manufacturer's installation or application instructions.
 - .6 Evidence of arrangements to procure.
 - .7 Evidence of manufacturer delivery problems or unforeseen delays.
- .3 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.
- .4 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.
- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.2 Product Quality

- .1 Contractor shall be solely responsible for submitting relevant technical data and independent test reports to confirm whether a product or system proposed for use meets contract requirements and specified standards.
- .2 Final decision as to whether a product or system meets contract requirements rest solely with the Departmental Representative in accordance with the General Conditions of the Contract.

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- 1.3 Manufacturer's Instructions
- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods to be used. Do not rely on labels or enclosure provided with products. Obtain written instructions directly from manufacturers.
 - .2 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions, so that Departmental Representative will designate which document is to be followed.
- 1.4 Availability
- .1 Immediately notify Departmental Representative in writing of unforeseen or unanticipated material delivery problems by manufacturer. Provide support documentation as per paragraph 1.1.2 above.
- 1.5 Workmanship
- .1 Ensure quality of work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.
 - .2 Remove unsuitable or incompetent workers from site as stipulated in the General Conditions of the Contract.
 - .3 Ensure cooperation of workers in laying out work. Maintain efficient and continuous supervision on site at all times.
 - .4 Coordinate work between trades and subcontractors. See Section 01 14 10 - Scheduling and Management of Work in this regard.
 - .5 Coordinate placement of openings, sleeves and accessories.
- 1.6 Fastenings - General
- .1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work and in humid areas.

- .2 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Wood or organic material plugs not acceptable.
- .3 Keep exposed fastenings to minimum, space evenly and lay out neatly.
- .4 Fastenings which cause spalling or cracking of material to which anchorage is made, are not acceptable.
- .5 Do not use explosive actuated fastening devices unless approved by Departmental Representative. See section on Health and Safety Requirements in this regard.

1.7 Fastenings -
Equipment

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur and, use resilient washers with stainless steel.

1.8 Storage,
Handling and
Protection

- .1 Deliver, handle and store materials in manner to prevent deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled materials in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work. Provide additional cover where manufacturer's packaging is insufficient to provide adequate protection.
- .3 Store products subject to damage from weather in weatherproof enclosures.

- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Immediately remove damaged or rejected materials from site.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

END OF SECTION

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- 1.1 General
- .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - .2 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
 - .3 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- 1.2 Materials
- .1 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- 1.3 Cleaning During Construction
- .1 Maintain work site and work areas in a tidy condition, free from accumulations of waste material and debris. Clean areas on a daily basis.
 - .2 Provide on-site containers for collection of waste materials and debris.
 - .3 Use separate collection bins, clearly marked as to purpose, for source separation and recycling of waste and debris in accordance with waste management requirements specified.
 - .4 Remove waste materials, and debris from site as required by Departmental Representative.
 - .5 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

- .6 Provide dust barriers, dividers, seals on doors and employ other dust control measures as required to ensure that dust and dirt, generated by work, are not transmitted to other existing areas of building. Should dust migrate into tenant occupied and public areas of building, employ such means as may be necessary to immediately clean all contaminated surfaces to the satisfaction of the Departmental Representative.
 - .1 See Section 01 50 00 - Temporary Facilities for requirements on dust control and for erection of dust partitions.
 - .7 Immediately clean all dust, dirt, smears, scuffs and soiled surfaces in lobbies, corridors, stairwells and within tenant occupied areas resulting from the Work.
 - .1 Perform cleaning, dusting and floor washing as necessary to thoroughly clean all soiled surfaces.
 - .8 Remove snow and ice from access doors used by workforce
- 1.4 Final Cleaning
- .1 In preparation for acceptance of the completed work perform final cleaning in areas affected by the Work.
 - .2 Remove grease, dust, dirt, stains, labels, fingerprints, marks and other foreign materials.
 - .3 Replace items with broken pieces, scratches or disfigured.
 - .4 Vacuum clean and dust building interiors.
 - .5 Broom clean and wash exterior paved surfaces and walks; rake clean other surfaces of grounds.
 - .6 Remove debris and surplus materials from crawl areas, roof areas and other accessible concealed spaces.

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- 1.1 Related Requirements .1 Environment Procedures: Section 01 35 43 - Environmental Procedures.
- 1.2 General .1 Carry out work placing maximum emphasis on the areas of:
.1 Waste reduction;
.2 Diversion of waste from landfill and;
.3 Material Recycling.
- 1.3 Waste Management Plan .1 Prior to commencement of work, prepare waste Management Workplan.
.2 Workplan to include:
.1 Waste audit.
.2 Waste reduction practices.
.3 Material source separation process.
.4 Procedures for sending recyclables to recycling facilities.
.5 Procedures for sending non-salvageable items and waste to approved waste processing facility or landfill site.
.6 Training and supervising workforce on waste management at site.
.3 Workplan to incorporate waste management requirements specified herein and in other sections of the Specifications.
.4 Develop Workplan in collaboration with all subcontractors to ensure all waste management issues and opportunities are addressed.
.5 Submit copy of Workplan to Departmental Representative for review and approval.
.1 Make revisions to Plan as directed by Departmental Representative.
.6 Implement and manage all aspects of Waste Management Workplan for duration of work.
.7 Revise Plan as work progresses addressing new opportunities for diversion of waste from landfill.

- 1.4 Waste Audit .1 At project start-up, conduct waste audit of:
- .1 Site conditions identifying salvageable and non-salvageable items and waste resulting from demolition and removal work.
 - .2 Projected waste resulting from product packaging and from material leftover after installation work.
- .2 Develop written list. Record type, composition and quantity of various salvageable items and waste anticipated, reasons for waste generation and operational factors which contribute to waste.
- 1.5 Waste Reduction .1 Based on waste audit, develop waste reduction program.
- .2 Structure program to prioritize actions, with waste reduction as first priority, followed by salvage and recycling effort, then disposal as solid waste.
- .3 Identify materials and equipment to be:
- .1 Protected and turned over to Departmental Representative when indicated.
 - .2 Salvaged for resale by Contractor.
 - .3 Sent to recycling facility.
 - .4 Sent to waste processing/landfill site for their recycling effort
 - .5 Disposed of in approved landfill site.
- .4 Reduce construction waste during installation work. Undertake practices which will minimize waste and optimize full use of new materials on site, such as:
- .1 Use of a central cutting area to allow for easy access to off-cuts;
 - .2 Use of off-cuts for blocking and bridging elsewhere.

- .3 Use of effective and strategically placed facilities on site for storage and staging of left-over or partially cut materials (such as gypsum board, plywood, ceiling tiles, insulation etc...) to allow for easy incorporation into work whenever possible avoiding unnecessary waste.
 - .5 Develop other strategies and innovative procedures to reduce waste such as minimizing the extent of packaging used for delivery of materials to site etc...
- 1.6 Material Source Separation Process
- .1 Develop and implement material source separation process at commencement of work as part of mobilization and waste management at site.
 - .2 Provide on-site facilities to collect, handle and store anticipated quantities of reusable, salvageable and recyclable materials.
 - .1 Use suitable containers for individual collection of items based on intended purpose.
 - .2 Locate to facilitate deposit but without hindering daily operations of existing building tenants.
 - .3 Clearly mark containers and stockpiles as to purpose and use.
 - .3 Perform demolition and removal of existing building components and equipment following a systematic deconstruction process.
 - .1 Separate materials and equipment at source, carefully dismantling, labelling and stockpiling alike items for the following purposes:
 - .1 Reinstallation into the work where indicated.
 - .2 Salvaging reusable items not needed in project which Contractor may sell to other parties. Sale of such items not permitted on site.
 - .3 Sending as many items as possible to locally available recycling facility.

- .4 Segregating remaining waste and debris into various individual waste categories for disposal in a "non-mixed state" as recommended by waste processing/landfill sites.
 - .4 Isolate product packaging and delivery containers from general waste stream. Send to recycling facility or return to supplier/manufacturer.
 - .5 Send leftover material resulting from installation work for recycling whenever possible.
 - .6 Establish methods whereby hazardous and toxic waste materials, and their containers, encountered or used in the course work are properly isolated, stored on site and disposed in accordance with applicable laws and regulations from authorities having jurisdiction.
 - .7 Isolate and store existing materials and equipment identified for re-incorporation into the Work. Protect against damage.
- 1.7 Worker Training and Supervision
- .1 Provide adequate training to workforce, through meetings and demonstrations, to emphasize purpose and worker responsibilities in carrying out the Waste Management Plan.
 - .2 Waste Management Coordinator: designate full-time person on site, experienced in waste management and having knowledge of the purpose and content of Waste Management Plan to:
 - .1 Oversee and supervise waste management during work.
 - .2 Provide instructions and directions to all workers and subcontractors on waste reduction, source separation and disposal practices.
 - .3 Post a copy of Plan in a prominent location on site for review by workers.

1.8 Certification of
Material Diversion

- .1 Submit to Departmental Representative, copies of certified weigh bills from authorized waste processing sites and sale receipts from recycling/reuse facilities confirming receipt of building materials and quantity of waste diverted from landfill.
- .2 Submit data at pre-determined project milestones as determined by Departmental Representative.
- .3 Compare actual quantities diverted from landfill with projections made during waste audit.

1.9 Disposal
Requirements

- .1 Burying or burning of rubbish and waste materials is prohibited.
- .2 Disposal of waste, volatile materials, mineral spirits, oil, or paint thinner into waterways, storm, or sanitary sewers is prohibited.
- .3 Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction.
- .4 Contact the authority having jurisdiction prior to commencement of work, to determine what, if any, demolition and construction waste materials have been banned from disposal in landfills and at transfer stations. Take appropriate action to isolate such banned materials at site of work and dispose in strict accordance with provincial and municipal regulations.
- .5 Transport waste intended for landfill in separated condition, following rules and recommendations of Landfill Operator in support of their effort to divert, recycle and reduce amount of solid waste placed in landfill.
- .6 Collect, bundle and transport salvaged materials to be recycled in separated categories and condition as directed by recycling facility. Ship materials only to approved recycling facilities.

- .7 Sale of salvaged items by Contractor to other parties not permitted on site.

END OF SECTION

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- 1.1 Related Requirements .1 Section 01 78 00 - Closeout Submittals.
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- 1.2 Inspection and Declaration .1 Contractor's Inspection: Coordinate and perform, in concert with subcontractors, an inspection and check of all Work. Identify and correct deficiencies, defects, repairs and perform outstanding items as required to complete work in conformance with Contract Documents.
- .1 Notify Departmental Representative in writing when deficiencies from Contractor's inspection have been rectified and that Work is deemed to be complete and ready for Departmental Representative's inspection of the completed work.
- .2 Departmental Representative's Inspection: Accompany Departmental Representative during all substantial and final inspections of the Work.
- .1 Address defects, faults and outstanding items of work identified by such inspections.
 - .2 Advise Departmental Representative when all deficiencies identified have been rectified.
- .3 Note that Departmental Representative will not issue a Certificate of Substantial Performance of the work until such time that Contractor performs following work and turns over the specified documents:
- .1 Project record as-built documents;
 - .2 Final Operations and Maintenance manuals;
 - .3 Maintenance materials, parts and tools;
 - .4 Compliance certificates from applicable authorities;
 - .5 Reports resulting from designated tests;
 - .6 Demonstration and training complete with user manuals;
 - .7 Manufacturer's Guarantee certificates.
 - .8 Testing, adjusting and balancing of equipment and systems complete with submission of test reports.

