

Austin Works Yard Fleet Maintenance Building Repurpose

500 Mariner Way
Coquitlam, BC V3K 7B6

Specifications

Thinkspace Project No. 241072
Owner / Client Project No. 51104

Issued for RFP
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Coordinating Registered Professional.

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END OF SECTION

DRAWING NO. DESCRIPTION REVISION NO.

ARCHITECTURAL DRAWINGS

A000 COVER SHEET
A010 CODE & BYLAW REVIEW
A070 SITE PLAN
A100 LEVEL 1 FLOOR PLAN - DEMOLITION
A101 DEMOLITION – EXISTING PICTURES
A110 LEVEL 1 FLOOR PLAN – CONSTRUCTION
A120 LEVEL 2 FLOOR PLAN – CONSTRUCTION
A140 ROOF PLAN – CONSTRUCTION
A300 EXTERIOR ELEVATIONS – CONSTRUCTION
A400 BUILDING SECTION, WALL SECTION AND DETAILS
A410 DETAILS
A500 WASHROOM
A600 DOOR SCHEDULE

STRUCTURAL DRAWINGS

S101 GENERAL NOTES AND TABLES
S201 LEVEL 1 FLOOR PLAN AND DETAILS

MECHANICAL DRAWINGS

M1.0 MECHANICAL SITE PLAN & COVER SHEET
M2.0 LEVEL 1 FLOOR PLAN – MECHANICAL DEMO
M2.1 LEVEL 2 FLOOR PLAN – MECHANICAL DEMO
M2.2 ROOF PLAN – MECHANICAL DEMO
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M5.1 MECHANICAL SPECIFICATIONS

ELECTRICAL DRAWINGS

E-101 SITE PLAN
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E-207 ROOF PLAN
E-301 ONE LINE DIAGRAM
E-401 SCHEDULES
E-501 SPECIFICATIONS

END OF SECTION

Section 011000
General Requirements

DIVISION 01 GENERAL REQUIREMENTS

1.01 DRAWINGS/NOTES/SPECIFICATIONS

- .1 Project to be built to Building Code as noted on Drawings.
- .2 Preparation of documents assumes knowledge of experienced and reputable contractors, manufacturers, supply specialists who shall be held responsible for providing the proper products and procedures for the work in accordance with the intent of these specifications. Where the intent is unclear, inform the Consultant immediately.
- .3 Refer to 09 06 00 – Schedule for Finishes, individual Technical Specification Sections, and Drawings for materials and products.
- .4 No additional costs will be allowed for fine tuning location of such elements prior to their installation or rough-in, provided the relocation of individual items does not exceed 3 metres (10 feet) if location is shown on Drawings, nor does the aggregate constitute a significant increase in materials or labour. Such elements include, but are not limited to: washroom accessories, grilles, and louvres, sprinkler heads, plumbing fixtures, hose reel and extinguisher cabinets, light fixtures, electrical outlets, electrical switches, and other mechanical and electrical devices exposed to view.
- .5 Where there is a discrepancy between quantities listed and quantities illustrated on drawings, the more onerous shall govern.
- .6 Do not scale drawings.
- .7 Contractor to verify all information, dimensions and specifications of contract documents and existing site conditions. Any discrepancies shall be reported to the Consultant.
- .8 Changes or deviations to the design, dimensions, products, materials, are to be approved by Consultant. Contractor to correct or replace any work installed in deviation with construction documents to satisfaction of Consultant.

1.02 CONTRACT METHOD (TBC by OWNER)

- .1 CCDC 2 - 2020 Edition of the Stipulated Price Contract as may be amended forms the basis of Agreement between the Owner and Contractor including the Definitions of specific words and terms.
- .2 CCDC 2 - 2020 Edition - The General Conditions of the Stipulated Price Contract - is the General Conditions between the Owner and Contractor.

1.03 FEES PERMITS AND LICENSES

- .1 Building permit to be obtained and paid for by Owner.
- .2 Other permits, licenses, and certificates required for the performance of the work to be obtained and paid for by Contractor.

- .3 Do not commence Work on the site until the Authority having Jurisdiction issues a conditional partial works Permit or a complete Building Permit.

1.04 WORK SEQUENCE

- .1 Coordinate Progress Schedule and coordinate with Owner Occupancy during construction.
- .2 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.
- .3 Maintain fire access/control and fire separations.

1.05 CONTRACTOR USE OF PREMISES

- .1 The area of renovation upon which the Work is to be conducted is shown on the drawings. The Work and the operation of storage of equipment, materials and/or supplies must be contained within the area.
- .2 Coordinate the location of site storage container, parking and delivery of materials with the Owner prior to commencing work.
- .3 Coordinate use of premises under direction of Owner.

1.06 OWNER OCCUPANCY

- .1 The area of renovation will be turned over to the Contractor. However, the Owner will occupy the facility, outside the area of renovation, during entire construction period for execution of normal operations.
- .2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.
- .3 Schedule the Work to accommodate owner occupancy.

1.07 CODES AND STANDARDS

- .1 Execute work in accordance with the British Columbia Building Code (latest edition) and its supplements, applicable Provincial laws, Local Acts, Regulations and all codes and standards specified within the text of this specification.
- .2 Conform to standards specified, all relevant and applicable codes, ordinances and by-laws as amended and revised on date of receipt of bids including the Workplace Hazardous Materials Information System Regulations.
- .3 In the event of conflict between any Codes and Standards, the most stringent provision shall apply.

1.08 DEFINITION OF TRADES

- .1 For convenience of reference the specifications are separated into Divisions and Sections.
- .2 The Contractor is the sole arbiter of apportioning the supply and installation of the work between the various trades in his scope of work.

1.09 SUBSTITUTIONS

- .1 Product Options
 - .1 For products specified by non-proprietary specification:
 - .1 Select any product by any manufacturer, which meets requirements of Contract Documents.
 - .2 For products specified by proprietary specification:
 - .1 Select any product or manufacturer named, or
 - .2 Request a substitution for an unnamed product or manufacturer in accordance with this Section.
 - .3 For products specified by proprietary specification and accompanied by words indicating that substitutions will not be accepted:
 - .1 Select any product or manufacturer named; substitutions are not permitted even if only one product is selected.
 - .2 Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request. If revision to the Contract Documents is required, notify Consultant and obtain approval for substitution request.
 - .3 The Consultant is not required to accept any proposed substitution submitted by the Contractor. Consultant may reject any item with no further explanation or may accept in accordance with considerations noted above.
 - .4 Substitutions shall not be ordered nor installed without Consultant's acceptance.
 - .5 If in Consultant's opinion, a substitution does not meet requirements of Contract Documents, Contractor shall, at no extra cost to Owner, provide a product which, in Consultant's opinion, does meet requirements of Contract Documents.
 - .6 Unsolicited Substitutions will not be permitted and may be required to be removed and replaced with materials and products and methods as specified. If this is required:
 - .1 Consultant will choose the substitute product and that extraordinary delivery methods be utilized at no extra cost to Owner.
 - .2 Consultant may accept a credit to the value of the Contract unless exceptional circumstances can be proven to the Consultant that necessitated other materials.
 - .7 If a substitution is accepted by the Consultant and is later found to be incompatible, nonconforming, substandard, requiring significant changes to construction, the Contractor shall, at no cost to the Owner, supply and install an original product.

1.10 REQUESTS FOR INFORMATION PROCEDURES

- .1 Interpretation Requests: Where Contractor or Subcontractor requires additional information arising from disconnects within Contract Documents, and where intent cannot be reasonably inferred from information presented in the Specifications and Drawings such as the following:

- .1 Interpretation will occur when inconsistencies arise from differing information components leading to contradictions between parts of the Contract Documents.
- .2 Interpretation will occur to address omissions, differences in coordination, or contradictions for placement of components indicated on Drawings and Specifications that lead to uncertainty of intent contained within the Contract Documents.
- .2 Clarification Requests: Where Contractor is unable to determine material or system required for project from the Contract Documents, or where site conditions or circumstances are different from those indicated within the Contract Documents.
- .3 Order of Priority: Information requests to be noted weeks before the information is required whenever possible. Address issues as noted, and in the following order of priority:
 - .1 Site Meetings: Document clarifications in meeting minutes.
 - .2 Field Reviews: Consultants to document clarification discussions in field reviews.
 - .3 RFI Forms: Document clarifications and log issue dates and response dates.
- .4 Project Meetings: Determine urgency of information request and include request for interpretation or clarification as a component of the next regularly scheduled Project meeting.
 - .1 Consultant will endeavour to provide a response as a component of the meeting minutes.
 - .2 Consultant will accept that a special project meeting may be required to discuss coordination of complex or numerous RFI points within a regularly scheduled project meeting.
 - .3 Submit an RFI where item cannot be addressed during meeting, or where urgency of need or complexity of item cannot be adequately addressed during Project meeting.
- .5 Field Reviews: Determine urgency of information request and include request for interpretation or clarification as a component of the next regularly scheduled site visit by Consultant.
- .6 RFI Forms: Determine urgency of information request and submit Request for Information form including the following.
 - .1 Submit an RFI where item where urgency of need or complexity of item cannot be adequately addressed during Project meeting or field review.
 - .2 Reference Drawing sheet number, drawing name and number.
 - .3 Reference Specification section number, section title, and paragraph numbers.
 - .4 Provide detailed written statements clearly stating the nature of the interpretation or clarification requested.
 - .5 Outline conditions that are different from those indicated within Contract Documents.

- .6 Contractor's suggested solution where request impacts construction means, methods, techniques, sequences, and procedures, or as required for coordinating the various parts of the Work.
- .7 Submit completed RFI using accepted mode of transmission discussed at start-up meeting.
- .8 Include one topic for each RFI submitted in chronological order with no breaks in consecutive numbering.
- .9 Label each page of attachments with RFI number.
- .10 Submit completed RFI using accepted mode of transmissions discussed at preconstruction meeting.
- .7 Procedures:
 - .1 Initiating an RFI: After exercising due diligence to locate required information, request clarification or interpretation of the requirements of the Contract Documents.
 - .2 Completion of Standard RFI Form: Prepare standard RFI form by completely filling in all required fields and clearly stating the nature of the request:
 - .1 Identify Drawings by drawing number, drawing name and location on the drawing sheet.
 - .2 Identify Specifications by section number, section title, and listing page and paragraph numbers.
 - .3 Attach additional or covering information necessary to provide clarity to request when that information does not fit on the standard form.
 - .4 Accompany RFIs issued for coordination issues of items like pipe and duct routing, or clearances for other work shown diagrammatically requiring specific locations by including drawings or sketches drawn to scale indicating suggested solutions.
 - .1 Site dimension or conditions that are different from those indicated within Contract Documents and that affect request for interpretation or clarification.
 - .2 Contractor's suggested solution as outlined above.
 - .5 Complete required entry items; handwritten entries must be fully legible after photocopying, scanning or facsimile transmission (fax).
 - .6 Record Keeping: Contractor is responsible for preparing and maintaining a log of RFIs indicating any unanswered, incomplete, or outstanding RFIs:
 - .1 Use RFI Log during project meetings to discuss status of pending and upcoming RFIs.
 - .2 Consultant to maintain a similar record of responses to RFIs, indicating actions or reasons for non-response.
 - .3 Pre-Submission Review: Review requests from Subcontractors, manufacturers and suppliers before submitting RFI to assess request.
 - .4 Acceptance of RFIs: RFIs to be directed through the prime contacts as noted in project start-up meeting notes.

- .1 Subcontractor RFIs to be sent to Contractor for review prior to issuing.
- .5 RFIs sent directly to Subconsultants by Subcontractors or Contractor will not be accepted and will be returned unanswered, unless agreed to before submission of RFI.
- .6 Unanswered Bid Inquiries from Bid Period: Bid inquiries during the bidding period are not considered RFIs and as such may not have been completely addressed through the addendum or bid revision process:
 - .1 Consultant informs the Contractor that complexity of a Bid Inquiry or timeliness of a submission may delay or cause an incomplete response requiring additional interpretation or clarification during the course of the Work.
 - .2 It is expected that any outstanding or incomplete inquiries arising from the Bid period will be submitted in the form of an RFI immediately upon award of Contract so that suitable responses can be provided by the Consultant.
- .8 Information Request Response
 - .1 Consultant will respond to properly prepared RFIs by one of the following methods:
 - .1 Directly on the submitted form or using additional attachments as appropriate to address concerns identified where no change to the Contract is anticipated.
 - .2 Retaining original RFI and issuing a Proposed Change form where Contractor indicates that a change to Contract is required.
 - .3 Respond by indicating that additional information or additional time is required to address the subject indicated in the RFI.
 - .4 Completion of response will close the RFI.
 - .2 Consultant will identify RFIs where content does not relate to means and methods for delivery of the Work to Contractor before responding.
 - .1 RFIs that cannot be reasonably interpreted by the Consultant will be returned unanswered accompanied by wording stating specific reasons and follow-up action where required.
 - .3 Contractor or Subcontractor can disagree with Consultant's response to an RFI, or any assessment of RFIs at any time during the process. Initiate meeting to resolve disagreement.
- .9 Response Time
 - .1 Consultant Coordination: Coordinate requirements for timely response period based on number or complexity of RFIs issued during the course of the Work.
 - .1 Consultant will attempt to respond within five (5) Working Days. Complex requests or requests requiring Subconsultant input may take longer.
 - .1 Consultant to request additional response time and prioritization where multiple RFIs are received within a short period of time.

- .2 Consultant's request for additional information from the Contractor, will result in a mutually agreed upon increase to the time required to respond to the RFI.
- .3 RFI to state a date and time where need for response is different than five (5) Working Days, or where greater urgency is required by the Contractor or Subcontractor.
- .4 The stated response time or other time proposed by Contractor or Subcontractor does not mean that RFIs will be addressed within the stated time period.
- .2 Contractor Coordination: Coordinate requirements for timely response period based on complexity of RFI issued.
- .10 Consultant's Response
 - .11 Consultant will respond to properly prepared RFIs by one of the following methods:
 - .1 Directly on the submitted form or using additional attachments as appropriate to address concerns identified where no change to the Contract is anticipated.
 - .2 Retaining original RFI and issuing a Proposed Change Notice where Contractor indicated that a change to Contract is required
 - .3 Respond by indicating that additional information or additional time is required to address the subject indicated in the RFI.
 - .4 Completion of response will close the RFI.
 - .12 Consultant will identify Improper RFIs to Contractor before responding and will attempt to respond where content does not relate to means and methods for delivery of the Work:
 - .1 Improper RFIs that cannot be reasonably interpreted by the Consultant will be treated the same as Unnecessary RFIs.
 - .2 Return of Improper RFI will close the RFI.
 - .3 Consultant will return Unnecessary RFIs directly to Contractor unanswered with a notation "Not Reviewed" accompanied by wording stating specific reasons and follow-up action where required:
 - .1 Return of Unnecessary RFI will close the RFI.
 - .2 Contractor or Subcontractor can disagree with Consultant's response to a properly prepared RFI, or any assessment of RFIs considered by the Consultant as Improper or Unnecessary at any time during the communication process disagreement will result in closing the current RFI and initiation of a meeting to discuss further resolution.
 - .13 Coordination: Coordinate requirements for timely response period based on number or complexity of RFIs issued during the course of the Work:
 - .1 Consultant will endeavor to respond within 5 Working Days or other time frame agreed upon prior to issuing any RFIs:

- .1 Complex requests may take more than 5 Work Days.
- .2 Requests requiring Subconsultant input may take more than 5 Working Days.
- .3 Consultant will request additional response time where multiple RFIs are received within a short period of time.
- .2 RFIs received after 2:00 pm will be considered as received on the following Working Day.
- .3 Consultant's response may include a request for additional information from the Contractor which will result in a mutually agreed upon increase to the time required to respond to the RFI.
- .4 RFI must state a date and time where need for response is different than indicated by the Consultant, or where greater urgency is required by the Contactor or Subcontractor
- .5 Consultant's stated response time or other time proposed by Subcontractor or the Contractor does not represent a guaranty that RFIs will be addressed within the stated time period.
- .14 Coordination: Coordinate requirements for timely response period based on number or complexity of RFIs issued during the course of the Work:
 - .1 RFI must state a date and time for the response if urgency is required by the Contactor or Subcontractor
 - .2 Consultant's response may include a request for additional information from the Contractor which will result in a mutually agreed upon increase to the time required to respond to the RFI.
 - .1 Consultant's stated response time or other time proposed by Subcontractor or the Contractor does not represent a guaranty that RFIs will be addressed within the stated time period.
- .15 Contract Changes
 - .1 Contract Changes Resulting from RFIs: Consultant response to RFIs includes the assumption that no change to Contract Price or Contract Time is involved with RFI.
 - .1 Notify Consultant immediately with any concerns arising from Consultant's response that has potential to affect Contract Price or Contract Time.
 - .2 RFI response time does not justify extension to Contract Time.
 - .3 Do not proceed with any work associated with the RFI if there is any concern for affect to Contract Price or Contract Time until a Change Order is prepared and approved, or a Change Directive is issued where urgency for continuation of the Work dictates.
 - .4 Claims for change to Contract resulting from a failure to identify affects to Contract Price or Contract Time within 10 Working days from issue of response from Consultant will not be considered by the Owner.
 - .2 The Owner reserves the right to invoice the Contractor for the processing of RFIs by the Consultant at standard per diem rates charged to the Owner when the

information requested is readily apparent within the Contract Documents or is reasonably inferable from them or that asks for a response to Shop Drawings and substitution requests.