- .9 Commissioning of equipment and systems specified.
- .4 Correct all discrepancies before Departmental Representative will issue the Certificate of Completion.

END OF SECTION

1.1 Project Record Documents

- .1 Departmental Representative will provide 2 white print sets of contract drawings and two (2) copies of Specifications Manual specifically for "as-built" purposes.
- .2 Maintain at site one set of the contract drawings and specifications to record actual as-built site conditions.
- .3 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Departmental Representative upon request.
- .4 As-Built Drawings:
 - .1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of work, neatly transfer notations to second set (also by use of red ink).
 - .2 Submit both sets to Departmental Representative prior to application for Certificate of Substantial Performance.
 - .3 Stamp all drawings with "As-Built Drawings". Label and place Contractor's signature and date.
 - .4 Show all modifications, substitutions and deviations from what is shown on the contract drawings or in specifications.
 - .5 Record following information:
 - .1 Field changes of dimension and details;
 - .2 Location of capped and terminated services and utilities;
 - .3 Chases for mechanical, electrical and other services;
 - .4 All structural steel installations to be fully dimensioned;
 - .5 Any details produced in the course of the contract by the Departmental Representative to supplement or to change existing design drawings;

- .6 All change orders issued over the course of the contract must be documented on the finished as-built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.
 - .5 As-built Specifications: legibly mark in red each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly items substituted from that specified.
 - .2 Changes made by Addenda and Change Orders.
 - .3 Mark up both copies of specifications; stamp "as-built", sign and date similarly to drawings as per above paragraph.
 - .6 Maintain As-built documents current as the contract progresses. Departmental Representative will conduct reviews and inspections of the documents on a regular basis. Failure to maintain as-builts current and complete to satisfaction of the Departmental Representative shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.
- 1.2 Reviewed Shop Drawings
- .1 Provide a complete set of all shop drawings reviewed for project to incorporate into each copy of the Operations & Maintenance manuals.
 - .2 Submit full sets at same time and as part of the contents of the Operation and Maintenance manuals specified.
- 1.3 Operations & Maintenance Manual
- .1 O&M Manual - Definition: an organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of the specifications.

- .2 Manual Language: final manuals to be in English language.
- .3 Number of copies required:
 - .1 Upon review and acceptance by Departmental Representative, submit three (3) final copies. Interim copies are not to be considered as part of the final copies unless they have been fully revised and are identical to the final approved version.
- .4 Submission Date: submit complete operation and maintenance manual to Departmental Representative three (3) weeks prior to application for Certificate of Substantial Performance of the work.
- .5 Binding:
 - .1 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.
 - .2 Use vinyl, hard covered, 3 "D" ring binders, loose leaf, sized for 215 mm x 280 mm paper, with spine pocket.
 - .3 Where multiple binders are needed, correlate data into related consistent groupings.
 - .4 Identify contents of each binder on spine.
 - .5 Organize and divide data following same numerical system as the section numbers of the Specification Manual.
 - .6 Dividers: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each individual product and system and give description of product or component.
 - .7 Type lists and notes. Do not hand write.
 - .8 Drawings, diagrams and manufacturers' literature must be legible. Provide with reinforced, punched binder tab. Bind in with text; fold larger drawings to size of text pages.

- .6 Manual Contents:
 - .1 Cover sheet containing:
 - .1 Date submitted.
 - .2 Project title, location and project number.
 - .3 Names and addresses of Contractor, and all Sub-contractors.
 - .2 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.
 - .3 List of maintenance materials.
 - .4 List of spare parts.
 - .5 List of special tools.
 - .6 Original or certified copy of warranties and product guarantees.
 - .7 Copy of approval documents and certificates issued by Inspection Authorities.
 - .8 Copy of reports and test results performed by Contractor as specified.
 - .9 Product Information (PI Data) on materials, equipment and systems as specified in various sections of the specifications. Data to include:
 - .1 List of equipment including manufacturer's name, supplier, local source of supplies and service depot(s). Provide full addresses and telephone numbers.
 - .2 Nameplate information including equipment number, make, size, capacity, model number and serial number.
 - .3 Parts list.
 - .4 Installation details.
 - .5 Operating instructions.
 - .6 Maintenance instructions for equipment.
 - .7 Maintenance instructions for finishes.
- .7 Shop drawings:
 - .1 Include complete set of reviewed shop drawings into each copy of the operations and maintenance manual.

- .2 Fold and bind material professionally in a manner that corresponds with the specification section numbering system.
- .3 When large quantity of data is submitted, place into separate binders of same size as O&M binders.

- .8 Equipment and Systems Data: the following list indicates the type of data and extent of information required to be included for each item of equipment and for each system:
 - .1 Requirements as specified in individual specification sections.

- .9 Materials and Finishes Maintenance Data:
 - .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .2 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
 - .3 Additional Requirements: as specified in individual specifications sections.

END OF SECTION

PART 1 - GENERAL

- 1.1 Related Requirements .1 Section 07 52 00 - Modified Bituminous Membrane Roofing.
- .2 Section 07 62 00 - Sheet Metal Flashing and Trim.
- 1.2 Description .1 This section sets out the requirements for:
- .1 Removal of existing roofing system.
- .2 Removal of wood cants, curbs, blocking and parapets.
- .3 Removal and reinstallation of existing mechanical equipment and curbs.
- .4 Removal of masonry where indicated.
- .5 Removal of metal siding as required to conduct new work, reinstall upon completion and make good finishes as required.
- .2 Installation of new roofing system to be done by roofing sections indicated in Article 1.1 above.
- 1.3 Job Conditions .1 Examine the site and the building and be fully informed as to the requirements of the Contract Documents and applicable codes.
- 1.4 Coordination With Owner .1 Closely coordinate work of this contract with the Departmental Representative. Schedule transportation of new and/or demolished materials and debris with the Departmental Representative. Protection and safety of staff and public, during work of this contract, shall be of utmost importance.
- 1.5 Protection .1 During demolition and removal of existing materials, provide protection to all existing construction. Where localized interior demolition may be required, provide protection to doors, finished rooms and corridors in which materials and debris are carried through. The intent is that all work except the localized interior work will be accessed from the exterior and all debris will be removed without the need for interior access to the building.
- .2 Provide protection pads over existing floor finishes.

- .3 Make good and pay for all damage, at no increase in contract price, due to lack of or inadequate protection.
- 1.6 Disposal of Demolition Debris .1 Demolished materials are to be removed from site and disposed of in an approved disposal site as authorized by Department of Environment and Local Government. Contractors may be requested to provide certified weigh bills or receipts from authorized disposal sites.

PART 2 - PRODUCTS

- 2.1 Materials .1 Refer to drawings and applicable specification sections for materials used to do repair work. Where no material is shown on drawings, use new material to match existing.

PART 3 - EXECUTION

- 3.1 General .1 Departmental Representative will remove all materials they wish to retain prior to demolition/repair work or will identify to the Contractor, items that are to be preserved during demolition.
- .2 Materials resulting from demolition work, except items to be reinstalled and items identified to be retained by Departmental Representative, shall become the property of the Contractor. Dispose of material off site, no burning or selling at the site will be permitted. Carefully remove materials identified to be retained.
- .3 Execute demolition work in a careful and orderly manner with least possible disturbance to the staff, and public.
- .4 Carefully remove materials designated for reinstallation. Store so as not to overload structure.
- .5 Existing ballast to be salvaged and turned over to Departmental Representative. Transportation and stockpiling location onsite to be provided by Departmental Representative.
- 3.2 Services .1 Make arrangements with, and pay for work for gas supplier to alter gas lines.

- .2 Make good liners and insulation on refrigerant lines that are damaged or removed during execution of Work.
- 3.3 Demolition Work - Whole Roof Tear-Off
- .1 Do demolition work indicated on drawings and specified herein.
- .2 Remove existing roofing system to expose deck.
- .3 Clean and prepare roof deck to condition acceptable to CRCA requirements.
- .4 Only remove amount of existing roofing that can be made watertight in same day.

END OF SECTION

PART 1 - GENERAL

- 1.1 References
- .1 ASTM International (ASTM).
 - .1 ASTM E96/E96M-13, Standard Test Methods for Water Vapor Transmission of Materials.
 - .2 Canadian Standards Association (CSA)
 - .1 CSA A82-14, Fired Masonry Brick Made From Clay or Shale.
 - .2 CSA A179-14, Mortar and Grout for Unit Masonry.
 - .3 CAN/CSA A370-14, Connectors for Masonry.
 - .4 CAN/CSA A371-14, Masonry Construction for Buildings.
 - .5 CSA S304-14, Design of Masonry Structures.
- 1.2 Quality Assurance
- .1 Masonry design: to CSA S304-M.
 - .2 Masonry construction: to CAN/CSA A371.
 - .3 National Building Code of Canada 2010.
 - .4 Local ordinances and bylaws.
 - .5 Where the provision of Codes and Standards conflict with the requirements of this specification, the more stringent requirements shall govern.
 - .6 Perform work using qualified masons under direction of an experienced foreman.
- 1.3 Delivery, Storage and Handling
- .1 Deliver materials to job site in dry condition.
 - .2 Keep materials dry until use.
 - .3 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.
- 1.4 Cold Weather Protection
- .1 Cold weather protection shall conform to CAN/CSA A371.
 - .2 Provide and maintain cold weather protection requirements for enclosure and heating of walls.

- .3 Provide sufficient heat and enclosure for storage and mixing of mortar materials to maintain specified temperatures.
- 1.5 Hot Weather Requirements .1 Protect freshly laid masonry from drying too rapidly by means of waterproof, nonstaining coverings.
- 1.6 Protection .1 Keep masonry dry using waterproof, nonstaining coverings that extend over walls and down sides sufficient to protect walls from wind-driven rain, until masonry work is completed and protected by flashings or other permanent construction.
 - .2 Protect masonry and other work from marking and other damage. Protect windows and other completed work from mortar droppings. Use nonstaining coverings.
 - .3 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

PART 2 - PRODUCTS

- 2.1 Mortar and Grout .1 Mortar and grout: CSA A179.
 - .1 Mortar: based on Proportion specifications.
 - .1 Veneer: Type N.
 - .2 Colour match mortar to match existing weathered mortar.
 - .3 Grout: fine grout, to CSA A179, Table 5.
- .2 Use same brands of materials and source of aggregates for entire project.
- 2.2 Masonry Accessories .1 Weep holes:
 - .1 Cellular plastic: honeycomb design, modular sizing; colour as selected by Departmental Representative.
 - .1 Acceptable Materials: Cell Vent by Blok-Lok, QV - Quadro Vent by Hohmann & Bernard, Inc.

- 2.3 Reinforcement .1 Connectors: to CAN/CSA A370 and CSA S304.1.
- .1 Ties: adjustable type, 1.5 mm thick plate complete with fastener to suit backup and 4.76 mm Ø wire tie.
 - .1 Acceptable Materials: BL 407 by Blok-Lok; BL 407 by Hohmann & Bernard, Inc.
- .2 Corrosion protection: to CSA S304.1, galvanized in accordance with CSA S304.1 and CAN/CSA A370.
- 2.4 Masonry Units .1 Face brick: Burned clay brick to CAN/CSA A82.1.
- .1 Appearance classification: Type X
 - .2 Durability classification: Grade - EG (exterior grade).
 - .3 Size: modular, to match existing.
 - .4 Colour and texture: to match existing.

PART 3 - EXECUTION

- 3.1 Preparation .1 Accurately lay out work. Prepare items to build-in as the work proceeds, either supplied and installed by Others or installed under this section.
- .2 Coordinate work of this section with Others, such as electrical trades, miscellaneous metal suppliers, etc.
- 3.2 Mortar and Grout Work .1 Mortar mixing:
- .1 Thoroughly mix mortar using paddle type mixer in good condition.
 - .2 Thoroughly dry-mix sand and cement before adding water. Mix minimum four minutes after all ingredients are added.
 - .3 Use mortar within 2 hours of mixing at temperatures over 25°C, within 3 hours under 25°C.
 - .4 Retempering is permitted within 2 hours of mixing to replace water lost by evaporation.
- 3.3 Reinforcement .1 Install ties in brick at 400 mm o.c. vertically.

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- 3.4 Accessory Installation .1 Install weep hole units in head joints in the first course immediately above all flashing. Space at 600 mm o.c. Keep free of mortar droppings.
- 3.5 Laying BRICK .1 Bond: to match existing.
.2 Coursing height: to match existing.
.3 Jointing: concave.
- 3.6 Cutting and Fitting .1 Do cutting, fitting, drilling, patching and making good for other trades in masonry work.
- 3.7 Lintels and Built-in Work .1 Build in loose and miscellaneous items of steel, and other appurtenances into the masonry work in their proper position as the work proceeds, and set plumb, level, rigid and secure. Take care so as not to damage items being built in.
- 3.8 CLEANING .1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
.2 Clean brick: Protect windows, sills, doors, trim and other work, and clean brick masonry as follows.
.1 Remove large particles with wood paddles without damaging surface. Saturate masonry with clean water and flush off loose mortar and dirt.
.2 Scrub with solution of 25 mL trisodium phosphate and 25 mL household detergent dissolved in 1 L of clean water using stiff fibre brushes, then clean off immediately with clean water using hose. Alternatively, use proprietary compound recommended by brick masonry manufacturer in accordance with manufacturer's directions.
.3 Repeat cleaning process as often as necessary to remove mortar and other stains.

- .4 Use acid solution treatment for difficult to clean masonry as described in Technical Note No.20 by the Brick Industry Association.

END OF SECTION

PART 1 - GENERAL

- 1.1 References
- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A325M-08, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength Metric
 - .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.40-97, Anticorrosive Structural Steel Alkyd Primer.
 - .3 Canadian Standards Association (CSA)
 - .1 CSA W59-13, Welded Steel Construction (Metal Arc Welding).
 - .2 CSA G40.20/G40.21-04 (R2009), General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steels.
- 1.2 Codes and Standards
- .1 Do welding in accordance with CSA W59.
 - .2 Submit written documentation within two weeks after award of contract from the Canadian Welding Bureau certifying that the steel subcontractor is qualified to requirements of CSA W47.1, Division 1 or 2.1.
 - .3 National Building Code of Canada 2010.
- 1.3 Stair Design Criteria.
- .1 Stair construction indicated on drawings is for general arrangement only. Actual design and detailing of stairs is the responsibility of this Section.
 - .2 Design stairs in accordance with National Building Code.
 - .3 Fabricate stairs to support a minimum uniform live load of 4.8 kN/m².
 - .4 Fabricate railing assembly to withstand a minimum uniform live load of 1.5 kN/m applied horizontally and vertically, but not simultaneously, on the top rail.
 - .5 Detail and fabricate stair components not detailed on drawings in accordance with NAAMM Metal Stairs Manual.

- .6 Detail and fabricate stair components in accordance with NAAMM Metal Stairs Manual.
- 1.4 Shop Drawings
- .1 Submit shop drawings for steel stairs.
- .2 Show sections and plans of stairs; dimensions and assembly of components such as: stringers, treads, nosings, risers, headers, platforms, railings, anchors, welded and bolted connections.
- .3 Shop drawings shall bear the seal of the fabricator's engineer, who shall be either registered or licensed to practice within the Province of Nova Scotia.
- .4 Submit shop drawing for review before any fabrication begins.
- 1.5 Delivery, Storage and Handling
- .1 Deliver and store items in a safe manner.
- .2 Deliver the products to the site in the largest practical sections. Tag or mark all items for identification.
- .3 Schedule delivery of products, and arrange storage area with Departmental Representative.
- PART 2 - PRODUCTS
- 2.1 Materials
- .1 Steel plates and rods:
CSA G40.20/G40.21, 300W.
- .2 Rolled structural steel section
material: to CSA G40.20/G40.21, 350W.
- .3 Hollow structural steel (HSS) section
material: to CSA G40.20/G40.21, 350W
Class H.
- .4 Steel pipe: to ASTM A53/A53M, standard weight, galvanized.
- .5 Steel roof deck: minimum base steel thickness, depth and profile as indicated on drawings, non-cellular, overlapping side laps.

- .6 Nuts and bolts:
 - .1 High-strength bolts: to ASTM A325M.
 - .7 Grating: to ANSI/NAAMM MBG 531, steel equal to Standard style, Type 19-4, 25 mm x 4.7 mm bearing bar size, by Fisher & Ludlow.
 - .8 Welding materials: to CSA W59.
 - .9 Welding electrodes: to CSA W48 Series.
 - .10 Prime coat of paint: to CAN/CGSB 1.40.
- 2.2 Workmanship and Fabrication
- .1 Fabricate miscellaneous metal work with structural qualities to withstand strain and stresses to which the item will be subjected.
 - .2 Fit and shop-fabricate the various items of work in sections as large and complete as possible. Make inconspicuous connections, and clearly mark matching surfaces to insure correct reassembly on the site. Do not use paint or grease markers for identifying steel work sections.
 - .3 Fabricate the work true to dimensions, free from distortion and defects detrimental to the appearance and performance. Accurately fit joints and intersecting members with adequate fastening.
 - .4 Shop weld connections where possible; otherwise, bolt connections. Ensure bolts are free of burrs, deformations, discolorations, or other blemishes and of the same material, texture, colour and finish as the base material on which they occur, unless required for structural or safety reasons.

- .5 Drill or punch holes in base and template plates.
- .6 Provide all miscellaneous clips, anchors and necessary accessories.
- .7 Separate dissimilar metals to prevent galvanic corrosion using fibrated paint.
- .8 Grind exposed welds and steel sections smooth.

2.3 Shop Painting

- .1 Thoroughly clean steel work to receive primer in accordance with manufacturer's instructions, and apply one coat, unadulterated, to items with exception of stainless steel, aluminum and galvanized items; surfaces to be embedded in concrete, and machined surfaces.
- .2 Clean surfaces to be field-welded; do not paint.

2.4 Galvanizing

- .1 Prepare irregular shaped items for hot-dipped galvanizing after fabrication as follows:
 - .1 Clip or drill holes at corners, closed ends of pipe and other areas where air may accumulate and prevent acid bath from completely cleaning surfaces.
 - .2 Make provisions in surface that will be hidden from view after installation. If all surfaces to be exposed to view, then obtain approval for location from Departmental Representative.
 - .3 Plug small holes after galvanizing with pear shaped lead, filed off smooth.
 - .4 Provisions for galvanizing shall not be detrimental to strength of item being galvanized.
 - .5 Hot-dip galvanize items in accordance with ASTM A123/A123M; where possible, galvanize after fabrication.
 - .6 Galvanize items indicated.

- 2.5 Miscellaneous Metal Items
- .1 Contractor is responsible for all miscellaneous metal items shown and specified.
 - .2 Refer to drawings for location, layout and details of all miscellaneous items. Work that is existing or supplied by Others is indicated on the drawings.
 - .3 Fabricate items from steel unless noted otherwise.
 - .4 Miscellaneous metal items consist of, but are not limited to the following:
 - .1 Roof deck infill and support framing.
 - .2 Grating stairs:
 - .1 Secure steel grating treads to stringers and supports as indicated. Form landings of steel grating and reinforce as required.
 - .2 Form stringers from MC310 x 15.8 channels as required.

PART 3 - EXECUTION

- 3.1 General
- .1 Take necessary field dimensions where required before fabrication.
 - .2 Repair items with errors in fabrication, or where damaged during installation, to satisfaction of Departmental Representative. If items are beyond repair, replace with new at no increase in Contract Price. Departmental Representative's decision as to repair or replacement is final.
- 3.2 Installation
- .1 Install the work of this section using skilled craftsmen in accordance with the best practice and according to manufacturer's recommendations where applicable.

- .2 Install the work plumb, level and structurally free from defects detrimental to the finished appearance. Install work rigidly and securely.
- .3 Insulate where necessary to prevent electrolysis due to metal-to-metal contact, or contact between metal and masonry or concrete. Use bituminous paint, butyl tape, building paper or other suitable and approved means.
- .4 Provide all drilling of concrete, masonry or other materials for fastening of work specified in this section.
- .5 Touch up bolts, field welds and burned or scratched surfaces with primer.
- .6 Touch up galvanized surfaces with zinc-rich primer where burned by field welding.

END OF SECTION

PART 1 - GENERAL

- 1.1 Related Requirements .1 Section 07 62 00 - Sheet Metal Flashing and Trim.
- 1.2 References .1 American Society for Testing and Materials (ASTM)
.1 ASTM F1667-13, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
.2 Canadian General Standards Board (CGSB).
.1 CAN/CGSB-51.34-M86 AMEND, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
.3 Canadian Standards Association (CSA)
.1 CSA O151-09, Canadian Softwood Plywood.
.4 Underwriters Laboratories of Canada (ULC).
.1 CAN/ULC-S702-14, Standard for Mineral Fibre Thermal Insulation for Buildings.
- 1.3 Quality Control .1 Lumber identification: by grade stamp in accordance with the regulation of the Maritime Lumber Bureau grading rules.
.2 Plywood identification: by grade stamp in accordance with applicable CSA standard.
- 1.4 Delivery and Storage .1 Store materials on site in such a way as to prevent damage, deterioration or the loss or impairment of their structural and other essential properties.
- 1.5 Job Conditions .1 Check job dimensions governing required openings, curb heights, blocking, roughing-in, and fabrication of shop-made components.
.2 Examine site conditions and surfaces for defects of work which may adversely affect the quality of workmanship of this section.
.3 Commencement of work shall imply acceptance of surfaces.