1.11 PAYMENT PROCEDURES

- .1 Refer to Owner-Contractor Agreement.
- .2 Substantial Performance Of The Work
 - .1 Prepare and submit to Consultant comprehensive list of items to be completed or corrected and apply for a review by Consultant to establish Substantial Performance of Work. Failure to include items on list does not alter responsibility to complete Contract.
 - .2 No later than ten (10) working days after receipt of list and application, Consultant will review Work to verify validity of application, and no later than five (5) working days after completing review, will notify Contractor if Work or designated portion of Work is substantially performed.
 - .3 Consultant: state date of Substantial Performance of Work or designated portion of Work in certificate.
 - .4 Immediately following issuance of certificate of Substantial Performance of Work, in consultation with Consultant and Owner, establish reasonable date for finishing Work.
 - .5 When the Contractor considers that the Work is substantially performed, submit the following:
 - .1 Contractor's statement that the building is finished sufficiently to become occupied. Contractor's List of all Incomplete or Deficient items (as outlined in agreement), associated costs to rectify the deficient items and the proposed completion dates. The Consultant will not review the site until these items are received.
 - .2 If when reviewed by the Consultant, the work is not deemed Substantially Complete, the Consultant will immediately notify the Contractor, in writing, stating reasons the work was considered not substantially performed. The Contractor, Owner and Consultants shall agree to a time period to allow the Contractor to rectify deficient items. The Contractor shall complete the Work and send second written notice to the Consultant, certifying that the Work is substantially performed, and all deficiencies have been completed.
 - .3 Statement of values for completed work less proposed values of incomplete or deficient work in the format.
 - .4 Statutory Declaration CCDC 9 – latest edition.
 - .5 Statement indicating reconciliation of all change orders or claims to the contract.
 - .6 Maintenance manuals, operating instructions, maintenance and operating tools, replacement parts or materials reserve maintenance replacement material as specified in the contract.

- .7 All required record drawings in the form specified in the contract documents.
 - .8 All required manufacturer's inspections, guarantees, certifications, and warranties covering articles, equipment and performance as specified in the contract.
 - .9 Extended warranties as specified under the various work sections of this specification.
 - .10 Final certificate from local authority approving the plumbing and electrical installations. Occupancy permit from local Building Inspection Department.
 - .11 Certifications and/or reports by all testing, infection control or inspection authorities as specified.
- .3 Payment Of Holdback Upon Substantial Performance Of Work
- .1 After issuance of certificate of Substantial Performance of Work:
 - .1 Submit application for payment of holdback amount.
 - .2 Submit sworn statement that accounts for labour, subcontracts, products, construction machinery and equipment, and other indebtedness which may have been incurred in Substantial Performance of Work and for which Owner might in be held responsible have been paid in full, except for amounts properly retained as holdback or as identified amount in dispute.
 - .2 After receipt of application for payment and sworn statement, Consultant will issue certificate for payment of holdback amount.
 - .3 Where holdback amount has not been placed in a separate holdback account, Owner shall, ten (10) working days prior to expiry of holdback period stipulated in lien legislation applicable to Place of Work, place holdback amount in bank account in joint names of Owner and Contractor.
 - .4 Amount authorized by certificate for payment of holdback amount is due and payable on day following expiration of holdback period stipulated in lien legislation applicable to Place of Work. Where lien legislation does not exist or apply, holdback amount is due and payable in accordance with other legislation, industry practice, or provisions which may be agreed to between parties. Owner may retain out of holdback amount any sums required by law to satisfy any liens against Work or, if permitted by lien legislation applicable to Place of Work, other third party monetary claims against Contractor which are enforceable against Owner.
- .4 Final Payment
- .1 Submit application for final payment when Work is completed.
 - .2 Consultant will, no later than ten (10) working days after receipt of application for final payment, review Work to verify validity of application. Consultant will give notification that application is valid or give reasons why it is not valid, no later than five (5) working days after reviewing Work.
 - .3 Consultant will issue final certificate for payment when application for final payment is found valid.

- .4 Provide the following with application for Final Payment.
 - .1 Contractor's statement that all incomplete items have been completed and deficiencies addressed.
 - .2 Statutory Declaration CCDC 9 - latest edition.
 - .3 Evidence of Compliance from the Workers Compensation Board of BC. Provide a tabulated list, with letters attached from the Worker's Compensation Board of BC stating that the General Contractor and all Subcontractors are in current good standing with the Board.
 - .4 Final statements of accounts to be submitted to the Consultant reflecting all adjustments and the following:
 - .1 Original Contract Sum.
 - .2 Additions and deductions resulting from: Change Orders; Unit Prices; Other Adjustments; Deductions for uncorrected Work.
 - .3 Total Contract Sum as adjusted.
 - .4 Previous payments certified.
 - .5 Remaining Balance.

1.12 PROJECT CO-ORDINATION

- .1 Responsibility for division of Work to sub-trades rests solely with the Contractor.

1.13 MEETINGS

- .1 Schedule and administer project meetings as noted below throughout the progress of the work.
 - .1 Prepare agenda for meetings.
 - .2 Distribute written notice of each meeting four days in advance of meeting date to Contractor, major subcontractors involved in Work, Consultants and Owner's Representative.
 - .3 Provide physical space and make arrangements for meetings.
 - .4 Preside at meetings.
 - .5 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
 - .6 Distribute copies of minutes within three (3) days after meetings and transmit to meeting participants and, affected parties not in attendance.
- .2 Preconstruction Meeting:
 - .1 Within 5 days after award of Contract, request a meeting of parties in Contract to discuss and resolve administrative procedures and responsibilities.
 - .2 Senior representatives of Owner, Consultant, Contractor, major Subcontractors, field inspectors and supervisors are to be in attendance.
 - .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
 - .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Items for co-ordination and co-operation with Owner and Consultant.
 - .3 Status of items required for the release of Building Permit.
 - .4 Site safety.
 - .5 Schedule of Work.
 - .6 Schedule of submission of shop drawings, samples, colour chips.
 - .7 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences.
 - .8 Delivery schedule of specified equipment.
 - .9 Site security.
 - .10 Requests for Information (RFI) Procedures
 - .1 Review RFI form and required content for timely response, limitations, of content, categories of requests that will be considered as RFIs.
 - .2 Review submission requirements, name and email address of primary contact and mode of transmission (email, FTP site, etc.)
 - .3 Review process for receiving, handling and responding to RFIs including the following:
 - .1 Prime contacts of Consultant and Contractor for accepting and dispersing RFIs, and out-source responsibility to Subconsultants and other Consultants.
 - .2 Confirmation of reasonable response times necessary to process and complete RFIs.
 - .3 Electronic project management software and record keeping requirements.
 - .4 Establish a baseline for responsible quantities of RFI submissions based on Project circumstances and complexities, and methods for discussing adjustments to timeframe for processing requests during peak requests.
 - .4 Review methods to resolve complex issues arising from RFI process; discuss methods for prioritizing crucial responses and establishing mutually acceptable response times where multiple RFIs are issued.
 - .11 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, administrative requirements.
 - .12 Owner provided products.
 - .13 As built drawings.
 - .14 Maintenance manuals.
 - .15 Take-over procedures, acceptance, warranties.

- .16 Monthly progress claims, administrative procedures, photographs, and hold backs.
- .17 Appointment of inspection and testing agencies or firms.
- .18 Insurances, transcript of policies.
- .3 Progress Meetings:
 - .1 Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner and Consultant as appropriate to agenda topics for each meeting. Provide a minimum of ten (10) working days notice if Consultants are requested to be on site.
 - .2 Agenda:
 - .1 Review minutes of previous meetings.
 - .2 Review of Work progress and schedule.
 - .3 Field observations, problems and decisions.
 - .4 Review of submittals schedule and status of submittals.
 - .5 Review of off-site fabrication and delivery schedules.
 - .6 Procedures for shut downs.
 - .7 Corrective measures to regain projected schedules.
 - .8 Planned progress during succeeding work period.
 - .9 Coordination of projected progress.
 - .10 Maintenance of quality and work standards.
 - .11 Effect of proposed changes on progress schedule and coordination.
 - .12 Other business relating to Work.
 - .3 Record minutes and forward within two days after meeting to Owner and Consultant for review. Revised minutes will be forwarded to the contractor within two (2) days of receipt. Contractor shall revise minutes and distribute copies within two (2) days, with one (1) copy to each participant and those affected by decisions made.
- .4 Meetings and Diary
 - .1 Convene regular meetings with sub-contractors. Ensure orderly execution of the Work, proper co-ordination and conformity with the agreed progress schedule.
 - .2 Maintain a daily site diary indicating, weather conditions, number of workmen on the site by trade, major material deliveries, dates of all meetings and their purpose, dates of visits or inspections by authorities having jurisdiction, work stoppages, accidents, inspections performed by Consultants, local authorities and other requirements of WorkSafeBC etc.
 - .3 In general, hold progress meetings every two weeks, except during final finishing when project nears completion, when weekly meetings are to be scheduled.

1.14 CO-ORDINATION AND CO-OPERATION

- .1 Co-ordination of the Work is to be included in the Contract Price.

- .2 Provide and maintain equipment, materials and labour force necessary for the proper execution of the work in accordance with the agreed progress schedule.
- .3 Co-ordinate the use and cost of construction plant and equipment, including cranes, hoists, ladders, scaffolds, etc. with the work of the various trades.
- .4 Co-ordinate and co-operate with Owner's forces on work performed by Owner.

1.15 CONSTRUCTION SCHEDULE

- .1 Prepare and submit for Consultant's review a Construction Progress Schedule indicating the schedule of activities of the Work. Indicate dates of commencement, equipment deliveries and completion of the various phases or parts of the Work.
- .2 Prepare and submit a horizontal bar type Schedule with separate horizontal bar for each trade or operation 10 days after award of Contract. Payment claims will not be processed until a Construction Schedule has been produced.
- .3 Maintain construction progress in compliance with the accepted Construction Schedule. If the progress of Work falls behind, or is delayed, engage additional labour and equipment and work additional hours, to bring the Work back on schedule at no additional cost to the Owner.
- .4 Submit a revised Construction Schedule when requested by the Consultant.

1.16 SUBMITTALS

- .1 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of work and contract documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
- .2 Submit digital (*.pdf) copies of shop drawings/ product data/brochures for each requirement requested in this and other specification sections.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated. Delete information not applicable to project. Supplement standard information to provide details applicable to project.
- .4 Submit for review samples as requested in respective specification sections.
- .5 Verify field measurements and ensure adjacent work is coordinated.
- .6 Do not proceed with Work affected by submittal until review is complete.
- .7 Delete information not applicable to project.
- .8 If required by Specification Section submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia. Refer to paragraph 1.5 below.

- .9 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
- .10 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
- .11 Co-ordinate submission of related items.
- .12 Product Data And Shop Drawings
 - .1 Submit one (1) PDF file of shop drawings and data sheets for each requirement requested in specification Sections and as consultant may reasonably request.
 - .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, limitations and colours.
 - .2 Provide Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS).
 - .3 Shop drawings:
 - .1 Submit Drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
 - .2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
 - .3 Supplement standard information to provide details applicable to project.
 - .4 Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
 - .5 Make changes in shop drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of any revisions other than those requested.
 - .4 Accompany submissions with transmittal letter, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Identification and quantity of each shop drawing, product data and sample.
 - .4 Other pertinent data.
 - .5 Name and address of:
 - .1 Contractor.
 - .2 Subcontractor.

- .3 Supplier.
- .4 Manufacturer.
- .5 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Specification Section, Article and Paragraph reference.
 - .5 Contract Drawing cross references.
 - .6 Other pertinent information Including but not limited to:
 - .1 Shipping, handing and delivery.
 - .2 Storage, weather protection, environmental condition.
 - .3 Limitations.
 - .4 Manufacturer’s Instructions, data sheets, technical bulletins, product catalogue, installation instructions, product carton installation instructions.
 - .5 Installation.
 - .6 Environmental protection.
 - .7 Cleaning.
 - .8 Operation and maintenance.
 - .7 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.
 - .8 All text, printed or typed, and graphics must be clear. Repeatedly faxed or copied documents with faded text or graphic quality will not be accepted. Drawings reduced from their original intended print size will not be accepted.
- .6 Submit electronic documents for each requirement requested in specification Sections and as Consultant may reasonably request.

- .7 Submit electronic documents of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .8 Submit electronic documents of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Consultant.
- .13 Samples
 - .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
 - .2 Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - .3 Include identification on each sample, with full Project information.
 - .4 Deliver samples prepaid to Consultant's business address.
 - .5 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
 - .6 Where colour, pattern or texture is criterion, submit full range of samples.
 - .7 Adjustments made on samples by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
 - .8 Make changes in samples which Consultant may require, consistent with Contract Documents.
 - .9 Reviewed samples will become standard of workmanship and material against which installed Work will be verified.
 - .10 Samples will not be used for testing purposes unless specifically stated in the specification section.
 - .11 If determined by the Owner and/or Consultant that the sample submitted is not adequate it will be the responsibility of the Contractor to provide a mock-up at the Contractor's cost.
- .14 Engineer Sealed Documentation And Field Review
 - .1 Provide engineered shop drawings and product data required by Specification Sections.
 - .2 Documentation requiring an Engineers seal submitted without the seal and signature on the document will be returned without review except:
 - .1 Documentation submitted with a sealed covering letter listing and confirming the Engineer has reviewed the documentation instead of actually sealing the documents may be accepted by the Consultant provided.
 - .2 Listed documentation is to be otherwise stamped by the contractor as being reviewed including that they are complete, project specific and otherwise comply with submission requirements.
 - .3 If the Consultant accepts the submission, only one copy bearing the review stamps will be returned to the Contractor.