- .4 Be responsible for obtaining all required field dimensions.

PART 2 - PRODUCTS

2.1 Lumber and Plywood

- .1 Lumber: No. 2 or better, SPF species group, S4S, S-dry.
- .2 Furring, blocking, nailing strips, grounds, rough bucks, curbs, fascia backing and sleepers:
 - .1 Board sizes: "Standard" or better grade.
 - .2 Dimension sizes: "Standard" light framing or better grade.
- .3 Softwood plywood: to CSA O151; square edge, select grade exterior plywood.
 - .1 Plywood to be located at all roof openings and edges with a depth of 600mm from edge of existing metal deck.
- .4 Ensure materials are seasoned to a maximum moisture content of 19%.

2.2 Accessories

- .1 Surface-applied wood preservative: copper naphthenate, green coloured, water repellent preservative.
- .2 Batt insulation: stone wool, to CAN/ULC S702; unfaced.
- .3 Nails, spikes and staples: to ASTM F1667.
- .4 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .5 Air/Vapour retarder:
 - .1 Self-adhesive membrane: SBS modified asphalt with cross laminated polyethylene face.
 - .1 Water vapour permeance: 2.8 ng/Pa.m².s (0.05 perms) when tested in accordance with ASTM E96/E96M.
 - .2 Roll width: 457 mm.

- .3 Standard of acceptance:
Perma-Barrier Wall Membrane
by W.R. Grace, Blueskin SA by
Henry Company, Aquabarrier
AVB by IKO, Sopraseal Stick
11T by Soprema.
- .2 Accessories:
 - .1 Primer: emulsion or solvent
type to suit application
temperature. Use emulsion or
low VOC solvent type whenever
possible.
 - .2 Sealant: of type recommended
by air/vapour retarder
manufacturer.
- .6 Polyethylene film: to CAN/CGSB-51.34,
Type 1, 0.15 mm thick.
- .7 Proprietary fasteners: toggle bolts,
expansion shields and lag bolts, screws
and lead or inorganic fibre plugs,
powder actuated fastening devices,
recommended for purpose by manufacturer.

PART 3 - EXECUTION

3.1 Installation

- .1 Install members true to line, levels and
elevations, square and plumb.
- .2 Construct continuous members from pieces
of longest practical length.
- .3 Supply fastening and anchoring devices
for installation into concrete or
masonry, for fastening materials
specified in this section. Installation
of fastening devices into concrete or
masonry shall be by trade concerned.

3.2 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.

3.3 Surface-Applied
Preservative
Treatment

- .1 Treat wood surfaces in contact with
masonry or concrete with wood
preservative before installation.

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- .2 Apply preservative 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 Keep preservative off wood surfaces to which membranes are to be adhered.
- 3.4 Air/Vapour Retarder
- .1 Install material in accordance with manufacturer's instructions.
- .2 Prime surface to receive membrane. Prime only as much area as can be covered by membrane the same working day. Reprime areas not covered in same working day. Apply primer by roller or spray, at rate recommended by manufacturer.
- .3 Cut membrane to fit around penetrations and apply bead of sealant to seal voids which may have been caused by fitting of membrane.
- .4 Overlap horizontal and vertical joints minimum 50 mm.
- .5 Firmly roll entire membrane and seams, using roller, as soon as possible to ensure proper contact. Smoothing/pressing membrane with only hands is not sufficient.
- 3.5 Insulation Installation
- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .2 Fit insulation closely around objects in or passing through insulation.
- .3 Do not compress insulation to fit into spaces.
- .4 Do not enclose insulation until it has been reviewed by Departmental Representative.

3.6 Miscellaneous
Carpentry

- .1 Assemble, erect and make complete, installation of all miscellaneous items of rough carpentry indicated on drawings.
- .2 Install miscellaneous specialties normally installed by the carpenters.

END OF SECTION

PART 1 - GENERAL

- 1.1 Related Sections .1 07 62 00 Flashing associated with roofing.
- .2 07 92 10 Joint Sealing.
- 1.2 References .1 ASTM International (ASTM).
- .1 ASTM A653/A653M-10, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM A792/A792M-10, Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .3 ASTM A924/A924M-10a, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-1.181-99, Ready Mixed Organic Zinc-Rich Coating.
- .2 CAN/CGSB-51.10-92, Mineral Fibre Board Thermal Insulation.
- .3 CAN/CGSB-51.11-92, Mineral Fibre Thermal Insulation Blanket.
- .4 CGSB 71-GP-24M+Amdt-Nov-83, Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation.
- 1.3 Definitions .1 Custom colours: colours not normally produced by the industry and have not been assigned a colour number.
- .2 Special colour range: colours produced by the industry that have been assigned a colour number; but, are more costly to produce than "standard colour range".
- .3 Standard colour range: colours produced by the industry that are currently popular and/or cost effective, and have been assigned a colour number, and are available for the gauge specified. Colours may or may not be in stock by manufacturer.

- .4 Stock colour range: colours in stock by an individual manufacturer for the gauge specified.
- 1.4 Product Data
- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide data on panels, insulation, exposed fasteners, exposed sealants.
- 1.5 Shop Drawings
- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Clearly show elevations, dimensions, type and gauge of material; details at openings, changes in plane and penetrations; spacings; installation method, type of insulation; design loads, and all other relevant details and data. Shop drawings to be stamped by professional engineer licensed to practice in the province of Nova Scotia.
- .3 Shop drawings shall be reviewed by Departmental Representative before fabrication.
- PART 2 - PRODUCTS
- 2.1 Materials
- .1 Galvanized steel sheet: fabricated in accordance with ASTM A653/A653M, having a core of Grade 230 (33) steel; zinc-coated in accordance with ASTM A924/A924M to a Z275 designation; prefinished with paint system as specified below.
- 2.2 Panels
- .1 Metal wall panel: corrugated profile; equal to 7/8" Corrugated by Agway, Corrugated 7/8 by Ideal Roofing or 2-2/3" x 7/8" Corrugated by VicWest Steel.
- .1 Nominal steel thickness: 0.61 mm.
- .2 Depth: 22 mm.
- .3 Module: 68 mm o.c.
- .2 Liner panel: v-rib liner, interlocking joint profile, shop installed seal material one side of interlocking joint; with the following characteristics.
- .1 Nominal steel thickness: 0.61 mm.
- .2 Depth: 4.7 mm.
- .3 Module: 160 mm o.c.

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- 2.3 Paint System
- .1 Fluoropolymer Coating: to AAMA 2605; polyvinylidene fluoride (PVF₂) resin , accounting for 70% of coating; Three-coat system consisting of primer, colour coat and clear top coat.
 - .2 Colour to be selected by Department Representative from custom colour range.
- 2.4 Insulation
- .1 Insulation: mineral fibre insulation, to CAN/ULC S702, semi-rigid board, 56 kg/m³ density,
 - .2 Insulation adhesive: to CGSB 71-GP-24M.
- 2.5 Flashing and Trim
- .1 Flashing and trim: of same material, thickness, finish and colour as panels.
 - .2 Provide all foam closure strips, drip caps, sills, flashings, ridge caps, metal closures and corners shown or required for a complete, watertight enclosure.
 - .3 In addition to above flashings, form and install flashings at transitions of metal wall panels with brick, siding and other cladding material.
- 2.6 Air Barrier
- .1 Air barrier membrane:
 - .1 Material: self-adhesive membrane consisting of modified polyolefin and two layers nonwoven polyethylene, backed with vapour permeable adhesive.
 - .1 Standard of acceptance: Blueskin VP 160 by Henry Company.
 - .2 Tensile strength (to ASTM D828):
 - .1 MD: 182 N.
 - .2 CD: 129 N.
 - .3 Water vapour permeance (to ASTM E96/E96M): 1658 ng/Pa.m².s (29 perms).
 - .4 Air permeability: tested to ASTM E2178.
 - .1 @ 75 Pa pressure: air leakage rate 0.02 L/s.m².

- .5 Surface burning characteristics (to ASTM E84): Class A.
 - .1 Flame spread: 0.
 - .6 Smoke developed: 105
 - .2 Accessories:
 - .1 Primer: polymer emulsion based primer; compatible with membrane.
 - .2 Termination sealant: type as recommended by membrane manufacturer.
- 2.7 Accessories
- .1 Subgirts: Z or U type, fabricated from commercial grade steel with Z275 zinc finish, notched where required for liner panel. Thickness and spacing to suit conditions.
 - .2 Fasteners: stainless steel shank, self-drilling, hex head design, colour to match panel.
 - .1 Washer head: Aluminum-zinc alloy cast or capped head; aluminum or type 303 stainless steel washer. Provide neoprene washer with each fastener.
 - .3 Sealants/tape: as recommended by panel manufacturer for applicable application.
 - .4 Touch-up paint: as recommended by panel manufacturer. Colour to match.
 - .5 Zinc-rich touch-up paint: to CAN/CGSB-1.181 or MPI#18.

PART 3 - EXECUTION

- 3.1 Installation - General
- .1 Installation of panels shall be performed by qualified and experienced personnel. Installation contractor shall be certified by manufacturer.
 - .2 Install in accordance with CSSBI standards, manufacturer's written instructions and shop drawings and as indicated.

- .3 Apply sealant/tape using hidden application unless otherwise directed.
- .4 Where horizontal joints are required, overlap joints in direction of water-flow and make watertight.
- .5 Cut necessary openings for mechanical, electrical and other penetrations and openings. Make joints around penetrating items perfectly tight.
- .6 Install flashing and trim as required for complete, watertight enclosure.
- .7 Use maximum practical length of panel to keep number of end laps to a minimum.
- .8 Install components to allow for thermal expansion and contraction.

3.2 Wall Assembly
Installation

- .1 Install liner sheet to form an air barrier/vapour retarder. Seal side laps using non-drying butyl rubber-based sealant. Attach liner sheet to each structural support using screws. Stitch side laps together at a maximum distance of 600 mm. Seal top of panel to roof vapour retarder membrane. Seal bottom of panel around openings to ensure continuity of building envelope seal.
- .2 Install sub-girt system including thermal breaks. When exterior panels are installed horizontally, fasten vertical sub-girts to structural girt with two (2) screws at each fastening point. Stagger screws and maintain a minimum distance of 19 mm from vertical edge of sub-girt. Proceed in the same fashion to fasten two (2) sub-girts together.
- .3 Install insulation to ensure continuous thermal barrier. Ensure joints are firmly closed. Use adhesive to hold in place. Where two layers are required, stagger joints between first and second layers.

- .4 Install exterior panels with fasteners. Stitch side laps with screws between girts. Use sufficient pressure to install screws without buckling the sheets.
 - .5 Install notched, shaped and waterproof closures in order to protect the exterior components against the effects of the weather.
 - .6 Provide alignment bars, brackets, clips, inserts, shims as required to securely and permanently fasten wall system to building structure.
 - .7 Hem exposed edges of sheet metal, except profiled sheets, a minimum of 13 mm toward the inside. Exposed bare edges are not acceptable.
- 3.3 Adjusting and Cleaning
- .1 Touch up panels with matching paint at all minor paint abrasions.
 - .2 Replace panels damaged beyond repair with new. Departmental Representative's decision as to which panels are to be replaced shall be final.
 - .3 Touch up galvanized supports with zinc-rich touch-up paint where damaged.
- 3.4 Cleaning
- .1 Wash down exposed interior and exterior surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths. Wipe interior surfaces clean as part of final clean-up.
 - .2 Remove excess sealant with recommended solvent.

END OF SECTION

PART 1 - GENERAL

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| 1.1 | Related Requirements | .1 | Section 06 10 00 - Rough Carpentry. |
| | | .2 | Section 07 62 00 - Sheet Metal Flashing and Trim. |
| 1.2 | References | .1 | ASTM International (ASTM). |
| | | .1 | ASTM A123/A123M-13, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products. |
| | | .2 | ASTM C209-12, Standard Test Methods for Cellulosic Fiber Insulating Board. |
| | | .3 | ASTM C1177/C1177M-13, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing. |
| | | .4 | ASTM D41/D41M-11, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing. |
| | | .5 | ASTM D412-06a(2013), Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension. |
| | | .6 | ASTM D570-98(2010)e1, Standard Test Method for Water Absorption of Plastics. |
| | | .7 | ASTM D624-00(2012), Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer. |
| | | .2 | Canadian Standards Association (CSA) |
| | | .1 | CSA A23.1-14, Concrete Materials and Methods of Concrete Construction. |
| | | .3 | Canadian General Standards Board (CGSB) |
| | | .1 | CAN/CGSB 19.24-M90, Multicomponent, Chemical Curing, Sealing Compound. |
| | | .2 | CGSB 37-GP-56M-80 (Amend), Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing. |
| | | .4 | Canadian Roofing Contractors Association (CRCA). |
| | | .1 | CRCA Roofing Specifications Manual. |
| | | .5 | Factory Mutual (FM Global). |

- .6 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC S704-11, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced.

- 1.3 Administrative Requirements
 - .1 Convene pre-installation meeting no later than one week prior to beginning waterproofing Work, with roofing contractor's representative and Departmental Representative.
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades if required.
 - .4 Review manufacturer's installation instructions and requirements.

- 1.4 Action and Informational Submittals
 - .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Provide copies of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
 - .1 Submit product data for roof membranes, asphalt, sealants and roof accessories.
 - .2 Provide copies of WHMIS MSDS in accordance with Section 01 35 29 - Health and Safety Requirements, and indicate VOC content for:
 - .1 Primers.
 - .2 Asphalt.
 - .3 Sealers.
 - .4 Adhesives.

- .3 Shop Drawings:
 - .1 Indicate flashing, control joints, mechanical fasteners and pattern and all related details.
 - .2 Provide layout for tapered insulation.
 - .3 Provide layout of engineered guard rail indicating profiles, sizes, connections, size and type of fasteners and accessories.
 - .4 Submit laboratory test reports certifying compliance of bitumens and membrane and insulation with specification requirements.
 - .5 Submit copy of work order indicating materials have been ordered and delivery dates.
- 1.5 Quality Assurance
- .1 Installer qualifications: company or person specializing in application of modified bituminous roofing systems approved by manufacturer.
- 1.6 Fire Protection
- .1 Fire Extinguishers: maintain one cartridge operated type or stored pressure rechargeable type with hose and shut-off nozzle, ULC labelled for A, B and C class protection. Size 9 kg on roof per torch applicator, within 10 m of torch applicator.
 - .2 Maintain a minimum fire watch for 1 hour after each days roofing operations cease and as according to Hot Works requirement of the Canadian Fire Code (latest edition).
 - .1 During work and at completion of days' work monitor for hot spots on roofs with heat detecting devices.
- 1.7 Delivery Storage and Handling
- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

- .2 Storage and Handling Requirements:
 - .1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.
 - .2 Provide and maintain dry, off-ground weatherproof storage.
 - .3 Store rolls of felt and membrane in upright position. Store membrane rolls with selvage edge up.
 - .4 Remove only in quantities required for same day use.
 - .5 Place plywood runways over completed work and existing roofs not under construction to enable movement of material and other traffic.
 - .6 Store sealants at +5°C minimum.
 - .7 Store insulation protected from daylight and weather and deleterious materials.
 - .8 Handle roofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.

- 1.8 Environmental Requirements
 - .1 Ambient conditions:
 - .1 Do not install roofing when temperature remains below -18°C for torch application.
 - .2 Minimum temperature for solvent-based adhesive is -5°C.
 - .2 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.
 - .3 Disposal of demolished materials are to be removed from site and disposed of in an approved disposal site as authorized by authority having jurisdiction. Contractors may be requested to provide certified weigh bills or receipts from authorized disposal sites.

- 1.9 Warranty
- .1 Provide a written CRCA warranty stating that the installed roofing membrane is warranted against defects and leakage for a period of three (3) years from date of Substantial Completion of project.
 - .2 Contractor shall deliver to the Departmental Representative, prior to Contract signing, a signed and sealed letter stating that he will provide the warranty coverage for his work in accordance with above.
 - .3 The warranty shall state that the entire cost, including labour and materials, of replacing or repairing the roofing membrane shall be borne by the warrantor.
 - .4 Provide a warranty and CRCA preventative maintenance manual before final acceptance of roofing.

PART 2 - PRODUCTS

- 2.1 Performance Criteria
- .1 Compatibility between components of roofing system is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system, meet this requirement.
- 2.2 Deck Covering
- .1 Glass Mat, Gypsum Board: to ASTM C1177/C1177M, FM Class 1, UL 790; mold and moisture resistant; designed specifically as roof board.
 - .2 Fasteners for securing deck covering to metal deck: corrosion-resistant coated #2 Phillips, recessed head screws, complete with 75 mm diameter x 0.80 mm thick galvanized steel plates; Factory Mutual listed.
- 2.3 Vapour Retarder
- .1 Vapour Retarder: SBS sheet, polyester reinforcement weighing 180 g/m², minimum thickness of 2.0 mm ± 0.2 mm; sanded top surface.

- 2.4 Membrane
- .1 Base sheet assembly: SBS sheet factory laminate to recovery board.
 - .1 Base Sheet: to CGSB 37-GP-56M, Styrene-Butadiene-Styrene (SBS) elastomeric polymer prefabricated sheet, fiberglass reinforcement, weighing 180 g/m², minimum thickness of 2.0 mm ± 0.2 mm.
 - .1 Type 1, fully adhered.
 - .2 Grade heavy duty service.
 - .3 Top surfaces:
 - .1 Polyethylene.
 - .2 Recovery board: prefabricated board consisting of mineral filled, high melt point asphalt core between non-woven glass fibre mats, 5 mm thick.
 - .3 Total nominal thickness (membrane and board): 7 mm.
 - .4 Acceptable Products
 - .1 Soprasmart Board 180 by Soprema
 - .2 Protectobase 180 by IKO
 - .2 Fire Seal Membrane: SBS modified bitumen membrane, reinforced, thermofusible plastic film top surface, self-adhering bottom surface with release paper. Provide primer as recommended by manufacturer.
 - .1 Acceptable products:
 - .1 NP180 Tack Sheet by Henry Company.
 - .2 Armourbond Flash by IKO.
 - .3 Sopralene Flam Stick by Soprema.
 - .3 Base Flashing and reinforcing sheet: to CGSB 37-GP-56M Styrene-Butadiene-Styrene (SBS) Elastomeric Polymer, prefabricated sheet, polyester reinforcement, weight 180 g/m², minimum thickness of 3.0 mm ± 0.2 mm.
 - .1 Type 1, fully adhered.
 - .2 Class C - Plain surface.
 - .3 Grade: heavy duty service.

- .4 Top and bottom surfaces.
 - .1 Polyethylene/polyethylene.
- .5 Acceptable products:
 - .1 Modified PLUS NP180P/P by Henry Company.
 - .2 TP-180-FF by IKO.
 - .3 Sopralene Flam 180 by Soprema.
- .4 Cap sheet: to CGSB 37-GP-56M, Styrene-Butadiene-Styrene (SBS) elastomeric polymer prefabricated sheet, polyester reinforcement, weighing 250 g/m², minimum thickness of 5 mm.
 - .1 Type 1, fully adhered.
 - .2 Class A-granule surfaced.
 - .3 Grade heavy duty service.
 - .4 Bottom surface: polyethylene.
 - .5 Acceptable products:
 - .1 Modified PLUS NP 250g T5 by Henry Company.
 - .2 Torchflex TP-250 (5.0) by IKO.
 - .3 Sopralene Mammouth 250 5mm GR by Soprema.
- .5 Cap flashing: same as Cap sheet, 1000 mm wide, unless noted otherwise.
- .6 Expansion joint membrane: torchable waterproofing membrane, copolymer reinforced with polyester reinforcement, 2.0mm overall thickness.
 - .1 Maximum Torching Temp.: 870°C.
 - .2 Water Absorption ASTM D570: <.001%.
 - .3 Tensile Strength ASTM D624: 8.00N/mm.
 - .4 Ultimate elongation ASTM D412: 700%.
 - .5 Acceptable Products:
 - .1 FlamLine by Situra
- 2.5 Isocyanurate (Urethane) Insulation
 - .1 Insulation: to CAN/ULC-S704, Facing to be factory applied kraft paper, CFC free.
 - .1 RSI: 1.05 / 25 mm thickness.
 - .2 Edges: square.
 - .3 Type: 4.

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- .4 Shape: flat and tapered, thickness as indicated on drawings. Boards are to be a maximum of 1220 mm width x 1220 mm length.
 - .5 Taper: as indicated on drawings.
 - .6 Acceptable products:
 - .1 Iso-Mar by ISOX.
 - .2 IKOthem by IKO.
 - .3 ACFoam II by Atlas.
 - .4 E'NRG"Y 3 by Johns Manville.
 - .5 Sopra ISO by Soprema.
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- 2.6 Crickets
- .1 Provide tapered shapes as indicated. Form using tapered polyisocyanurate insulation.
 - .2 Insulation to be by same manufacturer supplying insulation for use at field of roof.
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- 2.7 Adhesives, Primers, AND Sealers
- .1 Adhesives: cold applied trowel grade or low-rise urethane as recommended by manufacturer for materials being adhered.
 - .2 Primers: solvent based, of type recommended by roofing membrane manufacturer for substrate.
 - .3 Modified bitumen mastic: as recommended by roofing membrane manufacturer.
 - .4 Sealing compound: rubber asphalt type.
 - .5 Sealants: to CAN/CGSB 19.24-M.
-
- 2.8 Accessories
- .1 Polyethylene back-up rope: extruded closed cell foam, Shore A hardness 20, tensile strength 140 to 200 kPa, compatible with primers and sealants, oversized 30 to 50%.