- .4 The Contractor will have the returned documents copied in quantity as required, have the copies colour stamped and signed by the Engineer and then return one original signed set of documents plus one copy of that set to the Consultant not later than 7 days after return to the Contractor.
 - .3 Submit a minimum of one original with colour stamp and signature with additional copies as required with each submission.
 - .4 Perform sufficient field reviews to provide a letter of professional assurance by the Registered Professional Engineer after completion of the Work, that the Work has been installed in general conformance with the sealed shop drawings.
 - .5 Approved forms are British Columbia Building Code, Schedule S-B and S-C, Assurance of Professional Field Review and Compliance.
- .15 Product Data
- .1 Submit electronic documents of product data sheets or brochures for requirements requested in specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.
- .16 Test Reports
- .1 Submit electronic documents of test reports for requirements requested in specification Sections and as requested by Consultant.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within three (3) years of date of contract award for project.
- .17 Certificates
- .1 Submit electronic documents of certificates for requirements requested in specification Sections and as requested by Consultant.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .18 Manufacturer's Instructions
- .1 Submit electronic documents of manufacturers instructions for requirements requested in specification Sections and as requested Consultant.
 - .2 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .19 Manufacturer's Field Reports

- .1 Submit electronic documents of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Consultant.
 - .1 Submit report within 15 days of observation to Consultant for information.
 - .2 Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
- .20 Progress Photographs
 - .1 Submit electronic progress photographs in accordance with Section 01 33 00 Submittal Procedures and as requested by Consultant.

1.17 SUBMITTAL REVIEW

- .1 Submit product data, samples and shop drawings as required by Consultant.
 - .1 Contractor to review and stamp for general conformance and completeness prior to submission to Consultant. Allow minimum 10 days for review, do not commence fabrication until Shop Drawings are approved by Consultant.
 - .2 For items for which are required to have letters of assurance, shop drawings should also bear the seal of the engineer.
- .2 For each submittal for review, allow ten (10) work days excluding delivery time to and from the contractor, unless noted otherwise.
- .3 Work affected by submittals shall not proceed until review is complete.
- .4 The responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals. Consultant's review is for the sole purpose of ascertaining conformance with the general design concept. Review shall not mean approval of detail design or completeness.
- .5 Modify Work per Consultant review.
- .6 If submittals are considered by Consultant to have significant amounts of modifications required, Consultant will request resubmittal and review by Consultant prior to Work beginning.

1.18 HEALTH AND SAFETY

- .1 Contractor is responsible for the condition of the job site including safety of any person on site and property during the performance of Work. This requirement applies continuously to the duration of Project and is not limited to work hours.
- .2 Regulatory Requirements.
 - .1 Comply with all applicable laws and regulations of Federal, Provincial and Municipal authorities concerning and including construction safety, environmental regulations, WCB first aid regulations, WHMIS regulations.
 - .2 Comply with the Workers' Compensation Accident Prevention Regulations of British Columbia (latest edition) and provide all necessary safety requirements as prescribed by the regulations for the Work.

- .3 Submit site specific Health and Safety Plan: Within seven (7) days after date of Letter of Intent and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in Construction Safety Plan.
- .4 Submit Contractor's authorized representative's work site health and safety inspection reports Owner monthly.
- .5 Submit reports or directions issued by Federal and Provincial health and safety inspectors.
- .6 Submit incident and accident reports in writing to the Owner and all other authorities within two business days.
- .7 Submit WHMIS MSDS - Material Safety Data Sheets.
- .8 Owner will review Contractor's site specific Health and Safety Plan and may provide comments to Contractor within five (5) days after receipt of plan. Revise plan as appropriate and resubmit plan within five (5) days after receipt of comments.
- .9 Owners review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .10 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Owner and Consultant.
- .11 On site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .12 File Notice of Project with Provincial authorities prior to beginning of Work.
- .13 Perform site specific safety hazard assessment related to project.
- .14 Schedule and administer Health and Safety meeting prior to commencement of Work.
- .15 Develop written site specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .16 The Owner may respond in writing, where deficiencies or concerns are noted and may request re submission with correction of deficiencies or concerns.
- .17 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .18 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site specific Health and Safety Plan.

- .19 The Contractor is formally designated as “Prime Contractor” and shall meet the requirement as set out in Section 118 of the Worker Compensation Act and Part 20.3 of OHS Regulation.
- .20 The Contractor is the "Prime Contractor", as described by the Workers Compensation Act, is responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .21 Should any unforeseen or peculiar safety related factor, hazard, or condition become evident during performance of Work, and follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Authority Having Jurisdiction. Advise Owner verbally and in writing.
- .22 Verbally report accidents or incidents, that involve Contractor’s equipment and a another person, immediately to the Owner, facility operators and other authorities. Follow up with a written report to the Owner within two business days.
- .23 When unforeseen or peculiar safety related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Provincial Acts and Regulations having jurisdiction and advise Owner verbally and in writing.
- .24 Employ and assign to Work, competent and authorized representative as Health and Safety Co coordinator.
- .25 Coordinate work activities with consultants, contractor(s), Owner, and facility user groups.
- .26 In conjunction with the Owners representative inform occupants, building operators, all user groups including rentals, about site construction activities.
- .27 Health and Safety Coordinator must:
 - .1 Have site related working experience specific to activities associated with this project.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work.
 - .6 Contact WorkSafe BC and ask for a representative to attend initial project start up meeting with Owner. Coordinate work with WorkSafe BC as required.
 - .7 Ensure the “Notice of Projects” (KNOP), as applicable have been submitted to the WCB.
- .28 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Provincial Acts and Regulations having jurisdiction, and in consultation with Owner.

- .29 Install project information sign(s) as necessary at all available access points to the construction site, in order to control access. Ensure sign is in a visible location and notes the following information:
 - .1 Name and contact number for Contractors site representative.
 - .2 Location or means of receiving First Aid assistance.
 - .3 General site safety rules, such as wearing hard hats and safety shoes.
 - .4 Post a drawing at the entry point(s) to the site showing project layout, First Aid location, emergency procedures and the evacuation marshalling station.
 - .5 Provide signage prohibiting access to areas where work is in progress.
 - .6 Provide re-directional signage indicating alternate routes of travel for building occupants.
 - .7 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province Having Jurisdiction, and in consultation with Consultant.
 - .8 Remove signage and make good at completion of project or as directed by the Consultant.
 - .9 Do not display other signage.
- .30 Perform site specific safety hazard assessment related to project.
- .31 Schedule and administer Health and Safety meeting with each person attending the site at their initial arrival to the site.
- .32 Conduct regular Site Safety Meeting with all personnel on site and issue minutes accordingly.
- .33 Take precautions to prevent the overloading of any part of the structure, false work, formwork or scaffolding during the progress of the Work, and any damage and any claims resulting from such overloading shall be made good at no expense to Owner or Consultant.
- .34 No load bearing members shall be cut, drilled or sleeved without the written approval of the Consultant.
- .35 All persons employed on the Work are required to wear all Personal protective equipment (PPE) safety equipment as required by Work Safe BC, including hard hats and safety boots. Provide spare hard hats for visitors and refuse admission to the premises to those refusing to all safety items.
- .36 Immediately address health and safety non compliance issues identified by Authority Having Jurisdiction or by Owner.
- .37 Provide Owner with written report of action taken to correct non compliance of health and safety issues identified.
- .38 Owner may stop Work if non compliance of health and safety regulations is not corrected.
- .39 Blasting or other use of explosives is not permitted.
- .40 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

.41 Code Of Conduct

- .1 Establish and post a Code of Conduct for all workers on-site with respect to contact with facility occupants and use of existing facilities. The Code of Conduct shall include the following provisions:
 - .1 All facility occupants are to be treated with respect and courtesy.
 - .2 All facility occupants are not to be subjected to foul or disrespectful language.
 - .3 Existing building facilities, including washrooms and telephones, are to be prohibited from use by workers.
 - .4 Owners property and personal possessions of facility occupants are to be respected by all workers.
 - .5 The Owner has a no smoking policy anywhere on the property.
- .2 All construction personnel must conform to this policy.
- .3 Enforce construction personnel compliance.

.42 Construction Safety Plan

- .1 Develop written site specific Health and Safety Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Where deficiencies or concerns are noted re submit with correction of deficiencies or concerns.
- .3 The Safety Program, at a minimum, meet the requirements of the Workers' Compensation Board of B.C., Occupational Safety and Health, and a company safety manual containing a combination of the following types of information, as applicable:
 - .1 General Safety Policies - Corporate statements.
 - .2 Hazard Assessment Procedures - Checklist on hazards.
 - .3 Safe Work Practices & Procedures - Instructions on safe work.
 - .4 Rules & Regulations - Company rules & government regulations.
 - .5 Personal Protective Equipment Information - Policies & instructions.
 - .6 Maintenance Policies & Information - Policies on maintenance equipment.
 - .7 Training Policies - Policy statements on training regulations.
 - .8 Inspection Policies & Information - Policy statements on regular jobsite inspection.
 - .9 Incident Investigation Policies & Information - Cause & prevention of specific incidents.
 - .10 Emergency Provisions - First aid, reporting and emergency situations.
 - .11 Reports & Management Information - Summary reporting.

.43 Noise Control

- .1 Only perform noise and vibration generating work within or adjacent to Owner occupied areas:
 - .1 At times permitted by the municipal by-laws and municipal authority.
 - .2 Outside of Owner-occupied hours, refer to Section 01 14 13 Use of Site.
 - .3 Submit schedule of disruptions in accordance with Section 01 33 00 for approval by the Owner.
 - .2 Correct any noise or vibration found to be objectionable to the Owner and to the satisfaction of the Authority Having Jurisdiction and/or to the Owner.
 - .3 Use noise abatement measures listed below to minimize noise levels.
 - .1 Effective intake and exhaust mufflers shall be utilized on internal combustion engines and compressors.
 - .2 Hoppers, storage bins and chutes near adjacent properties shall be lined or covered with sound deadening material.
 - .3 Construction equipment and vehicles shall be routed so as to cause the minimum disturbances to the adjacent properties.
 - .4 Stationary equipment shall be located to minimize noise impact on the public and adjacent properties.
 - .4 Be responsible for being aware of the municipal authorities Noise Bylaw and ensuring that all personnel conform to these regulations.
- .44 Fire Protection
- .1 Develop and implement a fire prevention program which is to include:
 - .1 Fire prevention practices.
 - .2 Workers' training on use of fire extinguishers, etc.
 - .3 Means of alerting other workers of the emergencies.
 - .4 Provide portable fire extinguishers on the site.
 - .5 Provide fire truck access to site and facility equipment and connections.
 - .2 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
 - .3 Take all necessary precautions to eliminate fire hazards and make periodic inspections to ensure proper preventative measures are being complied with by all personnel working on the site.
 - .4 Enforce fire protection methods, good housekeeping, and adherence to Authority Having Jurisdiction and Underwriters' fire regulations and provide ULC approved fire extinguishers, and other fire fighting services and equipment.
 - .5 Maintain clear emergency exit paths for personnel at all times.
 - .6 Store paint and/or oil covered rags in covered metal containers.

- .7 Comply with Provincial and Municipal fire safety requirements during the period of construction and any other regulations pertaining to fire protection during construction work.
 - .8 Provide additional fire safety measures considered necessary to protect existing facilities from fire where torch cutting and electrical welding are required by the work. Provide a suitable fire extinguisher adjacent to all welding operations.
 - .9 Fires are not permitted on site and precautions shall be taken at all times to prevent fire by spontaneous combustion. "No Smoking" painted signs shall be erected where volatile fumes or liquids are present.
- .45 Fire Plan
- .1 Submit written site specific Fire Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Fire Plan must address project specifications.
 - .1 Submit separate Fire Safety Plan for construction site in accordance with local Authorities Having Jurisdiction.
 - .2 Include fire prevention practices; provision of fire extinguishers; workers' training on use of fire extinguishers, etc.; and, means of alerting other workers of the emergencies.
 - .3 After Owner occupancy provide a 24 hour fire watch if the fire alarm or sprinkler systems are temporarily shut down or non-operational during the warranty period.
 - .4 Where deficiencies or concerns are noted re submit with correction of deficiencies or concerns.
 - .2 Provide a Fire Plan indicating exiting provisions as related to construction area(s) and Owner occupied area(s).
 - .1 Construction Safety Plans to be acceptable to the Authority Having Jurisdiction, Fire Marshall, Contractors Insurance provider, Owners Insurance provider and in accordance with the British Columbia Fire Code.
 - .2 Coordinate fire safety provisions with safety and security aspects.
 - .3 Keep all required paths of exit travel clear of debris, lit in accordance to the applicable Codes and clearly signed.
 - .4 Update Construction Safety Plans as required.
- .46 Hazardous Material Management
- .1 Be responsible for the development and implementation of a hazardous material management program dealing with:
 - .1 Control of spills of hazardous materials.

- .2 Storage and identification of hazardous wastes.
- .3 Disposal procedures.
- .2 Workers' training on emergency procedures.
- .3 Provide containers to store hazardous wastes generated on site.
- .4 Store flammable and combustible liquids in approved containers located in a safe, ventilated, temporary construction facility, do not store within permanent facility during construction. Keep quantities to a minimum.
- .5 Store combustible liquids and flammable liquids in conformance with the BC Fire Code.
- .6 Have appropriate emergency spill response equipment available near the storage area, including personal protective equipment.
- .7 Report spills or accidents immediately to Authority Having Jurisdiction. Submit a written spill report to Authority Having Jurisdiction within 24 hours of incident.
- .8 Disposal.
 - .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.

1.19 ENVIRONMENTAL CONTROLS

- .1 Comply with all codes and bylaws Guidelines regarding noise, pollution, disposal, and water control during the demolitions.
- .2 All work must be undertaken and completed in such a manner as to prevent the release of any deleterious substances into any areas of the building. Protect the public from the work at all stages. Co-ordinate and cooperate with the Owner's representatives and Staff. Ensure complete isolation of dust generating activities, noise abatement provisions and waste removal facilities. Do not commence any demolition work without prior approval of the Owner.
- .3 Comply with the requirements of the authority having jurisdiction Noise By-Law regarding noise abatement and take all necessary steps to ensure the generation and transmission of noise and vibration due to the Work are kept to a minimum as required by the By-Law.
- .4 Any noise or vibration that is found to be objectionable shall be corrected, at no additional cost to the Owner and to the satisfaction of the authority having jurisdiction and/or the Owner.

1.20 REGULATORY REQUIREMENTS

- .1 Perform Work in accordance with the current edition of the British Columbia Building Code (BCBC) including all amendments up to Bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply

- .2 Where a conflict or discrepancy occurs between the specifications or drawings and the applicable codes, bylaws or regulations, the more onerous requirements shall apply.

1.21 QUALITY CONTROL/ MOCK UP REVIEW

- .1 Quality Of Work:
 - .1 The Owners Inspection, Testing and Consultants Field Reviews do not relieve the Contractor of his responsibility to provide materials and preform work in accordance with Contract Documents.
 - .2 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.
 - .3 Do not employ anyone unskilled in their required duties. Consultant reserves right to require dismissal from site any workers deemed incompetent or careless.
 - .4 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.
 - .5 Comply with applicable procedures and standards of the certification sponsoring association.
 - .1 Perform services under direction of supervisor qualified under certification requirements of sponsoring association. Provide adequate workforce training.
 - .6 Provide material, labour and necessary testing for all specified materials, systems, or assemblies.
 - .7 Review the materials supplied for conformance to the project specifications.
 - .8 Review workmanship in the fabrication shop. Determine it conforms to the Contract Documents
 - .9 Review the field erection for conformance with the Contact Documents.
- .2 Inspection:
 - .1 Allow Owner, Authorities Having Jurisdiction, Testing Agencies and Consultants access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
 - .2 Give timely notice requesting review if Work is designated for special tests, reviews by Consultant, or law of Place of Work.
 - .3 If Contractor covers or permits to be covered Work that has been designated for special tests, reviews or approvals before such is made, uncover such Work, have reviews or tests satisfactorily completed and make good such Work at own expense.
 - .4 Consultant will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.