- .2 Vent stack covers: telescoping cap and preinsulated flange sleeve of aluminum, sized to suit vents.
 - .1 Acceptable products: SJ-26/27 by Thaler Roofing Specialties Products Inc., VSC-S Series by Lexsuco.
 - .2 Install sleeve 3 mm below vent stack and install sealant to vent stack, place cap onto bead of sealant to seal cap to vent stack over flange. Do not seal cap to vent stack until vent stack installation has been inspected.

- .3 Roof drain: retrofit drain system consisting of seamless aluminum body, cast-aluminum strainer dome, clamping ring and integral or separate mechanical compression seal; drain size to suit existing drain.
 - .1 Acceptable products: Hercules Retrodrain with U-Flow seal by OMG Roofing Products, Flash-Tite Superdrain with Maxxflo drain seal by Lexcor.

- .4 Split flashing:
 - .1 Flashing: two-piece flashing with integral deck flange and sloped cap to divert water away from flashing. Secure parts together using stainless steel clips and screws.
 - .2 Fabricated from: 0.46 mm thick, Type 304 stainless steel to ASTM A240/A240M.
 - .3 Provide continuous EPDM seal:
 - .1 Along entire length of seam, including deck flange.
 - .2 At cap to close-off joint between flashing and penetration.
 - .4 Size: high x diameter/square size to suit.
 - .5 Coat flange with bituminous paint.
 - .6 Acceptable Materials: SPJ-Series by Thaler Metal Industries.

- .5 Guardrail System:
 - .1 Freestanding roof edge projection system, including pipe railings, uprights, bases, counterweights, and fittings all sourced from a single manufacturer. Railing to have galvanized finish.
 - .2 System to be engineered to withstand a minimum load of 200 lbs applied in any direction at any point on the top rail.
- .6 Rubberized Pipe Supports
 - .1 100% recycled, UV resistant rubber support with associated galvanized plates, channels, clips, clamps, and fasteners as required to fully support piping. Materials to be sourced from single manufacturer. Quantity and spacing as required supporting pipe within the rubberized roof top support unit's maximum load capacity as specified by manufacturer.
- .7 Securement bar: extruded aluminum.
- .8 Liquid Applied Flashing: Bitumen/polymer waterproofing mono-component resin and polyester reinforcing.
 - .1 Acceptable Products: Alsans
Flashing by Soprema, MS Detail by IKO.

PART 3 - EXECUTION

3.1 Quality of Work

- .1 Do examination, preparation and roofing work in accordance with applicable, standard in Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual, except where specified otherwise.
- .2 Do priming for asphalt roofing in accordance with manufacturers written instructions.
- .3 Fit interface of walls and roof assemblies with durable rigid material, sheet metal or plywood, providing connection point for continuity of air barrier.

3.2 Protection

- .1 Cover walls and adjacent work where materials hoisted or used.
- .2 Use warning signs and barriers. Maintain in good order until completion of work.
- .3 Clean off drips and smears of bituminous material immediately.
- .4 Dispose of rain water off roof and away from face of building until roof drains installed and connected.
- .5 Protect all roof areas from traffic and damage. Comply with precautions deemed necessary by Departmental Representative.
- .6 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed work and materials out of storage.
- .7 Metal connectors and decking will be treated with rust proofing or galvanization.

3.3 Examination Roof Decks

- .1 Notify Departmental Representative 48 hours prior to exposure of existing roof deck and/or removal of roof materials.
- .2 Inspect with Departmental Representative roof deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed. Report in writing any defects in structure or differences from details.

- .3 Prior to starting work ensure:
 - .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris.
 - .2 Cants, curbs, dividers and blocking are secure.
 - .3 Roof drains have been installed at proper elevations relative to finished roof surface. Verify that drains are at low point of roof elevation. Notify Departmental Representative if drains are not at proper elevation to allow water drainage.
 - .4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.
 - .5 Members true to line, levels and elevations, square and plumb.
 - .6 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
 - .7 Bolts are countersunk where necessary.
- .4 Conduit located under metal deck:
 - .1 Identify the location of existing conduit below metal deck **prior to** the installation of deck covering so as to avoid damage to wiring and/or conduit.
 - .2 To reduce down time to tenants daily operations, have electrician on site during installation of gypsum board to make repairs to wiring/conduit that gets damaged.
 - .3 Costs for electrician and repair of wiring/conduit damaged during execution of this work shall be at no increase in contract price.
- .5 Do not install roofing materials during rain or snowfall.

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- 3.4 Preparation of Concrete Deck .1 Ensure concrete substrate is clean and dry prior to roof installation.
- 3.5 Preparation of Steel Deck .1 Mechanically fasten deck covering to top flanges of steel deck using screws. A 2440 mm x 1220 mm sheet to have a minimum 10 fasteners per sheet in field of roof, 16 fasteners at perimeters and 32 fasteners in the exterior corners.
- .2 Place with long axis of each gypsum sheet transverse to steel deck top flanges, with end joints staggered and fully supported on ribs
- 3.6 Vapour Retarder .1 Apply torchable vapour retarder and with manufacturer's instructions and CRCA standards.
- 3.7 Fire Seal Membrane .1 Install fire seal membrane at all exposed wood and combustibles starting at the vapour barrier and covering the entire curb. Ensure wood is not exposed to flame. Prime wood surface with primer as recommended by manufacture. Fasteners maybe used to ensure a good adherence. Fire seal membrane is an underlay for the standard torch applied base sheet flashing and is to provide a continuous fire seal at wall/curb and roof junctions.
- 3.8 Roof/Wall Junction .1 Notify Departmental Representative 48 hours prior to covering thru-wall flashings to allow inspection.
- .2 Inspect with the Departmental Representative and examine thru-wall flashings and report in writing any defects in structure or differences from details. Inspection will review water-tightness of membrane at thru-wall prior to installing siding material or masonry and metal flashings.

- 3.9 Exposed Membrane Roofing Application
- .1 Insulation application.
 - .1 Clean dust and loose fibres from insulation to promote better adhesion.
 - .2 Adhere insulation in accordance with manufacturer's instructions using adhesive type and application rates recommended by manufacturer. Increase adhesive at perimeter and corner locations.
 - .3 Install tapered insulation as second layer in accordance with shop drawings. Stagger joints between layers 150 mm minimum.
 - .2 Base Sheet Assembly.
 - .1 Fully adhere over insulation, as per manufacturer's instructions.
 - .2 Stagger joints minimum of 25 mm from insulation joints.
 - .3 Butt tight to adjacent boards without gaps.
 - .4 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.
 - .5 Application to be free of blisters, wrinkles and fishmouths.
 - .3 Cap sheet application.
 - .1 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.
 - .2 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.
 - .3 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet
 - .4 Application to be free of blisters, fishmouths and wrinkles.
 - .5 Do membrane application in accordance with manufacturer's recommendations.
 - .4 Flashings.
 - .1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.
 - .2 Nail and torch flashing base sheet and torch flashing cap sheet onto substrate in 1 metre wide strips.

- .3 Lap flashing base sheet to membrane base sheet minimum 200 mm and seal by torch welding.
 - .4 Lap flashing cap sheet to membrane cap sheet 150 mm minimum and torch weld.
 - .5 Provide 75 mm minimum side lap and seal.
 - .6 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.
 - .7 Do work in accordance with manufacturer's recommendations.
- .5 Expansion joint installation:
- .1 Factory vulcanize corners to suit site conditions.
 - .2 Confirm that expansion joint membrane conforms to site conditions prior to installation.
 - .3 Ensure that expansion joint is clean and free of debris.
 - .4 Pack joint with compressible batt insulation.
 - .5 Align expansion joint membrane in the centre of expansion joint.
 - .6 Heat base sheet membrane and embed expansion joint membrane into base sheet membrane.
 - .7 Flash expansion joint membrane with base sheet flashing.
- 3.10 Roof Penetrations
- .1 Vent stack covers
 - .1 Set in mastic on top of base sheet.
 - .2 Install reinforcing sheet over flange, ensuring it extends 150 mm beyond.
 - .3 Torch cap sheet over reinforcing sheet and seal joint between vent stack cover and cap sheet.
 - .4 Install sleeve 3 mm below vent stack and install sealant to vent stack. Place cap into bead of sealant to seal cap to vent stack cover.
 - .5 Installation of cap to vent stack cover is to be done after vent stack insulation has been reviewed by the Departmental Representative.

- .2 Roof drain:
 - .1 Insert drain seal in drain stem and tighten enough to hold seal in place.
 - .2 Install assembled drain into existing leader pipe until flange lies flush on roof membrane.
 - .3 Secure drain flange to roof deck/nailer using a minimum of three pan-head fasteners, evenly spaced around flange.
 - .4 Tighten drain seal to provide positive seal
 - .5 Place clamping ring over metal studs. Install stainless steel nut and lock washers tightening clamping ring against membrane flashing until secure.
 - .6 Install strainer dome and fasten in place.
 - .7 Insulate drains using low-expansion foamed-in-place polyurethane insulation.
 - .3 Install other roof penetration flashings and seal to membrane in accordance with the manufacturer's recommendations and details.
- 3.11 Field Quality Control
- .1 Inspection and testing of roofing application may be carried out by testing laboratory designated by Departmental Representative. Costs of inspection and testing will be paid by Departmental Representative.
- 3.12 Cleaning
- .1 Remove bituminous markings from finished surfaces.
 - .2 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their documented instructions.
 - .3 Repair or replace defaced or disfigured finishes caused by work of this section.

PART 1 - GENERAL

- 1.1 Related Requirements
- .1 Section 06 10 00 - Rough Carpentry: Wood cants and curbs.
 - .2 Section 07 52 00 - Modified Bituminous Membrane Roofing.
 - .3 Section 07 92 10 - Joint Sealing.
- 1.2 References
- .1 ASTM International (ASTM).
 - .1 ASTM A653/A653M-13, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A924/A924M-13, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 - .3 ASTM C920-14, Specification for Elastomeric Joint Sealants.
 - .4 ASTM F1667-13, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
 - .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
 - .2 CGSB 37-GP-9Ma, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
- 1.3 Definitions
- .1 Custom colours: colours not normally produced by the industry and have not been assigned a "QC" number.
 - .2 Special colour range: colours produced by the industry that have been assigned a "QC" number, but are more costly to produce than "standard colour range".
 - .3 Standard colour range: colours produced by the industry that are currently popular and/or cost effective, and have been assigned a "QC" number. Colour is independent of gauge of steel.
 - .4 Stock colour range: colours stocked by an individual manufacturer for the gauge specified.

- 1.4 Action and Informational Submittals
- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish.
 - .3 Submit shop drawings for metal enclosure and scupper.
- 1.5 Delivery, Storage and Handling
- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Prevent contact of dissimilar metals during storage, and protect from corrosive materials and elements.

PART 2 - PRODUCTS

- 2.1 Metal Materials
- .1 Galvanized steel sheet: fabricated in accordance with ASTM A653/A653M, having a core of Grade 230 (33) steel; zinc-coated in accordance with ASTM A924/A924M to a Z275 designation; prefinished with polyester coating system.
 - .1 Thickness: 0.76 mm base thickness steel.
- 2.2 Accessories
- .1 Isolation coating: alkali resistant bituminous paint.
 - .2 Asphalt primer: to CGSB 37-GP-9M.
 - .3 Plastic cement: to CAN/CGSB-37.5-M.
 - .4 Cleats/hook strip: of same material and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
 - .5 Fasteners: to ASTM F1667, flat head roofing nails, of length and thickness suitable for flashing application; of same material as sheet metal.

- .6 Washers: of same material as sheet metal, 1.6 mm with rubber packings.
- .7 Exposed screws: zinc coated steel, head colour same as exterior sheet, dished steel/neoprene washer; 25 mm long.
- .8 Sealant: silicone, to ASTM C920, Type S, Grade NS, uses NT, G, M, A and O.

2.3 Finishes

- .1 Silicone modified polyester.
 - .1 Acceptable products: WeatherX by VicWest, Perspectra Series by Dofasco, Perspectra Series by Baycoat.
 - .2 Coating thickness: exposed surface 0.025 mm ± 0.002 mm; unexposed surface to have washcoat finish.
 - .3 Colour: as selected by Departmental Representative from custom range.

2.4 Fabrication

- .1 Fabricate metal flashings to profiles indicated.
- .2 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 13 mm. Miter and seal corners with sealant.
- .4 Use flat lock seam joints, unless otherwise shown.
- .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.

PART 3 - EXECUTION

3.1 Manufacturer's Instructions

Compliance: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

- 3.2 Installation
- .1 Install flashings as detailed.
 - .2 Use prefinished galvanized steel flashings where existing flashing was prefinished; aluminum flashings where existing flashings were aluminum.
 - .3 Coat flanges of flashing with asphalt primer before embedding into roofing.
 - .4 Nail flashing at 150 mm o.c.; stagger nails.
 - .5 Use concealed fastenings except where approved before installation.
 - .6 Provide lock seam joints for all flashing at 2400 mm sections and lock seam slip joints every 4800 mm. Provide lock seam joints at exterior corners. Apply sealant to completely fill joints.
- 3.3 Adjust and Clean
- .1 Clean all flashing surfaces after installation. Do not use solvents detrimental to roofing membrane or roofing components.
 - .2 Remove all fasteners, metal clippings, etc., from roof surfaces and site.

END OF SECTION

PART 1 - GENERAL

- 1.1 Related Requirements
- .1 Section 07 52 00 - Modified Bituminous Membrane Roofing: caulking associated with roofing.
 - .2 Section 07 62 00 - Sheet Metal Flashing and Trim: caulking associated with metal flashings.
- 1.2 References
- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- 1.3 Submittals
- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Manufacturer's product shall describe.
 - .1 Required primers.
 - .2 Sealing compound.
 - .3 Submit manufacturer's instructions for each product used.
- 1.4 Delivery, Storage, and Handling
- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 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.
- 1.5 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 5°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.
- 1.6 Environmental Requirements
- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

PART 2 - PRODUCTS

- 2.1 Sealant Materials
- .1 Sealants and caulking compounds shall:
- .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 Sealant and caulking compounds must not be formulated or manufactured with: aromatic solvents, fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, barium or their compounds, except barium sulfate.
- .3 Sealant and caulking compounds must contain total VOC content (volatile organic compounds) that do not exceed the requirements of the California South Coast Air Quality Management District (SCAQMD) Rule #1168.

- .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 In the selection of the products and materials of this section preference will be given to those with the following characteristics: Water based, water soluble, water clean-up, non-flammable, low Volatile Organic Compound (VOC) content, manufactured without compounds which contribute to ozone depletion in the upper atmosphere, manufactured without compounds which contribute to smog in the lower atmosphere, does not contain methylene chloride, does not contain chlorinated hydrocarbons.
- 2.2 Sealant Material Designations
- .1 Urethanes Two Part.
 - .1 Non-Sag to CAN/CGSB 19.24, Type 2, Class B.
 - .2 Colour: as selected by Departmental Representative.
 - .2 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 Bond Breaker Tape.
 - .1 Polyethylene bond breaker tape which will not bond to sealant.
- 2.3 Joint Cleaner
- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
 - .2 Primer: as recommended by manufacturer.
- 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 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.
- .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 Sealant
Application

- .1 Apply sealant where indicated.
- .2 Apply sealant in accordance with manufacturer's written instructions.
- .3 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
- .4 Apply sealant in continuous beads.
- .5 Apply sealant using gun with proper size nozzle.

- .6 Use sufficient pressure to fill voids and joints solid.
- .7 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
- .8 Tool exposed surfaces before skinning begins to give slightly concave shape.
- .9 Remove excess compound promptly as work progresses and upon completion.

3.7 Curing

- .1 Cure sealants in accordance with sealant manufacturer's instructions.
- .2 Do not cover up sealants until proper curing has taken place.

3.8 Cleanup

- .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 Related Requirements
- .1 06 10 00 - Rough Carpentry: Insulating shim space.
 - .2 07 92 00 - Joint Sealing.
 - .3 08 80 00 - Glazing.
- 1.2 References
- .1 ASTM International (ASTM).
 - .1 ASTM A123/A123M-13, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A653/A653M-13, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .3 ASTM E283-04, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - .4 ASTM E331-00, Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 - .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 19.24-M90, Multicomponent, Chemical Curing, Sealing Compound.
 - .2 CAN/CGSB 79.1-M91, Insect Screens.
 - .3 Canadian Standards Association (CSA)
 - .1 AAMA/WDMA/CSA 101/I.S.2/A440-08 - NAFS - North American Fenestration Standard / Specification for Windows, Doors, and Skylights.
 - .4 Underwriters Laboratories of Canada (ULC).
 - .1 CAN/ULC-S702-14, Standard for Mineral Fibre Thermal Insulation for Buildings.

1.3 Curtain Wall
Performance
Requirements

- .1 Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with National Building Code.
- .2 Design and size components to withstand seismic loads and sway displacement as calculated in accordance with National Building Code.
- .3 Limit mullion deflection to $L/175$; with full recovery of glazing materials.
- .4 Provide system to accommodate, without damage to components or deterioration of seals:
 - .1 Movement within system.
 - .2 Movement between system and perimeter framing components.
 - .3 Dynamic loading and release of loads.
 - .4 Deflection of structural support framing.
 - .5 Shortening of building concrete structural columns.
 - .6 Creep of concrete structural members.
- .5 System to provide for expansion and contraction within system components caused by a cycling temperature range of 95°C over a 12 hour period without causing detrimental effect to system components.
- .6 Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.
- .7 Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound or other method acceptable to Departmental Representative. Position thermal insulation on exterior surface of air barrier and vapour retarder.

- .8 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.
- 1.4 Submittals
- .1 Submit in accordance with Section 01 33 00 - Submittals.
 - .2 Submit shop drawings clearly indicating:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia, Canada.
 - .2 Materials, dimensions, gauges, profiles, finishes.
 - .3 Elevations and dimensions of units.
 - .4 Large scale details (half-scale or full-scale) at head, jamb and sill. Include installation and anchorage information. Show actual wall construction for each window installation. Show tie-in with air/vapour retarder systems.
 - .5 Complete glazing system including glazing, drain/weep hole locations, heel/toe beads, glazing tapes, gaskets, cap beads.
 - .6 Other relevant details and information required for proper installation.
 - .3 Submit product data for:
 - .1 Window frames.
 - .2 Technical data for finishes including thickness.
- 1.5 Test Reports
- .1 Submit test reports from approved independent testing laboratories, certifying compliance with specifications, for:
 - .1 Window classifications: as specified below.
 - .2 Air tightness.
 - .3 Water tightness.
 - .4 Wind load resistance.
 - .5 Condensation resistance.

- 1.6 Maintenance Data
- .1 Provide operation and maintenance data for windows for incorporation into maintenance manual.
- 1.7 Waste Management and Disposal
- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .3 Divert unused caulking material from landfill to official hazardous material collections site approved by Departmental Representative.
- .4 Plastic caulking tubes are not recyclable and must not be diverted for recycling with other plastic materials.
- 1.8 Warranty
- .1 Contractor hereby warrants aluminum windows against air leakage, water leakage and for wind load resistance (in accordance with AAMA/WDMA/CSA 101/I.S.2/A440), defects, broken and loose hardware and malfunction under normal usage.
- .2 Leaking, fading and discolouration, deforming shall be judged as defective work.

PART 2 - PRODUCTS

- 2.1 Curtain Wall System
- .1 Curtain wall system:
- .1 Standard of acceptance: 3300 Series by Anotec, 2200 Series by Alumicor, 1602 Wall by Kawneer.
- .2 Mullions and horizontals: minimum beam size 45 mm wide x 92 mm deep.
- .3 Exterior cap: snap-on type, 19 mm high.
- .4 Pressure plate: extruded aluminum.

- .5 Pocket filler: rigid PVC.
 - .6 Door adapters: complete with weather-stripping for exterior and vestibule doors.
- 2.2 Performance Requirements
- .1 Curtain wall performance: comply with the following requirements.
 - .1 Air in or ex-filtration: maximum of $0.0003 \text{ m}^3/\text{s}\cdot\text{m}^2$ when tested in accordance with ASTM E283, at 75 Pa pressure difference.
 - .2 Water infiltration: none, when tested in accordance with ASTM E331, with pressure differential of 480 Pa.
 - .3 Thermal performance: no condensation shall form on any interior surface of aluminum before any condensation forms on exposed area of a 25 mm insulating glass unit.
- 2.3 Materials
- .1 Aluminum: Aluminum Association alloy 6063-T5.
 - .2 Fasteners: Series 300 stainless steel or 400 series stainless steel, cadmium plated, of sufficient strength to perform the function for which they are intended.
 - .3 Thermal break: polyvinylchloride.
 - .4 Weathering and glazing splines: extruded black neoprene of Durometer appropriate for the function.
 - .5 Sealant: multi-component urethane to CAN/CGSB 19.24-M, Type 2, Class B.
 - .6 Glazing material: as specified in Section 08 80 00.

- .7 Insulation: fibreglass batt, expanded polystyrene or foamed-in-place urethane.
- .8 Sill: extruded aluminum, size as required; finish to match frame.
 - .1 Standard of acceptance: ASL series by Unique.
- 2.4 Isolation Coating
 - .1 Isolate aluminum from following components, by means of isolation coating:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
 - .2 Concrete, mortar and masonry.
- 2.5 Air / Vapour Retarder
 - .1 Equip frames with strip of air / vapour barrier material for tying into wall air / vapour barrier as follows:
 - .1 Material: identical to, or compatible with, building air barrier and vapour retarder materials noted in Section 06 10 00: to provide required air tightness and vapour diffusion control throughout exterior envelope assembly.
 - .2 Material width: adequate to provide required air tightness and vapour diffusion control to building air / vapour retarder from interior.
- 2.6 Finish
 - .1 Aluminum:
 - .1 Clear anodized: give exposed aluminum surfaces an anodic oxide treatment to obtain an Aluminum Association Architectural Class 1 coating (0.0.8 mm); designation AAM12C22A41.
- 2.7 Fabrication - General
 - .1 Shop drawings shall be reviewed before any fabrication begins.