- .5 Cooperate with testing organization and field review personnel.
- .6 Coordinate collection and storage of test samples with testing agency.
- .3 Independent Inspection Agencies
 - .1 Independent Inspection/Testing Agencies will be engaged by Owner for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Owner.
 - .2 Provide equipment required for executing inspection and testing by appointed agencies.
 - .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
 - .4 The independent firm will perform tests and other services specified in individual specification sections and as required by the Consultant and/or Owner.
 - .5 Testing and source quality control may occur on or off the project site. Perform off-site testing as required by the Owner.
 - .6 Reports will be submitted by the independent firm to the Consultant, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
 - .7 Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labour as requested.
 - .1 Notify Consultant and independent firm 24 hours prior to expected time for operations requiring services.
 - .2 Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
 - .8 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to the Owner. Pay costs for retesting and re-inspection.
- .4 Access To Work
 - .1 Allow inspection/testing agencies access to Work.
 - .2 Co-operate to provide reasonable facilities for such access.
- .5 Procedures
 - .1 Notify appropriate agency and Consultant in advance of requirement for tests, in order that attendance arrangements can be made.
 - .2 Submit samples and materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
 - .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.
- .6 Rejected Work

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
 - .2 Make good other Contractor's work damaged by such removals or replacements promptly.
 - .3 If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Consultant.
 - .4 No reviews or partial payments will be authorized for deficiency items between Substantial Performance and Total Performance unless unusual circumstances occur beyond the Contractor's control.
 - .5 Upon receipt of the Contractor's statement of completion and request for Final Payment, the Consultant will provide one review for each trade as appropriate. Where any work is found to be incomplete and that subsequently requires re-review for reasons within the Contractor's control, the work will be re-reviewed where required. At the Owner's discretion, the Contractor will be charged for the additional time and travel required for the Consultant to provide re-review.
- .7 Reports
- .1 Submit one (1) PDF file of inspection and test reports to Consultant.
 - .2 Provide copies to Owner and Subcontractor of work being inspected or tested.
- .8 Mock-Ups
- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
 - .2 Construct full size mock-ups on the site of the following conditions in locations acceptable to the Consultant and as specified in specific Section. Make changes to the mock-ups as directed by the Consultant. Mock-ups, once accepted, may be used in the finished Work and will serve as a standard against which other Work will be judged.
 - .3 Complete mock-ups on site a minimum of 15 working days in advance of material ordering deadline or actual related construction activity, whichever is earlier and call Consultant for field review.
 - .4 Allow 72 hours for review of mock-ups by Consultant before proceeding with work.
 - .5 Failure to prepare mock ups in ample time is not considered sufficient reason for an extension of Contract Time or change of specified product and no claim for extension by reason of such default will be allowed.
 - .6 At time of field review provide documentation supporting materials used in mock-ups conforms to Specifications, approved shop drawings and samples. Provide product labels and manufacturer's instructions.
 - .7 Remove mock-ups not incorporated into the work at conclusion of Work or when acceptable to Consultant.

- .8 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.
- .9 Provide mock up for review by Consultants:
 - .1 penetrations of building envelope
 - .2 membrane/flashings
 - .3 exterior cladding
 - .4 and as noted within specification sections.
- .10 Mock up shall demonstrate minimum standard of work, constructability of proposed details, and field review protocol.
- .11 Mock up may remain, if acceptable, as part of finished work.
- .9 Equipment And Systems
 - .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.
 - .2 Refer to Mechanical and Electrical for definitive requirements.
- .10 Complementary Documents
 - .1 Drawings, specifications, and schedules are complementary each to the other and what is called for by one to be binding as if called for by all. Should any discrepancy appear between documents, that leaves doubt as to the intent or meaning, abide by Precedence of Documents article below or obtain direction from the Consultant.
 - .2 Drawings indicate general location and route of conduit and wire/conductors. Install conduit or wiring/conductors and plumbing piping not shown or indicated diagrammatically in schematic or riser diagrams to provide an operational assembly or system.
 - .3 Install components to physically conserve headroom, to minimize furring spaces, or obstructions. If care is not exercised to meet these requirements, the Consultant may direct the Contractor to remove and replace or reconfigure the work at the cost of the Contractor.
 - .4 Locate devices with primary regard for convenience of operation and usage.
 - .5 Examine all discipline drawings, specifications, and schedules and related Work to ensure that Work can be satisfactorily executed. Conflicts or additional work beyond work described to be brought to attention of Consultant.
- .11 Coordination And Project Conditions
 - .1 Contractors submitting bidders on this Work shall first examine the site and premises and all conditions thereon and therein as noted in this Document. Bidders shall take into consideration such conditions as are reasonably evident that may affect the Work under this Contract. Failure to do so will in no way relieve the Contractor from the necessity of furnishing any products or performing any work that may be required to complete the Work in accordance with the drawings and specifications without additional cost to the Owner.
 - .2 Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of

- interdependent construction elements, with provisions for accommodating items installed later.
- .3 Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
 - .4 Coordinate space requirements, supports, and installation of mechanical and electrical work that is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
 - .5 In finished areas conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
 - .6 Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion.
 - .7 After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.
- .12 Quality Assurance - Control Of Installation
- .1 Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.
 - .2 Comply with manufacturers' instructions, including each step in sequence.
 - .3 Should manufacturers' instructions conflict with Contract Documents, request clarification from Consultant before proceeding.
 - .4 Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
 - .5 Perform Work by persons qualified to produce required and specified quality.
 - .6 Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
 - .7 Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
- .13 Tolerances
- .1 Monitor fabrication and installation tolerance control of Products to produce acceptable Work. Do not permit tolerances to accumulate.
 - .2 Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Consultant before proceeding.
 - .3 Adjust Products to appropriate dimensions; position before securing Products in place.

1.22 INSPECTION AND TESTING

- .1 Refer also to Owner-Contractor Agreement.

- .2 Refer to Sections of Work in Specifications for other Contractual Requirements.
- .3 Refer to Sections of Work in Specifications for technical requirements.
- .4 Arrange for and pay costs related to the performance of all inspections and testing required by all Regulatory Authorities having jurisdiction.
- .5 Notify appropriate agencies 48 hours in advance of the requirements for tests.
- .6 Allow Inspection and Testing Agencies access to all portions of Work. Cooperate to provide reasonable facilities for access.
- .7 Prepare and submit written reports of each test or series of tests to the Consultant.
- .8 If defects are revealed during inspection or testing, the Inspection or Testing Agency will request additional inspections or testing to ascertain the full degree of defect. Pay all costs for retesting and reinspection. Correct defects and irregularities as advised by the Consultant at no cost to the Owner.

1.23 PROJECT IDENTIFICATION

- .1 Provide safety signage as required by Regulatory Authorities.
- .2 Remove signage and make good at completion of project or as directed by the Consultant.
- .3 Do not display other signage without written authorization from the Owner or the Consultant.

1.24 EXAMINATION OF SITE

- .1 Ascertain all existing conditions reasonably inferable from examination of the site and its surroundings and the Contract Documents with respect to surface and sub-surface conditions, access to the site, restrictions prevailing on adjacent streets, disposal of materials, municipal by-laws with respect to noise, street cleaning, pollution and other conditions having effect on the execution of the Work. Include in the Contract Price all costs associated with the above.
- .2 Claims for additional costs will not be entertained with respect to conditions which would reasonably have been ascertained by an inspection of the site prior to final quote.
- .3 Report promptly to the Consultant any discrepancy, inaccuracy or deviation between the information contained in the Contract Documents and the actual conditions found to be in existence during the process of the work.

1.25 ACCESS TO SITE

- .1 Do not close or obstruct streets, sidewalks, lanes or other public rights of way without obtaining required permits from the authorities having jurisdiction.
- .2 Maintain adequate traffic control procedures during operations, including delivery and off- loading of materials, on or adjacent to streets, sidewalks, lanes, public rights of way and parking areas available to the public.

- .3 During progress of the Work maintain adequate means of egress from the Project in the event of fire or another emergency. Do not store materials in a manner that will impair means of egress.
- .4 During operations do not diminish adequate means of access to and egress from the existing premises. Maintain egress routes from the existing facility by constructing temporary means if necessary.

1.26 WORKING LIMITS

- .1 Confine all operations within the area of new construction and to those areas as indicated on drawings located within the property limits.
- .2 Restrict working hours to hours stipulated in Municipal Bylaws at place of work.

1.27 PROTECTION OF BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Be responsible for damage incurred due to lack of or improper protection.
- .3 Protect installed Work and provide special protection where specified in individual specification sections.
- .4 Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.
- .5 Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- .6 Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- .7 Protect corridors, elevators and stairs used for storage, access and distribution of materials and supplies.

1.28 SETTING OUT OF WORK

- .1 Upon entering the project site for the purpose of beginning work, locate all general reference points and protect such points from destruction. Lay out work, be responsible for all lines, elevations and measurements of building, utilities and other work executed under this Contract.
- .2 Verify figures shown on the drawings prior to laying out the work. Notify Consultant of any discrepancy in accuracy or deviation from the information contained in Contract Documents and actual site conditions.
- .3 Mark out locations for all materials and equipment. Arrange for cutting and patching with the appropriate trades.
- .4 Avoid interference between heating, plumbing, drainage, electrical and other equipment.
- .5 Make corrections required to avoid the work of other trades.

1.29 TEMPORARY UTILITIES

- .1 Services are obtained at the Contractors expense.
 - .1 The Contractor use is limited to equipment and service line excess capacity.
 - .2 Pay all costs for temporary equipment and service line installation and removal.
- .2 Provide temporary utilities controls to execute work expeditiously.
- .3 Arrange for temporary connection with appropriate utility company or service provider and pay all costs including but not limited to for equipment, installation, maintenance, removal and restoration.
- .4 Pay for all utility charges for service.
- .5 Provide all required means, methods and operations for temporary provisions.
- .6 Remove from site all such temporary work after use. Restore any remaining associated items affected by installation, use or removal.
- .7 Pay for all costs to use new permanent services during construction prior to Substantial Completion.
- .8 Provide construction temporary power during a power shutdown or service disruption.
- .9 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.
- .10 Ensure water leaving site is free from silt and other contaminants.
- .11 Owner will Provide continuous supply of potable water for construction use. Exercise measures to conserve water.
- .12 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.
- .13 Provide temporary heating and ventilation required during construction period, including attendance, maintenance and fuel.
- .14 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
- .15 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 and to meet Infection Control Standards.
- .16 Maintain temperatures of minimum 10 degrees C and maximum 26 degrees C in areas where construction is in progress.
- .17 Ventilating:

- .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
- .2 Provide local HEPA ventilation exhausted directly to the exterior to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
- .3 Provide negative pressure within area of renovation to prevent infiltration of dust and odours. Provide data log recorder with negative pressure unit.
- .4 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
- .5 Ventilate storage spaces containing hazardous or volatile materials.
- .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .18 Permanent heating system of building may not be used when available. Be responsible for damage to heating system if use is permitted.
- .19 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.
- .20 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.
- .21 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.
- .22 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.
- .23 Exercise measures to conserve energy.
- .24 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx, unless noted otherwise.
- .25 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Consultant provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than 3 months.
- .26 Maintain lighting and provide routine repairs.
- .27 Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- .28 Obtain prior authority from the Department Representative before making any connections to power sources.

- .29 The Contractor is responsible for, at their own expense, providing any temporary power distribution, outlets and panels as necessary for carrying out the work.
- .30 Install and maintain all temporary power services in accordance with the Canadian Electrical Code standards and applicable by-laws for such work. The Contractor is responsible for any alteration, connection, disconnection and restoration to existing services.

1.30 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

- .1 Contractor to provide construction facilities and temporary controls in order to execute the work safely and expeditiously.
- .2 Remove from site all such work after use.
- .3 Provide, operate and maintain hoists/cranes required for moving of materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .4 Hoists/cranes shall be operated by qualified operator.
- .5 Confine work and operations of employees by Contract Documents. Do not encumber premises with products.
- .6 Coordinate deliveries to the facility loading dock with the Owner's Representative and be responsible to receive deliveries and immediately relocate to approved storage area as not to encumber the premises with products.
- .7 Deliveries must occur after 4pm.
- .8 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.
- .9 Parking will be permitted on site provided it does not disrupt performance of Work. When site space is not adequate, arrange additional off-site parking at no cost to the Owner.
- .10 Provide and maintain adequate access to project site.
- .11 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.
- .12 Abide by existing security requirements of building security system during Contract period; obtain Owner's permission prior to commencing any Work in the alteration work areas and ensure workers observe all of the existing security regulations, wherever such regulations apply.
- .13 The Contractor shall be responsible for security of the Work.
- .14 The Owner, the Consultant, or other consultants and/or their respective representatives shall not be liable for any loss or damage to materials, equipment or other property of the Contractor, unless caused by their negligence.
- .15 Protect Work, equipment, tools, existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
- .16 Initiate program in coordination with Owner's existing security system at project mobilization.

- .17 Provide a clearly marked and fully stocked first-aid case in a readily available location.
- .18 The Contractor will be permitted to use areas in the building that are within the area of the Work and as are available by phasing.
- .19 The Contractor will be permitted to use areas in the building that are within the area of the Work.
- .20 Locate materials in a manner to cause least interference with work activities.
- .21 Contractor may use existing sanitary facilities.
- .22 If the cleanliness of the sanitary facilities are not kept to the satisfaction of the Owner, Contractor's ability to use the existing facilities shall be terminated.

1.31 PUMPING AND DRAINAGE

- .1 The Contractor shall not permit surface or sub-surface water to accumulate in excavations or crawl space areas. If such conditions develop or are encountered, control and dispose of the water by means of temporary pumps, piping, drainage lines, ditches, dams or other suitable means as approved by the Consultant.

1.32 INSTALLATION AND REMOVAL

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

1.33 HOARDING

- .1 Hoarding shall not compromise exit paths of travel, existing fire separations, or closer devices within fire separations.
- .2 Provide barriers to prevent unauthorized entry to construction areas to allow for Owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

1.34 WEATHER ENCLOSURES

- .1 Provide weather tight closures to unfinished door and window openings, and other openings in existing construction.
- .2 Schedule construction activity or make provisions to protect exterior wall materials and building construction in general.
- .3 Prevent water ingress into exterior wall framing and building prior to installation of entrances, door and window framing.

1.35 DUST TIGHT SCREENS

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

1.36 CONTRACT CLOSE OUT

- .1 Record drawings:
 - .1 Continually maintain record drawings of all "as-built conditions".
 - .2 Record drawings to be available at all times and at each site visit by the Consultants.
 - .3 As work progresses, record clearly and indelibly in red pencil all "as-built" deviations from the contract documents as a result of changed site conditions, various directives by addenda, correspondence, site clarifications, site instructions, change orders, shop drawings and changes required by authorities having jurisdiction.
 - .4 Provide both two full size hard print copies and a digital (pdf) copy of record drawings.

1.37 QUALITY OF PRODUCTS

- .1 Incorporate into the Work only new, undamaged materials and equipment of the best quality suitable for the purpose intended.
- .2 In the event of any dispute as to the quality or suitability of materials or equipment, the Consultant will make a decision based on the requirements of the Contract Documents.

1.38 AVAILABILITY OF PRODUCTS

- .1 Upon signing the Contract review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of materials or equipment are foreseeable, notify the Consultant in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of work.
- .2 Document each request for substitution with complete data substantiating compliance with Contract Documents.
- .3 Request for substitution acknowledges that Contractor:
 - .1 Has investigated proposed product and determined that it meets or exceeds in all respects the requirements of the specified product.
 - .2 Will provide the same warranty for substitution as for specified product.
 - .3 Will coordinate installation and make other changes necessary for work to be complete in all respects.
 - .4 Waives claims for additional costs which may subsequently become apparent.
- .4 Substitutions will not be considered when acceptance will require substantial revisions or when submitted on shop drawings or product data submittals without prior written request.
- .5 Consultant will determine acceptability of proposed substitution and will notify Contractor of acceptance or rejection in writing.

1.39 EXECUTION

- .1 Submit written request in advance of cutting or alteration which affects:

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

1.40 EXAMINATION AND PREPARATION

- .1 Inspect existing conditions, including elements or adjacent Work subject to irregularities, damage, movement, including Work during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of the Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.
- .6 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .7 Locate equipment, fixtures and distribution systems in accordance with manufacturer's recommendations to provide:
 - .1 Minimum interference with functionality.
 - .2 Good flexibility for modifications.
 - .3 Good access for intended use and maintenance.
 - .4 Maximum useable space for safety access and maintenance and applicable code requirements.
- .8 Conceal pipes, ducts, and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise. Furr around with same materials as adjacent wall and/or ceiling finishes where pipes or ducts cannot be concealed within wall thickness.
- .9 Before installation, inform the Contractor if there is a contradictory situation. Install as directed by Consultant.
- .10 Perform cutting, fitting and patching as required to make work fit together as intended.

1.41 PREPARATION

- .1 Prepare surface in accordance with manufacturer's written recommendations.
- .2 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .3 Complete radar scanning through concrete block, precast concrete and in situ concrete prior to coring or cutting. Co-ordinate coring with trades as required to complete the scope of work. Advise consultants of any rebar or conduit conflicts prior to coring or cutting.
- .4 After uncovering, inspect conditions affecting performance of Work.
- .5 Beginning of cutting or patching means acceptance of existing conditions.
- .6 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .7 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.
- .8 Clean substrate surfaces prior to applying next material or substance.
- .9 Seal cracks and openings of substrate prior to applying next material or substance.
- .10 Apply manufacturer required, recommended or specified substrate primer, sealer, and conditioner before applying any new material and substance in contact or bond.

1.42 EXAMINATION

- .1 Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- .2 Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
- .3 Examine and verify specific conditions described in individual specification sections.
- .4 Verify that utility services are available, of the correct characteristics, and in the correct locations.
- .5 Verify all grades, lines, levels, inverts and dimensions as indicated and report errors or inconsistencies to the Consultant before commencing work. Employ competent instrument operators and use accurate devices to identify all reference points and be responsible for all lines and elevations during the course of the Work.
- .6 Set out the work and provide the trades with the levels and dimensions required to relate their work to other parts of the work.
- .7 Failure to examine the site and premises will in no way relieve the Contractor from the necessity of furnishing any products or performing any work that may be required to complete the Work in accordance with the drawings and specifications without additional cost to the Owner.

1.43 RECORD DRAWINGS

- .1 Record drawings for the existing building are available on request.

1.44 METRIC MEASUREMENT AND CO-ORDINATION

- .1 This Project has been designed using metric dimensions. Linear dimensions are expressed in millimeters in whole numbers. The unit symbol 'mm' is deleted from the dimensioning on the drawings.
- .2 Within the specifications the unit symbols for all metric units are included. Decimal numbers are included where products are 'soft converted'. Dimensioning for spacing of products is expressed in whole number millimeters in both specifications and drawings.
- .3 In general all dimensioning of materials, products and equipment are 'soft converted'. Exceptions are certain products available in metric sizes which are 'hard converted'.
- .4 Supply 'hard converted' products when specified and available.
- .5 Co-ordinate metric and Imperial products in dimensioning and installation.
- .6 Ensure workers are familiar with metric system of measurement and are using metric measurement devices.

1.45 EXECUTION

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

1.46 MANUFACTURER'S DIRECTION

- .1 Install or erect all products in accordance with manufacturer's recommendations. Obtain written instructions from manufacturer or their appointed agent.
- .2 Notify Consultant in writing of any conflicts between specifications and manufacturer's instructions.

1.47 WORKMANSHIP

- .1 Workmanship shall be best quality and good trade practice, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify consultant if required work is such as to make it impractical to produce required results.
- .2 Do not employ any unfit person or anyone unskilled in their required duties.
- .3 Workmanship to be of the best quality executed by workers experienced and skilled in the respective duties for which they are employed.
- .4 Work signed off under required B1 & B2 letters of assurance, to be completed to the satisfaction of the Consultant.
- .5 Contractor shall protect work and adjacent properties at all times during construction.
- .6 The Consultant or his authorized representative has the right to reject any item that does not conform to an acceptable standard of quality, quietness of operation, finish, appearance or performance. The Contractor must rectify unacceptable material or workmanship to the approval of the Consultant at no additional cost to the Owner.
- .7 Submit a comprehensive summary of the experience and qualifications of the Site.
- .8 Superintendent to the Consultant for review prior to the award of Contract.

1.48 ON-SITE DOCUMENTS

- .1 Maintain at job site, one copy each of the following and make available to Consultants and Owner:
 - .1 Contract drawings including specifications and schedules.
 - .2 Building Permit drawings including specifications and schedules if any.
 - .3 Addenda.
 - .4 Change orders.
 - .5 Other modifications to contract.
 - .6 Reviewed shop drawings.
 - .7 Field test reports.
 - .8 Copy of accepted work schedule.
 - .9 Manufacturers' installation and application instructions.

1.49 FIRESTOP

- .1 Install gypsum board or solid wood as required by Code in void spaces (drop ceilings, chases, behind bulkheads and similar) in order to close interconnected framing cavities.

1.50 CEILING NOTES

- .1 Sprinklers show indicated / design intent and are to be considered the minimum number of heads. Contractor is responsible for sprinkler hydraulic calculations, design, and coverage. Notify the Consultant where additional coverage may be required.
- .2 Sprinkler heads to be fully recessed where in gypsum or acoustic ceiling tile typical. Discuss with Consultant conditions that conflict.

1.51 FASTENERS - GENERAL

- .1 Provide metal fastenings and accessories in same texture, colour, finish as base material in which they occur, unless noted otherwise. Prevent galvanic action between dissimilar metals. Use non-corrosive fasteners, anchors, and spacers for exterior work.
- .2 Keep exposed fastening to a minimum, review with Consultant prior to installation.
- .3 Fasteners for preservative treated materials to be stainless steel or as per written recommendations of preservative treated materials manufacturer.
- .4 Use non-corrosive hot dipped galvanized fasteners and anchors for securing exterior work unless stainless steel or other material is specifically requested in the pertaining specification Section.
- .5 Space anchors within their load limit or shear capacity and ensure they provide positive permanent anchorage. Do not use wood or organic material plugs.
- .6 Prevent electrolytic action between dissimilar metals and materials.

1.52 CUTTING AND PATCHING

- .1 Employ skilled and experienced installer to perform cutting and patching.
- .2 Submit written request in advance of cutting or altering elements which affect:
 - .1 Structural integrity of element.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of element.
 - .4 Visual qualities of sight exposed elements.
 - .5 Work of Owner or separate contractor.
- .3 Cut masonry and concrete materials using masonry saw or core drill. Jack hammering of concrete or masonry will **NOT** be permitted at any time.
- .4 Restore Work with new Products in accordance with requirements of Contract Documents.
- .5 Maintain integrity of wall, ceiling, or floor construction, and completely seal voids.
- .6 Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- .7 Identify hazardous substances or conditions exposed during the Work to the Consultant for decision or remedy.

- .8 Trades to provide, coordinate and locate the number and size of openings, holes, chases, sleeves, inserts and hangers that are required in connection with their work. The Contractor is responsible to make good and reinstate all finishes as required to accommodate the sub-trades work.
- .9 Tie into existing utilities, services and other areas of work as required to make proper connections and terminations to existing; patch and make good existing work that may be damaged through work of this Contract and reasonably match new to existing in all respects. Use extreme care when tying into existing work as some services may not be shown or defined.
- .10 Provide all demolitions and alterations. Furnish as and where shown on the Drawings and as required by work of the Contract, work to demolish, alter, adapt, build in, cut, patch and make good to match existing. If damage occurs in portions of building that are to remain do repair work only with consultation of Consultant.
- .11 Be responsible for all adaptations, cutting, fitting, and making good which may be required to make the various parts of the Work fit together properly; do cutting and making good in a clean and careful manner.
- .12 Make good and reinstate all finishes in existing building which are required to be altered, including the necessary patching, cutting, filling, furring, blocking, framing, matching, replacing, extending. Including glazing, ceiling, floor and wall work, and reinstatement of fixtures, equipment, to make new and existing work come together completely.
- .13 The Contractor is responsible for removing and reinstalling materials to facilitate the work on other floors. Co-ordinate the work with the Owner.

1.53 PROTECTION OF WORK IN PROGRESS

- .1 Protect adjacent private and public property from damage during the performance of Work.
- .2 Protect the Owner's existing premises and persons occupying or visiting them from construction operations. Make good any damage to the existing premises or property of the Owner.
- .3 Adequately protect existing work completed and new work in progress. Repair or replace any damaged work or defaced due to failure in providing such protection is to be removed and replaced or replaced as directed by Consultant.
- .4 Prevent overloading of any part of the building. Do not cut, drill or sleeve any load bearing structural member without written approval of the Consultant.
- .5 The Contractor shall make good, at no expense to the Owner, any damage or disruption caused to other property, utilities etc. due to the construction work of this Project. Perform repair work to standards, codes of the authorities having jurisdiction after consultation with the appropriate parties and authorities.

1.54 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities carry out work at times directed by local governing authorities with a minimum disturbance to work, pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services as required. Cap off existing services encountered in a manner approved by the local governing authority having jurisdiction. Stake or otherwise record the location of the capped service.

1.55 INSPECTION AND DECLARATION

- .1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
- .2 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
- .3 Request Consultant's Inspection.
- .4 Consultant's Review: Consultant and Contractor will perform review of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .5 Completion: submit written certificate that following have been performed:
- .6 Work has been completed and inspected for compliance with Contract Documents.
- .7 Defects have been corrected and deficiencies have been completed.
- .8 Certificates required by authorities having jurisdiction have been submitted.
- .9 Work is complete and ready for Final Inspection.
- .10 Final Review: when items noted above are completed, request final review of Work by Consultant. If Work is deemed incomplete by Consultant, complete outstanding items and request re-review.
- .11 Declaration of Substantial Performance: when all life-safety requirements are met and Consultant considers deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for Certificate of Completion.
- .12 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .13 Final Payment: When Consultant considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. If Work is deemed incomplete by Consultant, complete outstanding items and request re-inspection.
- .14 Payment of Holdback: After issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount.

1.56 OPERATION AND MAINTENANCE MANUALS

- .1 Submit one draft review copy of Operation and Maintenance Manuals 4 weeks prior to Substantial Completion. Submit [two] final hard copies and [two] final USB flash drive of Operating and Maintenance Manuals (O & M Manuals).
- .2 Provide separate Architectural, Mechanical, and Electrical manuals.
- .3 Electronic copy to be organized with index into similar categories.
- .4 Submit the following items for incorporation into architectural O & M Manual.
- .5 Product data and reviewed submittals.
- .6 Operation and Maintenance data.
- .7 Include manufacturer, product number, dimensions, finish, texture and colour for each product and type installed in this project.
- .8 Warranty documentation.

1.57 WASTE MANAGEMENT

- .1 Develop, establish, document and implement a Construction Waste Management Plan including:
 - .1 Material type segregation and storage facilities.
 - .2 Storage methods.
 - .3 Environmental protection.
 - .4 Security.
 - .5 Safety.
 - .6 Fire protection.
 - .7 Trade personnel education.
 - .8 Trade waste materials.
- .2 Comply with all applicable codes and regulations.
- .3 Implement the Construction Waste Management Plan at the commencement of site activity.
- .4 Identify and separate hazardous wastes for disposal in accordance with government regulations.
- .5 Instruct all personnel on the site of the Construction Waste Management Plan and on it's use
- .6 Review the Construction Waste Management Plan at monthly meetings with all onsite personnel.
- .7 Modify plan to correct unforeseen conditions.
- .8 Coordination: Coordinate waste management requirements with all Divisions of the Work for the project, and ensure that requirements of the Construction Waste Management Plan are followed.

- .9 Storage Requirements: Implement a recycling/reuse program that includes separate collection of waste materials as appropriate to the project waste and the available recycling and reuse programs in the project area.
- .10 Handling Requirements: Clean materials that are contaminated before placing in collection containers and ensure that waste destined for landfill does not get mixed in with recycled materials:
 - .1 Deliver materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
 - .2 Arrange for collection by or delivery to the appropriate recycling or reuse facility.
- .11 Hazardous Waste and Hazardous Materials: Handle in accordance with applicable regulations.

1.58 CLEANUP DURING CONSTRUCTION

- .1 Maintain the Work in a safe and tidy condition and free from the accumulation of waste products and debris, other than that caused by the Owner, other contractors or their employees.
- .2 Provide adequate waste containers for construction debris. Do not use Owner's ladders, containers, trash cans, waste paper baskets or recycling bins for construction waste.
- .3 Before applying for Substantial Performance of the Work as provided in GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK, remove waste products and debris, other than that resulting from the work of the Owner, other contractors or their employees, and shall leave the Place of the Work clean and suitable for use or occupancy by the Owner. Remove products, tools, Construction Equipment, and Temporary Work not required for the performance of the remaining work.
- .4 Prior to application for the final payment, Remove any remaining products, tools, Construction Equipment, Temporary Work, and waste products and debris, other than those resulting from the work of the Owner, other contractors or their employees

1.59 CLEANING

- .1 Cleaning Products.
 - .1 Use 0 (zero) VOC, fragrance free and natural cleaning products conforming to manufacturer's written instructions for both materials being cleaned and cleaning materials.
- .2 Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.
- .3 Subject to total completion of dust generating or odour generating activities clean immediately prior to the first of either full activation of air systems as approved by the Consultant.
- .4 Clean including but not be limited to the following:
 - .1 Remove all dust from finished surfaces.
 - .2 Clean all finished surfaces of foreign materials, marks etc.

- .3 Remove all protective wraps and papers.
- .5 Remove waste products and debris and leave the Work clean and suitable for Commissioning, Sustainable Design Air Flush and inspections for Substantial Completion.
- .6 At completion of construction power wash all outdoor storage and work areas..
- .7 Cleaning Prior To Acceptance
 - .1 Remove waste products and debris and leave Work clean and suitable for occupancy.
 - .2 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
 - .3 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .8 Final Product Cleaning
 - .1 Execute final cleaning prior to turn over to Owner.
 - .2 Clean interior and exterior glass, all surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
 - .3 Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
 - .4 Replace temporary construction filters of operating equipment.
 - .5 Clean site; sweep paved areas, rake clean landscaped surfaces.
 - .6 Remove waste and surplus materials, rubbish, and construction facilities from the site.
 - .7 Consider all construction waste from demolition as hazardous materials.
 - .8 Use 0 (zero) VOC, fragrance free and natural cleaning products conforming to manufacturer's written instructions for both materials being cleaned and cleaning materials.

1.60 MAINTENANCE MANUALS:

- .1 Submit to the Owner, two copies of maintenance, operating, and instruction manuals.
- .2 Manuals are to contain:
 - .1 Pertinent care, maintenance, operational and installation information for the building.
 - .2 Contact list which is to include subcontractor or suppliers name, address, telephone number and emergency contact.
 - .3 Reviewed shop drawings or product data as specified. Submit engineered shop drawings where specified.
 - .4 Installation instructions for products.
 - .5 Warranties and guarantees as called for in the specifications. Warranties and guarantees to be signed by an authorized signing authority.
 - .6 Recommended maintenance schedule for materials covered under warranties and guarantees.