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| .2 | Accurately fabricate and fit components in the shop in accordance with details and reviewed shop drawings. | .5 | assemble and seal joints to provide neat, weather tight joinery. When units are too large to handle or ship fully assembled, temporarily assemble unit in shop and mark pieces for reassembly in field. Disassemble unit to allow for shipping and handling. |
| .3 | Build units square, true, accurate to size, free from distortions, waves, twists, buckles and other defects detrimental to appearance and performance. | .6 | Insulate joints of unlike materials with bituminous paint to prevent electrolytic action or chemical action. |
| .4 | Accurately machine, fit, | .7 | Assemble framing by means of screws driven through the walls and into integrally extruded screw channels of abutting sections. |
| .8 | | .8 | Provide weep/drain holes to from glazing cavity to outside to provide "rain-screen" system. Quantity of holes as recommended by window manufacturer. |
| <u>2.8 Curtain Wall System Fabrication</u> | | .1 | All horizontal members must form individually pressure equalized and sealed gutter members. |
| | | .2 | Provide and design vertical expansion and construction joints for baffled overlaps with a compressed resilient air seal laid in between mullion ends. |
| | | .3 | Structural anchors shall have three-way adjustment and be welded after curtain wall alignment. Field paint touch-up shall follow welding operation. |

- .4 Prepare frame to accommodate glazing as specified in Section 08 80 00.

PART 3 - EXECUTION

3.1 Installation

- .1 Install work plumb, square, level, free from warp, twist and superimposed loads.
- .2 Install shims at quarter points directly below setting blocks. Cut shims back from face of frame to allow installation of backer rod and sealant.
- .3 Securely anchor windows to contiguous work where indicated or as required. Use concealed fixings where possible; otherwise, use colour-matched flat-head screws in countersunk holes.
- .4 Air/vapour retarder to frame connection curtain walls.
 - .1 Curtain wall frames require connection to air/vapour retarder to maintain continuity of air/vapour retarder assembly. Connection may be achieved by either of the following methods:
 - .1 Install interface sheet between frame and frame extension at window; or into glazing pocket of curtain wall. Seal interface sheet to air/vapour retarder membrane or transition sheet as applicable.
 - .2 If installation of air/vapour retarder permits, extend air/vapour retarder membrane directly between frame and frame extension of window or into glazing pocket of curtain wall.
- .5 Insulate perimeter frame with spray-foam insulation. Take care when installing insulation to ensure no voids remain.
- .6 Install sill under uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces.

- .7 Site tolerances:
 - .1 Maximum variation from plane: 3 mm in 3600 mm of length up to not more than 13 mm in total length, whichever is less.
 - .2 Maximum misalignment of two adjoining members abutting in plane: 0.8 mm.
 - .3 Maximum sealant space between curtain wall and adjacent construction: 13 mm.

3.2 Glazing -
General

- .1 Check openings before glazing to make certain opening is square, plumb and secure. Seal each butt, and mitre joint of interior with small bead of sealant.
- .2 Thoroughly wipe surfaces receiving glazing materials with a clean cloth dampened with xylol or MEK. Wipe dry with a clean, dry cloth.
- .3 Use setting blocks of suitable size at quarter points.
- .4 Ensure glazing unit is centred in opening and that metal surround is not exposed above stop.

- .5 Select glazing system in consultation with frame and sealant manufacturer and submit to Departmental Representative for review of shop drawing stage.
 - .1 Dry/dry application incorporating compression gasket at fixed stop, continuous heel bead of acrylic sealant and dense gasket on removable stop. Cap exterior gasket with silicone if gasket has flat top.
 - .2 Wet/dry application incorporating preshimmed glazing tape and silicone cap bead at exterior, continuous heel bead of acrylic sealant and dense gasket at interior.
 - .3 Wet/wet application incorporating preshimmed glazing tape and silicone cap bead at exterior, continuous heel bead of acrylic sealant, continuous spacer shim and silicone cap bead at interior.
 - .4 Do not place cap bead during winter construction. Only apply cap bead during spring, summer or fall.

3.3 Caulking

- .1 Prepare joint and apply sealant in accordance with Section 07 92 00. Conceal sealant within aluminum work where possible. Fillet joint will not be acceptable.
- .2 Caulking of exterior joints between exterior insulation system and windows shall be by exterior insulation installer.
- .3 All interior joints, and exterior joints other than specified in .3 above, shall be caulked under this section.

END OF SECTION

PART 1 - GENERAL

- 1.1 Related Requirements .1 07 92 10 - Joint Sealing.
- .2 08 50 00 - Aluminum Curtain Wall.
- 1.2 References .1 American National Standards Institute (ANSI).
- .1 ANSI Z97.1-2009, Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
- .2 ASTM International (ASTM).
- .1 ASTM C920-14, Specification for Elastomeric Joint Sealants.
- .3 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
- .2 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.
- .3 CAN/CGSB-12.8-97, Insulating Glass Units.
- .4 CAN/CGSB-12.10-M76, Glass, Heat and Light Reflecting.
- .5 CAN/CGSB 19-GP-5M, Sealing Compound, One Component, Acrylic Base, Solvent Curing.
- .4 Underwriters Laboratories (UL).
- .1 UL 10C-2009, Standard for Positive Pressure Fire Tests of Door Assemblies.
- .5 Underwriters Laboratories of Canada (ULC).
- .6 CAN/ULC S104-10, Standard Method for Fire Tests of Door Assemblies.
- .1 CAN4-S106-M80(R1985), Standard Method for Fire Tests of Window and Glass Block Assemblies.
- 1.3 Quality Assurance .1 Insulating glass unit manufacturer shall be a current member of the Insulated Glass Manufacturers Association of Canada (IGMAC).
- 1.4 Performance Requirements .1 Provide continuity of building air barrier/vapour retarder using glass and glazing materials as follow:

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- .2 Utilize inner light of multiple light sealed units for continuity of air barrier/vapour retarder.
- 1.5 Action and Informational Submittals
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- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for glass, sealants, and glazing accessories and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
- .1 Submit for review and acceptance of each unit.
- .2 Submit duplicate 300 mm x 300 mm size samples of Low-E coating.
- .3 Labeling: Label each sample with following information:
- .1 Insulating glass unit:
- .1 Product information: Glass type, thickness, coating, spacer type and thickness.
- .2 Performance information: Shading coefficient, solar heat gain, visible light transmittance, winter U-Value.
- .4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .5 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .1 Submit testing analysis of glass.

- 1.6 Protection .1 Protection of glass during shipping, storage and installation shall be the responsibility of this trade. After installation and acceptance of glass and glazing work by the Departmental Representative, the Contractor shall be responsible for protection and replacement of glass.
- 1.7 Maintenance Instructions .1 Provide maintenance data for cleaning of glass for incorporation into manual specified in Section 01 77 00 - Closeout Procedures.
- 1.8 Warranty .1 Contractor hereby warrants insulating glass units for five (5) years against:
- .1 Dusting or film formation on the internal glass surfaces caused by failure of hermetic seal other than through glass breakage.
 - .2 Glass breakage due to improper installation.

PART 2 - PRODUCTS

- 2.1 Glass .1 Glass: to applicable standard listed below.
- .1 Label each glass lite in accordance with applicable CGSB standard.
 - .2 Safety glass: to CAN/CGSB-12.1-M, Type 2 - tempered Class B.
 - .3 Float glass: to CAN/CGSB-12.3-M.
 - .4 Insulating glass unit: to CAN/CGSB-12.8.
 - .5 Low-E glass: Glass type as specified in glazing schedule.
 - .1 Metallic coating: soft, sputtered.
 - .2 Properties (base upon two 6 mm lites clear glass, argon fill, Low-E coating on 2nd surface).
 - .1 Light transmittance: 69% ± 1%.
 - .2 Shading coefficient: 0.45 ± 0.01.
 - .3 Solar heat gain coefficient: 0.39 ± 0.01.

- .4 U-Value (night time/winter):
0.24 ± 0.01.
- .5 Acceptable Materials: LoE²-
272 by Cardinal Glass,
Comfort TiAC40 by AGC,
Solarban 60 by PPG.

2.2 Glazing Material

- .1 Acrylic sealant: to CAN/CGSB 19-GP-5M.
- .2 Sealant: silicone, to ASTM C920, Type
S, Grade NS, Class 35, uses NT, G, M, A
and O.
- .3 Glazing tape: polyisobutylene; shimmed
or unshimmed.
- .4 Glazing points and wire spring clips:
corrosion resistant, manufacturer's
standard.

PART 3 - EXECUTION

3.1 Examination

- .1 Verification of Conditions: verify
conditions of substrates previously
installed under other Sections or
Contracts are acceptable for glazing
installation in accordance with
manufacturer's written instructions.
 - .1 Verify that openings for glazing
are correctly sized and within
tolerance.
 - .2 Verify that surfaces of glazing
channels or recesses are clean,
 - .3 free of obstructions, and ready to
receive glazing.
 - .4 Visually inspect substrate in
presence of Departmental
Representative.
 - .5 Inform Departmental Representative
of unacceptable conditions
immediately upon discovery.
 - .6 Proceed with installation only
after unacceptable conditions have
been remedied and after receipt of
written approval to proceed from
Departmental Representative.

3.2 Preparation

- .1 Clean contact surfaces with solvent and
wipe dry.
- .2 Seal porous glazing channels or recesses
with substrate compatible primer or
sealer.

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- .3 Prime surfaces scheduled to receive sealant.
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- 3.3 Cleaning
- .1 Remove labels from glass at time of installation except as specified below.
 - .2 Have Departmental Representative review labels on Low-E glass before removing labels.
 - .3 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .1 Remove traces of primer, caulking.
 - .2 Remove glazing materials from finish surfaces.
 - .3 Remove labels.
 - .4 Clean glass using approved non-abrasive cleaner in accordance with manufacturer's instructions.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .4 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
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- 3.4 Protection
- .1 Protect installed products and components from damage during construction.
 - .2 After installation, mark each light with an "X" by using removable plastic tape or paste.
 - .1 Do not mark heat absorbing or reflective glass units.
 - .3 Repair damage to adjacent materials caused by glazing installation.

- 3.5 Glazing Schedule .1 Supply only, glass for the following.
- Supply Only Installation under respective sections.
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- .2 Aluminum windows: insulating glass unit
consisting of 6 mm thick clear Low-e
exterior lite, 13 mm air space, and 6 mm
thick clear tempered interior lite.

END OF SECTION