- .7 Manufacturers care and maintenance instructions for finishes.
- .8 A complete copy of the hardware schedule.
- .9 List of paint products, colours, gloss levels and locations.
- .10 Descriptions and operation of major components and systems, including seasonal variations, interface with other systems, and operation of controls.
- .11 Detailed preventative maintenance schedule, include description of task, frequency, tools required and time.
- .12 Detailed operating instructions and trouble shooting checklists.
- .13 Testing, adjusting and balancing reports as specified.
- .14 Inspection and test certificates issued by authorities having jurisdiction and equipment manufacturers. Submit performance data sheets after commissioning is complete.
- .15 Wiring diagrams and schematics as specified.
- .3 Submit list of equipment and fixtures installed with make and model numbers.
- .4 Submit list of spare parts for equipment and provide source for replacement and re-stocking.
- .5 Bind manual contents into hard plastic coated three-ring binders, complete with coloured plastic tabs organizing contents into applicable categories of work, following master specifications organization. Label the cover and spine of the manuals with the name of the project and manual contents.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Descriptions for demolishing, salvaging, recycling and removing site work items identified for removal in whole or in part, and for backfilling trenches and excavations resulting from site demolition activities.
- .2 Related Sections:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 02 19 13 Selective Building Demolition

1.2 REFERENCES

- .1 Definitions:
 - .1 Selective Demolition: Sequencing demolition activities to allow separation and sorting of selected site materials.
 - .2 Hazardous Substances: dangerous substances, dangerous goods, hazardous commodities and hazardous products, including but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.
 - .3 Draft Construction Waste Management Plan (Draft CWM Plan): Detailed inventory of materials in building indicating estimated quantities of reuse, recycling and landfill, prepared in accordance with Section 01 10 00 General Requirements as follows:
 - .1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project.
 - .4 Waste Management Coordinator (WMC): contractor's representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
 - .5 Construction Waste Management Plan (CWM Plan): Written plan addressing opportunities for reduction, reuse, or recycling of materials prepared in accordance with Section 01 10 00 General Requirements.
- .2 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Assessment Act (CEAA), 2012
 - .2 Canadian Environmental Protection Act (CEPA), 2012
 - .1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations
 - .2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations
 - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34
 - .4 Motor Vehicle Safety Act (MVSA), 1995

- .5 Hazardous Materials Information Review Act, 1985
- .2 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S660-[08], Standard for Nonmetallic Underground Piping for Flammable and Combustible Liquids
 - .2 ULC/ORD-C58.15-[1992], Overfill Protection Devices for Flammable Liquid Storage Tanks
 - .3 ULC/ORD-C58.19-[1992], Spill Containment Devices for Underground Flammable Liquid Storage Tanks

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate with Owner for the material ownership including the following:
 - .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.
 - .2 Coordinate selective site demolition work so that work of this Section adheres to aesthetic criteria established by the Drawings and specified dimensions with all elements in planes as drawn, maintaining their relationships with all other building elements
- .2 Pre-Demolition Meetings.
 - .1 Convene pre-demolition meeting 1 week before beginning work of this Section, with Contractor, Owner Representative and Consultant in accordance with Section 01 10 00 General Requirements to:
 - .1 Verify project requirements.
 - .2 Verify existing site conditions adjacent to demolition work
 - .3 Coordinate with other construction sub trades
 - .4 Examine existing site conditions adjacent to demolition work, prior to start of Work
 - .5 Waste reporting requirements
 - .2 Ensure key personnel attend.

1.4 SUBMITTALS

- .1 Action Submittals: Provide the following submittals before starting any work of this Section:
 - .1 Schedule of Selective Site Demolition Activities: Coordinate with Section 02 41 19.13 Selective Building Demolition, and indicate the following:
 - .1 Detailed sequence of selective site demolition and removal work, with starting and ending dates for each activity
 - .2 Interruption of utility services
 - .3 Coordination for shutoff, capping, and continuation of utility services
 - .4 Locations of temporary partitions and means of egress
 - .2 Proposed Dust Control Measures: Submit statement or drawing that indicates measures proposed for use, proposed locations, and proposed time frame for their operation.

- .3 Inventory: Submit a list of items that have been removed and salvaged after selective site demolition is complete
 - .1 Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.5 QUALITY ASSURANCE

- .1 Proceed in accordance with 01 10 00 General Requirements
- .2 Regulatory Requirements: Ensure Work is performed in compliance with CEPA, CEAA, and applicable provincial regulations.
- .3 Regulatory Requirements: Ensure Work is performed in compliance with applicable Provincial/Territorial regulations.
- .4 Comply with hauling and disposal regulations of Authority Having Jurisdiction.
- .5 Regulatory Requirements: Comply with governing environmental notification requirements and regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- .6 Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

1.6 SITE CONDITIONS

- .1 Visit the site to become aware of all conditions affecting the scope of work.
- .2 Environmental protection:
 - .1 Ensure Work is done in accordance with [Section 01 10 00 General Requirements.
 - .2 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .3 Fires and burning of waste or materials is not permitted on site.
 - .4 Burying of rubbish waste materials is not permitted.
 - .5 Disposal of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers, is not permitted.
 - .6 Ensure proper disposal procedures are maintained throughout the project.
- .3 Pumping of water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties, is not permitted.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction and as directed by Owner.
- .5 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.
- .6 Conduct selective site demolition so Owner's operations will not be disrupted:
 - .1 Provide not less than 72 hours' notice to Owner of activities that will affect operations.
- .7 Consultant assumes no responsibility for Selective Site elements being demolished:

- .1 Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- .2 Before selective site demolition, remove, protect and store salvaged items as directed by Owner

1.7 EXISTING CONDITIONS

- .1 Hazardous Materials as identified in the Hazardous Material report (Appendix F) may be encountered while performing the Scope of Work of this RFP:
- .2 Contractors refer to Hazardous Material Assessment report included in this RFP and perform removal as required by the Scope of Work.
- .3 If material resembling spray or trowel applied asbestos or other designated substance listed as hazardous be encountered in course of demolition, notify Owner and Consultant immediately. Perform abatement as required. Cost associated with removal of hazardous materials as per hazardous Material report is to be included in the contract.
- .4 Site elements that will be demolished are based on their condition on date that tender is accepted.

Part 2 Products

2.1 EQUIPMENT

- .1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 EXAMINATION

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of selective site demolition required.
- .2 Owner and Consultant do not guaranty that existing conditions are the same as those indicated in Project Record Documents.
- .3 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to Owner and Consultants.
- .4 Verify that hazardous materials have been remediated before proceeding with site demolition operations.

3.2 PREPARATION

- .1 Surface Preparation:
 - .1 Disconnect and re-route electrical and service lines within the site to be demolished.
 - .1 Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of selective site demolition.

- .1 Disconnect and re-route electrical and service lines within the site to be demolished.
- .1 Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of selective site demolition.

3.3 REMOVAL AND DEMOLITION OPERATIONS

- .1 Remove items as indicated.
- .2 Disruption of items designated to remain in place is not permitted.
- .3 Removal of pavements, curbs and gutters:
 - .1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Owner and Consultant.
 - .2 Protect adjacent joints and load transfer devices.
 - .3 Protect underlying and adjacent granular materials.
- .4 Excavate at least 300 mm below pipe invert, when removing pipes under existing or future pavement area, when necessary.
- .5 When a removal of a tree or landscape item is required, obtain written approval of Owner prior to removal of trees
- .6 Disposal of Material:
 - .1 Dispose of materials not designated for salvage or reuse on site.

3.4 REMOVAL FROM SITE

- .1 Remove stockpiled material as directed by Owner Representative, when it interferes with operations of project.
- .2 Dispose of materials in accordance with applicable regulations.

3.5 RESTORATION

- .1 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.
- .2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 General Requirements
 - .1 Leave Work area clean at end of each day.
 - .2 Remove debris, trim surfaces and leave work site clean, upon completion of Work
 - .3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 10 00 General Requirements.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section includes:
 - .1 Demolition and removal of selected portions of exterior building components and structural elements.
 - .2 Demolition of mechanical and electrical equipment.
 - .3 Repair procedures for selective demolition operations.
- .2 Related requirements:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 02 41 13 Selective Site Demolition

1.2 REFERENCES

- .1 Definitions:
 - .1 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.
 - .2 Remove and Salvage: Detach items from existing construction for purpose of recycling or deliver them to Owner.
 - .3 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
 - .4 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed, removed and salvaged, or removed and reinstalled.
 - .5 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB's, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by the Federal Hazardous Products Act (RSC 1985) including latest amendments.
- .2 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 American National Standards Institute (ANSI).
 - .1 ANSI A10.8: Safety Requirements for Scaffolding.
 - .2 CSA Group (CSA).
 - .1 CSA S350 M1980: Code of Practice for Safety in Demolition of Structures.
 - .3 National Research Council Canada (NRC)
 - .1 British Columbia Building Code 2018
 - .2 National Fire Code of Canada (NFC).
 - .4 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Assessment Act (CEAA).
 - .2 Canadian Environmental Protection Act (CEPA).

- .1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
- .2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.
- .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34
- .4 Motor Vehicle Safety Act (MVSA), 1995
- .5 Hazardous Materials Information Review Act, 1985
- .5 National Fire Protection Association (NFPA).
 - .1 NFPA 241 13, Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate with Representative for the material ownership including but not limited to:
 - .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.
 - .2 Coordinate selective building demolition work so that work of this Section adheres to aesthetic criteria established by the Drawings and specified dimensions with all elements in planes as drawn, maintaining their relationships with all other building elements
- .2 Pre-Demolition Meetings:
 - .1 Convene pre-installation meeting prior to beginning work of this Section, with Contractor and Representative in accordance with Section 01 10 00 General Requirements.

1.4 SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
- .2 Schedule of Demolition Activities: Coordinate with Section 02 41 13 Selective Site Demolition and indicate the following:
 - .1 Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
 - .2 Coordinate with Owner ongoing site operations, and limit the number of interruptions during regular business hours.
 - .3 Interruption of utility services.
 - .4 Coordination for shutoff, capping, and continuation of utility services.
 - .5 Use of stairs.
 - .6 Locations of temporary partitions and means of egress, including for others affected by selective demolition operations.
 - .7 Coordination with Owner continuing occupancy of portions of existing building.
- .3 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of any remaining element of the Project.
 - .2 Integrity of weather exposed or moisture resistant element.

- .3 Efficiency, maintenance, or safety of any operational element.
- .4 Visual qualities of sight exposed elements.
- .5 Work of Owner or separate contractor.
- .4 Include in request:
 - .1 Location and description of affected Work.
 - .2 Necessity for cutting or alteration
 - .3 Description of proposed Work and Products to be used
 - .4 Alternatives to cutting and patching
 - .5 Effect on work of Owner or separate contractor
 - .6 Written permission of affected separate contractor
 - .7 Date and time work will be executed.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: Comply with governing environmental notification requirements and regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- .2 Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

1.6 SITE CONDITIONS

- .1 Owner will occupy portions of building immediately adjacent to selective demolition area:
 - .1 Conduct selective demolition so that Owner's operations will not be disrupted.
 - .2 Provide not less than 72 hours notice to Consultant and Owner of activities that will affect operations.
- .2 Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities and as follows:
 - .1 Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission.
- .3 Storage or sale of removed items or materials on site will not be permitted.
- .4 Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- .5 Maintain fire protection facilities in service during selective demolition operations.

1.7 EXISTING CONDITIONS

- .1 Hazardous Materials: It is expected that hazardous materials will be encountered in the Work:
 - .1 Hazardous materials will be as defined in the Hazardous Materials Act.
- .2 If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Owner and Consultant. Hazardous materials will be removed by Owner under a separate contract or as a change to the Work.

- .3 Proceed only after receipt of written instructions have been received from Owner and/or Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Temporary Support Structures: Design temporary support structures required for demolition work and underpinning and other foundation supports necessary for the project using a qualified professional engineer registered or licensed in province of the Work.

2.2 EQUIPMENT

- .1 Use water efficient wetting equipment/attachments when minimizing dust.
- .2 Demonstrate that tools are being used in manner which allows for materials to remain to be in best condition possible.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify that utilities have been disconnected and capped.
- .2 Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- .3 Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- .4 Notify the Consultant where existing mechanical, electrical, or structural elements conflict with intended function or design:
 - .1 Investigate and measure the nature and extent of conflict and submit a written report to Consultant.
 - .2 Consultant will issue additional instructions or revise drawings as required to correct conflict.
- .5 Engage a professional engineer to survey condition of building when removing elements that may result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.
- .6 Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES

- .1 Coordinate existing services indicated to remain and protect them against damage during selective demolition operations.
- .2 Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.
 - .1 Arrange to shut off affected utilities with utility companies.

- .2 If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
- .3 Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
- .4 Cut off pipe or conduit to a minimum of 25 mm below slab, and remove concrete mound.
- .3 Coordinate with Mechanical and Electrical Divisions for shutting off, disconnecting, removing, and sealing or capping utilities.
- .4 Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.
- .5 Existing Utilities:
 - .1 Abandon existing utilities and below grade utility structures; cut utilities flush with grade.
 - .2 Demolish existing utilities and below grade utility structures that are within 1500 mm outside of footprint indicated for new construction; abandon utilities outside this area, fill abandoned utility structures with satisfactory soil materials.
 - .1 Piping: Disconnect piping at unions, flanges, valves, or fittings
 - .2 Wiring Ducts: Disassemble into unit lengths and remove plug in and disconnecting devices
 - .3 Demolish and remove existing utilities and below grade utility structures.
 - .1 Piping: Disconnect piping at unions, flanges, valves, or fittings
 - .2 Wiring Ducts: Disassemble into unit lengths and remove plug in and disconnecting devices

3.3 PREPARATION

- .1 Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
- .2 Conduct selective demolition and debris removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities:
 - .1 Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Consultant, Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
 - .2 Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
 - .3 Protect existing site improvements, appurtenances, and landscaping to remain.
 - .4 Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.

- .3 Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain, and as follows:
 - .1 Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - .2 Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - .3 Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - .4 Cover and protect furniture, furnishings, and equipment that have not been removed.
- .4 Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
 - .1 Provide temporary weather tight enclosure for building exterior.
 - .2 Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures.
 - .3 Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
- .5 Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
- .6 Provide and maintain shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished:
 - .1 Strengthen or add new supports when required during progress of selective demolition.

3.4 POLLUTION CONTROLS

- .1 Dust Control: Provide water mist, temporary enclosures or other suitable methods to limit spread of dust and dirt. Comply with governing environmental protection regulations, and as limited below:
 - .1 Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
 - .2 Wet mop floors to eliminate tracking of dirt, wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.
- .2 Remove and transport debris to prevent spillage on adjacent surfaces and areas.
- .3 Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- .4 Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.5 SELECTIVE DEMOLITION

- .1 Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - .1 Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - .2 Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - .3 Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - .4 Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame cutting operations. Maintain fire watch and portable fire suppression devices during flame cutting operations.
 - .5 Maintain adequate ventilation when using cutting torches.
 - .6 Remove decayed, vermin infested, or otherwise dangerous or unsuitable materials and promptly dispose of off site.
 - .7 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - .8 Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - .9 Dispose of demolished items and materials promptly.
 - .10 Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
- .2 Comply with Owner's requirements for using and protecting, stairs, walkways, building entries, and other building facilities during selective demolition operations.
- .3 Removed and Salvaged Items:
 - .1 Clean salvaged items.
 - .2 Pack or crate items after cleaning.
 - .3 Identify contents of containers.
 - .4 Store items in a secure area until delivery to Owner.
 - .5 Protect items from damage during transport and storage.
- .4 Removed and Reinstalled Items:
 - .1 Clean and repair items to functional condition adequate for intended re use. Paint equipment to match new equipment
 - .2 Pack or crate items after cleaning and repairing
 - .3 Identify contents of containers
 - .4 Protect items from damage during transport and storage

- .5 Reinstall items in locations indicated
- .6 Comply with installation requirements for new materials and equipment

Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated

- .5 Existing Items to Remain:
 - .1 Protect construction indicated to remain against damage and soiling during selective demolition
 - .2 Items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete
- .6 Concrete:
 - .1 Demolish in small sections.
 - .2 Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition.
 - .3 Neatly trim openings to dimensions indicated
- .7 Masonry:
 - .1 Demolish in small sections
 - .2 Cut masonry at junctures with construction to remain, using power driven saw, then remove masonry between saw cuts.
- .8 Roofing:
 - .1 Remove no more existing roofing than can be covered in one day by new roofing.
- .9 Air Conditioning Equipment:
 - .1 Remove equipment without releasing refrigerants.

3.6 CLOSEOUT ACTIVITIES

- .1 Patching and Repairs: Promptly repair damage to adjacent construction caused by selective demolition operations and as follows:
 - .1 Patch to produce surfaces suitable for new materials where repairs to existing surfaces are required,
 - .2 Completely fill holes and depressions in remaining existing masonry walls remain with an approved masonry patching material applied according to manufacturer's written recommendations.
 - .3 Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.
- .2 Demolition Waste Disposal: Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre) [except where explicitly noted otherwise for materials being salvaged for re use in new construction and as follows:
 - .1 Promptly dispose of demolished materials.
 - .2 Do not allow demolished materials to accumulate onsite.

- .3 Do not burn demolished materials.

3.7 CLEANING AND RESTORATION

- .1 Keep site clean and organized throughout deconstruction.
- .2 Upon completion of project, remove debris, trim surfaces and leave work site clean.
- .3 Upon completion of project, reinstate areas affected by Work to condition which existed prior to beginning of Work.

END OF SECTION

- .2 Weather Requirements: CAN/CSA-A371.

Part 2 Products

2.1 MATERIALS

- .1 Use same brands of materials and source of aggregate for entire project.
- .2 Cement:
 - .1 Portland Cement: to CAN/CSA-A3000, Type GU - General use hydraulic cement (Type 10) gray colour.
- .3 Aggregate: supplied by one supplier.
 - .1 Fine Aggregate: to CAN/CSA A179.
- .4 Water: Clean and potable.
- .5 Lime:
 - .1 Hydrated Lime: to CAN/CSA A179, Type S.
- .6 Bonding Agent: Latex type.
- .7 Polymer Latex: Organic polymer latex admixture of butadiene-styrene type non-emulsifiable bonding admixture.

2.2 COLOUR ADDITIVES

- .1 Use colouring admixture not exceeding 10% of cement content by mass, or integrally coloured masonry cement, to produce coloured mortar to match approved sample. Admixtures to be approved prior to use. Use in accordance with the specific manufacturer's recommendations.
- .2 White mortar: use white Portland cement, and lime to produce mortar type specified.
- .3 Powder: inorganic mineral oxide pigment; colour as selected.

2.3 GROUT MIXING

- .1 Mix batched and delivered grout in accordance with CAN/CSA-A23.1 transit mixed.
- .2 Mix grout ingredients in quantities needed for immediate use in accordance with CAN/CSA A179 fine grout.
- .3 Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- .4 Do not use calcium chloride or chloride based admixtures.

2.4 MIX TESTS

- .1 Testing Grout Mix:
 - .1 Test grout to requirements of Section 01 45 00 - Quality Control, and in accordance with CAN/CSA A179, for grout based on proportion specification. Test prior to construction and during construction for:
 - .1 Compressive strength.
 - .2 Sand/cement ratio.

Part 1 General

1.1 SUMMARY

- .1 Furnish all labour, materials, equipment, accessories and services necessary for the complete supply and installation of cold formed metal framing as indicated on the drawings, scheduled and as specified.
- .2 Section Includes:
 - .1 Exterior non-load-bearing wall framing.
 - .2 Interior non-load-bearing wall framing.
 - .3 Ceiling and bulkhead framing.
 - .4 Soffit framing.
- .3 Related Requirements:
 - .1 Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.
 - .2 Section 05 50 00 "Metal Fabrications" for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.
 - .3 Section 09 21 16 "Gypsum Board Shaft Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies, with height limitations.
- .4 Related Sections:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Cast-In-Place Concrete
 - .2 Section 05 12 00 Structural Steel
 - .3 Section 06 10 00 Rough Carpentry
 - .4 Section 07 21 16 Blanket Insulation
 - .5 Section 07 84 00 Fire Stopping
 - .6 Section 08 11 00 Metal Doors and Frames
 - .7 Section 09 21 16 Gypsum Board Assemblies
 - .8 Structural Drawings and Specifications

1.2 REFERENCES

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 American Iron and Steel Institute (AISI)
 - .1 AISI D110-16: Cold-Formed Steel Framing Design Guide.
 - .2 AISI S200: North American Standard for Cold-Formed Steel Framing - General Provisions.
 - .3 AISI S201: North American Standard for Cold-Formed Steel Framing - Product Standard.
 - .4 AISI S211: North American Standard for Cold-Formed Steel Framing - Wall Stud Design.

- .5 AISI S212: North American Standard for Cold-Formed Steel Framing - Header Design.
- .6 AISI S213: North American Standard for Cold-Formed Steel Framing - Lateral Design.
- .2 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A653/A653M: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM C645: Standard Specification for Non-structural Steel Framing Members.
 - .3 ASTM C754: Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 - .4 ASTM C955: Standard Specification for Cold-Formed Steel Structural Framing Members.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181: Ready-Mixed Organic Zinc-Rich Coating.
- .4 Underwriter's Laboratories (UL)
 - .1 UL-2768: Architectural Surface Coatings.
- .5 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual.
 - .1 MPI #26, Primer, Galvanized Metal, Cementitious.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate installation with: fire stopping and fire rated assembly construction
 - .1 Refer to and coordinate with the drawings and the following sections:
 - .1 Section 06 10 00 Rough Carpentry (Blocking)
 - .2 Section 07 84 00 Firestopping
 - .3 Section 09 21 16 Gypsum Board Assemblies
 - .2 Fire stopping design depends on deflection track design and construction. Drawings and specifications indicate specific methods and systems. Any variation from those shown on drawings and specified requires system design and shop drawing submittal.
- .2 Pre-Installation Meeting:
 - .1 Convene pre-installation meeting prior to beginning work of this Section and on-site installation, with Contractor's Representative and Installer to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other construction subtrades.
 - .4 Review manufacturer's written installation instructions and warranty requirements.

- .2 Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Architect's drawings, and are acceptable for product installation in accordance with the manufacturer's instructions.

1.4 SUBMITTALS

- .1 Product data: Manufacturer's data sheets on each product to be used, including:
 - .1 Product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Preparation instructions and recommendations.
 - .3 Storage and handling requirements and recommendations.
 - .4 Installation instructions.
- .2 Shop drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in British Columbia, Canada.
 - .1 Submit Schedule S-B; Assurance of professional design and commitment for field review.
 - .2 Submit Schedule S-C; Assurance of professional field review and compliance.
 - .2 Include design calculations, and other structural data, layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
 - .3 Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer Qualifications:
 - .1 Minimum three (3) years documented experience installing similar products and size projects.
 - .2 Supervised by a person having a minimum of five (5) years experience installing on similar type and size projects.
- .2 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .3 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Deliver, store, handle and protect materials in accordance with manufacturer's written instructions.
- .2 Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- .3 Delivery and Acceptance Requirements:

- .1 Deliver materials to site in unopened original factory packaging, labelled with manufacturer's name and address.
- .4 Storage, Handling and Protection Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, free from dampness, and well-ventilated area.
 - .2 Store, protect and prevent product from damage.
 - .3 Replace defective or damaged materials with new.
- .5 Packaging Waste Management:
 - .1 Separate waste materials for recycling.

Part 2 Products

2.1 PERFORMANCE REQUIREMENTS

- .1 Delegated Design: Engage a qualified professional engineer to design cold-formed steel framing.
- .2 Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits.
- .3 Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:
 - .1 Wall Studs: AISI S211.
 - .2 Headers: AISI S212.
 - .3 Lateral Design: AISI S213.
- .4 Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - .1 Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to authorities having jurisdiction.
 - .2 Construct fire-resistance rated partitions in compliance with tested assembly requirements.
- .5 STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, in accordance with ASTM E90 and classified in accordance with ASTM E413.

2.2 MATERIALS

- .1 Framing Members, General: Comply with ASTM C 955 for conditions indicated.
- .2 Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
 - .1 Grade: As required by structural performance.
- .3 Steel Sheet for Vertical Deflection and Drift Clips: ASTM A 1003/A 1003M, ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
 - .1 Grade: As required by structural performance.

- .4 Non-load bearing channel stud framing: to ASTM C645, roll formed from hot dipped zinc-coated (galvanized) steel sheet in accordance with ASTM A653, Z180, for screw attachment of gypsum board.
 - .1 Knock-out service holes at 460 mm centres.
- .5 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, and as follows:
 - .1 Slotted Deflection Track for Fire Separations: Premanufactured slotted top runner with 63 mm down standing legs and having 6 mm wide x 38 mm high slots spaced at 25 mm on centre along length of runner; tested and certified for use in fire rated wall construction.
 - .2 Double Runner Deflection Track: Outside runner using 75 mm flanges; inner runner 33 mm; maintaining 25 mm minimum deflection space.
 - .3 Deep Leg Deflection Track: Top runner having 75 mm down standing legs; maintaining 13 mm minimum deflection space.
 - .4 Base Runner: Bottom track with 33 mm upstanding legs.
- .6 Furring Channels: Commercial steel sheet in accordance with ASTM A653, Z180, hot dipped zinc-coated (galvanized), as follows:
 - .1 Hat Shaped, Rigid Furring Channels: ASTM C645, 0.75 mm thickness x 22 mm deep.
 - .2 Resilient Furring Channels: 0.46 mm thickness x 13 mm deep members designed to reduce sound transmission having asymmetrical face attached to single flange by a slotted leg (web).
- .7 Metal channel stiffener: 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.
- .8 Acoustical sealant: in accordance with Section 07 92 00 - Joint Sealants.
- .9 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.

2.3 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- .1 Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges.
- .2 Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges.
- .3 Headers and Jambs - Heavy-Duty Stud: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges.
- .4 Vertical Deflection Clips: Manufacturer's standard bypass and head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- .5 Deflection Track and Firestop Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thicknesses not less than indicated for studs and in width to accommodate depth of studs.

- .6 Slotted Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; punched with vertical slots in both legs. Studs should be positively attached to deep-leg track using vertical slots while allowing free vertical movement. Legs designed to support horizontal and lateral loads and transfer them to the primary structure.
- .7 Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure. Install a continuous row of bridging, composed of 38 mm cold-formed channel secured to each stud with clip angle at upper-most knockout, not more than 305 mm from top of wall.
- .8 U-Channel Assembly: Manufacturer's standard length U-Channel for lateral bracing for exterior curtain wall framing, loadbearing walls, or high interior partitions constructed of structural studs.
- .9 Bridging and Spacer Bar: As per manufactures recommendation.
- .10 Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
 - .1 Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure.
 - .2 Inner Track: Of web depth indicated.
- .11 Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.4 INTERIOR NON-LOAD-BEARING WALL FRAMING

- .1 Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges.
- .2 Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges.
- .3 Vertical Deflection Clips: Manufacturer's standard clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- .4 Deflection Track and Firestop Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thicknesses not less than indicated for studs and in width to accommodate depth of studs.
- .5 Slotted Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; punched with vertical slots in both legs. Studs should be positively attached to deep-leg track using vertical slots while allowing free vertical movement. Legs designed to support horizontal and lateral loads and transfer them to the primary structure.
- .6 Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical

- movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure. Install a continuous row of bridging, composed of 38 mm cold-formed channel secured to each stud with clip angle at upper-most knockout, not more than 305 mm from top of wall.
- .7 U-Channel Assembly: Manufacturer's standard length U-Channel for lateral bracing for exterior curtain wall framing, loadbearing walls, or high interior partitions constructed of structural studs.
 - .8 Bridging and Spacer Bar: As per manufactures recommendation.
 - .9 Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
 - .1 Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure.
 - .2 Inner Track: Of web depth indicated.
 - .10 Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.
 - .11 Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - .12 Channel Bridging and Bracing: Manufacturer's standard Pre-notched steel.
 - .13 U-Channel Bridging: Manufacturer's standard Steel, minimum base-steel thickness, with minimum 13-mm wide flanges.
 - .14 Hat-Shaped, Rigid Furring Channels: ASTM C645.
 - .15 Resilient Furring Channels: Manufacturer's standard 13-mm deep, steel sheet members designed to reduce sound transmission.
 - .16 Carrying Channels: Manufacturer's standard 1.37-mm uncoated-steel thickness, with minimum 13-mm wide flanges.
 - .1 Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.75 mm.
 - .2 Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 1.57-mm diameter wire, or double strand of 1.21 mm diameter wire.
 - .17 Z-Shaped Furring: Manufacturer's standard slotted or non-slotted web, face flange of 32 mm, wall attachment flange of 19 mm, minimum base-steel thickness of 0.45 mm, and depth required to fit insulation thickness indicated.
 - .18 Radius Framing: Manufacturer's standard Steel sheet runner for non-load-bearing curves, bends, variable radii and arches using expandable ribbon technology.
 - .19 Headers and Jambs: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges and as follows:

- .20 Framed Openings: Galvanized-steel, one-piece header and jamb studs complying with or exceeding requirements of ASTM C754 for conditions indicated below:
- .21 Shaftwall System: Non-load-bearing fire-rated wall assemblies that provide critical, life safety, fire-resistant protection for elevator shafts, stairwells, vertical chases, and mechanical enclosures.
 - .1 Stud: ASTM C645, of profile, size and base-steel thickness required to produce assemblies complying with applicable AISI Specification. Manufacturer's standard profile for repetitive members, corner and end members, and fire-resistance-rated assembly indicated:
 - .2 Runner Tracks: Manufacturer's standard J-profile track and matching studs in depth.

2.5 SUSPENSION SYSTEMS

- .1 Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 1.57 mm diameter wire, or double strand of 1.21 mm diameter wire.
- .2 Hanger Attachments to Concrete:
 - .1 Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES as appropriate for the substrate.
 - .1 Uses: Securing hangers to structure.
 - .2 Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941M, Class Fe/Zn 5, unless otherwise indicated.
 - .3 Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Stainless steel bolts, ASTM F593, and nuts, ASTM F836M.
 - .2 Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- .3 Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper.
- .4 Flat Hangers: Steel sheet.
- .5 Carrying Channels (Main Runners): Cold-formed, commercial-steel sheet with a base-steel thickness of 1.37 mm and minimum 13-mm wide flanges.
- .6 Furring Channels (Furring Members):
 - .1 Cold-Formed Channels: 1.37 mm base-steel thickness, with minimum 13 mm wide flanges, 19 mm deep.
 - .2 Non-Structural Studs: Cold-formed galvanized-steel C-studs, as per ASTM C645
 - .3 Non-Structural Track: Cold-formed galvanized-steel runner tracks in compliance with ASTM C645
 - .4 "EQ" (Equivalent-Gauge Thickness) Steel Studs and Runners: Members that can show certified third-party testing with gypsum board in accordance with ICC-ES AC86 need not comply with minimum thickness limitation or minimum section properties set forth in ASTM C645. The submission of an evaluation report is acceptable to show compliance with this requirement.
 - .5 Hat-Shaped, Rigid Furring Channels: ASTM C645, 22 mm and 38 mm deep.

- .6 Resilient Furring Channels: 13 mm deep members designed to reduce sound transmission.

2.6 CEILING JOIST FRAMING

- .1 Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges.

2.7 SOFFIT FRAMING

- .1 Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges.

2.8 FRAMING ACCESSORIES

- .1 Fabricate steel-framing accessories from ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
- .2 Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated.
 - .1 Supplementary framing.
 - .2 Bracing, bridging, and solid blocking.
 - .3 Web stiffeners.
 - .4 Anchor clips.
 - .5 End clips.
 - .6 Foundation clips.
 - .7 Gusset plates.
 - .8 Stud kickers and knee braces.
 - .9 Joist hangers and end closures.
 - .10 Hole-reinforcing plates.
 - .11 Backer plates.

2.9 ANCHORS, CLIPS, AND FASTENERS

- .1 Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- .2 Anchor Bolts: ASTM F 1554, threaded carbon-steel, carbon-steel nuts, and flat, hardened-steel washers; zinc coated.
- .3 Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, as appropriate for the substrate.
 - .1 Uses: Securing cold-formed steel framing to structure.
 - .2 Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5, unless otherwise indicated.

- .3 Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
- .4 Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- .5 Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 - .1 Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.
- .6 Welding Electrodes: Comply with AWS standards.

2.10 MISCELLANEOUS MATERIALS

- .1 Galvanizing Repair Paint: ASTM A 780/A 780M
- .2 Cement Grout: Portland cement, ASTM C 150/C 150M, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- .3 Non-metallic, Non-shrink Grout: Factory-packaged, non-metallic, noncorrosive, non-staining grout, complying with ASTM C 1107/C 1107M, and with a fluid consistency and 30-minute working time.
- .4 Shims: Load-bearing, high-density, multi-monomer, non-leaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.
- .5 Sealer Gaskets: Closed-cell neoprene foam, 6 mm thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

2.11 AUXILIARY MATERIALS

- .1 General: Provide auxiliary materials that comply with referenced installation standards.
 - .1 Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- .2 Isolation Strip at Exterior Walls:
 - .1 Asphalt-Saturated Organic Felt: ASTM D226/D226M, Type I (No. 15 asphalt felt), nonperforated.
 - .2 Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 3.2 mm thick, in width to suit steel stud size.
- .3 Backing Plates: Backer bar horizontally between stud spaces to suit application.
 - .1 Grade 33ksi min. yield strength, CP60, 33mils: 0.836mm (20ga)
 - .2 Dimensions:
 - .1 Legs: 32mm minimum.
 - .2 Width: 127mm minimum.
 - .3 Lengths: for 305mm, 406mm and 610mm o.c. spacing.

2.12 FABRICATION

- .1 Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - .1 Fabricate framing assemblies using jigs or templates.
 - .2 Cut framing members by sawing or shearing; do not torch cut.
 - .3 Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - .1 Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - .2 Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
 - .4 Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- .2 Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection
- .3 Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1:960 and as follows:
 - .1 Spacing: Space individual framing members no more than plus or minus 3 mm from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - .2 Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 3 mm.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for cold formed metal framing installation in accordance with manufacturer's written instructions.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
 - .3 Start of installation indicates installer's acceptance of substrate installation conditions.

3.2 PREPARATION

- .1 Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- .2 After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.
- .3 Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

- .1 Comply with reviewed signed and sealed engineered shop drawings, manufacturer's written recommendations and specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .2 Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- .3 Install cold-formed steel framing in accordance with ASTM C 1007 and AISI S200 "North American Standard for Cold-Formed Steel Framing – General Provisions," and manufacturer's written instructions unless more stringent requirements are indicated.
- .4 Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - .1 Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1.6 mm.
- .5 Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
 - .1 Cut framing members by sawing or shearing; do not torch cut.
 - .2 Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - .1 Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - .2 Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.
- .6 Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- .7 Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

- .8 Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- .9 Install insulation in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- .10 Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- .1 Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- .2 Fasten both flanges of studs to top and bottom track unless otherwise indicated.
- .3 Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.
- .4 Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - .1 Install deflection tracks and anchor to building structure.
 - .2 Connect drift clips to cold-formed steel framing and anchor to building structure.
- .5 Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 1220 mm apart. Fasten at each stud intersection.
 - .1 Channel Bridging: Cold-formed steel channel, welded or mechanically fastened to webs of punched studs.
 - .2 Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - .3 Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- .6 Install solid blocking at centers as indicated.
- .7 Top Bridging for Single Deflection Track: Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
 - .1 Install solid blocking at centers indicated on Shop Drawings.
 - .2 Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 INTERIOR NON-LOAD-BEARING WALL INSTALLATION

- .1 Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- .2 Fasten both flanges of studs to top and bottom track unless otherwise indicated.
- .3 Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.

- .4 Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - .1 Install deflection tracks and anchor to building structure.
 - .2 Connect drift clips to cold-formed steel metal framing and anchor to building structure.
- .5 Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 1220 mm apart. Fasten at each stud intersection.
 - .1 Channel Bridging: Cold-formed steel channel, welded or mechanically fastened to webs of punched studs.
 - .2 Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - .3 Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- .6 Install Top Bridging for Single Deflection Track as required.
- .7 Install solid blocking at centers as indicated.
- .8 Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.6 ERECTION TOLERANCES

- .1 Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1:960 and as follows:
 - .1 Space individual framing members no more than plus or minus 3 mm from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.7 CLEANING AND WASTE MANAGEMENT

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment
- .3 Waste Management: Separate waste materials for reuse and recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.8 REPAIRS AND PROTECTION

- .1 Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.
- .2 Protect installed products and components from damage during construction.
- .3 Repair or replace damage to adjacent materials caused by work of this section before Substantial Completion.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Furnish all labour, materials, equipment, accessories and services necessary for the complete supply and installation of rough carpentry as indicated on the drawings, scheduled and as specified.
- .2 Related Requirements:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 05 40 00 Cold Formed Metal Framing
 - .2 Section 07 21 16 Blanket Insulation
 - .3 Section 07 25 13 Air and Vapour Membranes
 - .4 Section 07 46 46 Fiber-Cement Siding
 - .5 Section 07 52 00 Modified Bituminous Membrane Roofing
 - .6 Section 07 62 00 Sheet Metal Flashing and Trim
 - .7 Section 07 92 00 Joint Sealants
 - .8 Section 08 11 00 Metal Doors and Frames
 - .9 Section 08 36 13 Sectional Doors
 - .10 Section 09 21 16 Gypsum Board Assemblies
 - .11 Section 10 28 13 Protective Wall Covering
 - .12 Section 10 28 13 Washroom Accessories
 - .13 Structural Drawings and Specifications

1.2 REFERENCES

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 CSA Group (CSA)
 - .1 CSA B111: Wire Nails, Spikes and Staples.
 - .2 CAN/CSA-O80 Series-08: Wood Preservation.
 - .3 CSA O121: Douglas Fir Plywood.
 - .4 CSA O141: Softwood Lumber.
 - .5 CSA O151: Canadian Softwood Plywood.
 - .6 CSA O153: Poplar Plywood.
 - .7 CAN/CSA-O325.0-92: Construction Sheathing.
 - .8 CAN/CSA-Z809: Sustainable Forest Management.
 - .2 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001: FSC Principle and Criteria for Forest Stewardship.
 - .3 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber [2010].
 - .4 Sustainable Forestry Initiative (SFI)

- .1 SFI: Standard.

1.3 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.
- .3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.

1.4 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Deliver, store, handle and protect materials in accordance with manufacturer's written instructions.
- .2 Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- .3 Delivery and Acceptance Requirements:
 - .1 Deliver materials to site in unopened original factory packaging, labelled with manufacturer's name and address.
- .4 Storage, Handling and Protection Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, free from dampness, and well-ventilated area.
 - .2 Store, protect and prevent product from damage.
 - .3 Replace defective or damaged materials with new.
- .5 Packaging Waste Management:
 - .1 Separate waste materials for recycling

Part 2 Products

2.1 MATERIALS

- .1 Lumber: Unless specified otherwise, softwood, S4S, in accordance with following standards:
 - .1 Moisture content maximum of 15% for exterior material, 15% for interior work.
 - .2 CAN/CSA-O141.
 - .3 NLGA Standard Grading Rules for Canadian Lumber.
 - .4 CAN/CSA-Z809 or FSC or SFI certified.
 - .5 Mill stamp materials as "Kiln Dried".
- .2 Panel Materials: Urea-formaldehyde free.
 - .1 Douglas fir plywood (DFP): to CSA O121, standard construction.
 - .2 Canadian softwood plywood (CSP): to CSA O151, standard construction.
 - .3 Exposed as a finish material: grade to be G1S with good face exposed.
 - .4 Wood and plywood for roof, wall cavity or exterior:

- .1 pressure treated with ACQ and kiln dried to a moisture content not exceeding 19%.
- .3 Wood preservative:
 - .1 "Alkaline Copper Quat" (ACQ) or "Copper Azole" ACQ-A-B-C. Preservative Treated wood manufactured to their applicable CSA Standard requirements and subsequently kiln dried to a moisture content not exceeding 19%.
- .4 Air and Vapour Membranes
 - .1 Refer to section 07 25 13 Air and Vapour Membranes

2.2 ACCESSORIES

- .1 Subflooring adhesive: to CAN/CGSB-71.26, cartridge loaded.
- .2 General purpose adhesive: to CSA O112.9.
- .3 Nails, spikes and staples: to ASTM F1667.
- .4 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .5 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.
- .6 Joist hangers, connectors and fasteners: In accordance with structural requirements.
- .7 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, type accordance with structural requirements.
- .8 Fastener Finishes:
 - .1 Galvanizing: to ASTM A123/A123M, use galvanized fasteners for exterior work and interior highly humid areas.
 - .2 Proprietary corrosion resistant fasteners for pressure- preservative, fire-retardant and treated lumber: as recommended by manufacturer for material and service conditions.
 - .3 Stainless steel: use 316 stainless steel.
 - .1 Fasteners for attaching of, - to or - thru pressure treated material.
 - .4 Plated finish: use cadmium plated fasteners for interior work.
- .9 Sill Plate Gasket: Closed cell polyethylene foam gasket in width to match sill plate width, 6 mm thick.
- .10 Insect screen:
 - .1 fibreglass screen, black.
 - .2 Flex-O-Vent, black.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for rough carpentry installation in accordance with manufacturer's written instructions.

- .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
 - .3 Start of rough carpentry installation indicates installer's acceptance of substrate installation conditions.
- .2 Inform Consultant before covering any rough carpentry to allow inspection.

3.2 SYSTEMS INTEGRATION

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

3.3 PREPARATION

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

3.4 BACKING, BLOCKING AND FURRING

- .1 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding electrical and mechanical equipment mounting boards, and other work as required.
- .2 Install backing continuous horizontally between stud spaces or vertically within stud profile to suit application.
- .3 Continuous Backing/Sheathing.
 - .1 Provide Min.13mm plywood blocking/sheathing to:
 - .1 All washroom and shower walls prior to application of gypsum board or cementitious tile backer.
 - .2 Behind all finished plywood and MDF.
 - .3 Behind all gypsum board in high traffic areas.
- .4 Backing:
 - .1 Provide min. 2 x 19 mm x stud width plywood blocking/sheathing, nested and screwed in steel and wood studs to:

- .1 Washroom accessories.
 - .2 Grab bars, handrails, ladders - backing c/w 38 x 140 mm vertical cripples at each rung.
 - .3 Clocks.
 - .4 Whiteboard and tackboard frames.
 - .5 Attachment points (3 rows minimum) for lockers.
 - .6 Door frames.
 - .7 Acoustic wall panels at perimeter and internal mounting locations.
 - .8 Wall mounted mechanical equipment including room exterior wall mounted heating units, 2 rows.
 - .9 Wall mounted light fixtures.
 - .10 Other architectural items and equipment to provide for fastening.
- .5 Install furring to support siding applied vertically where there is no blocking and where sheathing is not suitable for direct nailing.
 - .1 Align and plumb faces of furring and blocking to tolerance of 1:600.
 - .6 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
 - .7 Install fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.

3.5 CASEWORK WALL ANCHORAGE

- .1 In accordance with North American Architectural Woodwork Standards (NAAWS).
- .2 Except for peninsula/island or base casework with mechanical spacing allowances (because of the need to be engineered on an individual basis), requires:
 - .1 Continuous in wall blocking or backing of at least 51 x 152 mm (2"x6") nominal wood, 19 x 152 mm veneer core plywood or 152 x 1.2 mm (6" x 18 ga) steel sheet metal, located and screwed in all wood and metal stud walls.
 - .2 Intermediate Anchor Strip required when cabinet is over 1524 mm (60") tall.

3.6 SEISMIC CASEWORK INSTALLATION

- .1 In accordance with North American Architectural Woodwork Standards (NAAWS).

3.7 CLEANING AND WASTE MANAGEMENT

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment
- .3 Separate waste materials for reuse and recycling.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Furnish all labour, materials, equipment, accessories and services necessary for the complete supply and installation of blanket insulation as indicated on the drawings, scheduled and as specified.
- .2 Related Sections:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 01 10 00 General Requirements
 - .2 Section 07 46 46 Fiber-Cement Siding
 - .3 Section 08 11 00 Metal Doors and Frames
 - .4 Section 09 21 16 Gypsum Board Assemblies

1.2 REFERENCES

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 ASTM International
 - .1 ASTM C553: Standard Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .2 ASTM C665: Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - .3 ASTM C1320: Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
 - .2 CSA Group (CSA)
 - .1 CSA B111: Wire Nails, Spikes and Staples.
 - .2 CSA B149 PACKAGE: Consists of B149.1, Natural Gas and Propane Installation Code and B149.2, Propane Storage and Handling Code.
 - .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S702: Standard for Mineral Fibre Insulation for Buildings.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Installation Meeting:
 - .1 Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Consultant's Drawings, and are acceptable for product installation in accordance with the manufacturer's instructions.

1.4 SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
- .2 Product Data: Manufacturer's data sheets on each product to be used, including:
 - .1 Product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Preparation instructions and recommendations.

- .3 Storage and handling requirements and recommendations.
- .4 Installation instructions.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
- .2 Product data, instructions and submittals for incorporation into Architectural O & M Manual.
 - .1 Include manufacturer, product number, dimensions, for each insulation product and type installed in this project.
- .3 Manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- .1 Proceed in accordance with 01 10 00 General Requirements.
- .2 Supply product and accessories specified from one manufacturer to ensure total system compatibility and integrity.
- .3 Qualifications:
 - .1 Installer Qualifications:
 - .1 Minimum two (2) years documented experience installing similar products and size projects.
- .4 Board Insulation Installer Quality Assurance: Work experience of 5 years minimum with work similar to work of this Section.

1.7 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Deliver, store, handle and protect materials in accordance with Section 01 10 00 – General Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
 - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage, Handling and Protection Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, free from dampness, and well-ventilated area.
 - .2 Store, protect and prevent product from damage.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management:
 - .1 Proceed in accordance with Section 01 10 00 General Requirements.

1.8 WARRANTY

- .1 Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is

in addition to and not intended to limit other rights Owner may have under Contract Conditions.

- .2 Warranty period: 1 year commencing on Date of Substantial Performance of Work.

Part 2 Products

2.1 DESCRIPTION

- .1 Non-combustible, lightweight, semi-rigid stone wool batt insulation to CAN/ULC-S702, Type 1.

2.2 BATT INSULATION FOR EXTERIOR STUD WALLS

- .1 Batt Insulation for exterior stud walls: To CAN/ULC-S702, Type I
 - .1 Fire performance:
 - .1 Non-combustibility: To CAN/ULC S114.
 - .2 Surface Burning Characteristics: To CAN/ULC S102.
 - .1 Flame spread: 0.
 - .2 Smoke developed: 0.
 - .2 Thermal resistance: to ASTM C518.
 - .1 RSI value/25.4 mm at 24 ° C: 0.71 m²K/W
 - .2 R-value/inch at 75 ° F: 4.0 hr.ft².F/BTU
 - .3 Density: 32 kg/m³ to ASTM C167.
 - .4 Recycled content: 40 % minimum.
 - .5 Material: Non-combustible, lightweight, semi-rigid stone wool batt insulation to CAN/ULC-S702, Type 1.
 - .1 Size: 412 x 1219 mm.
 - .2 Thickness and weight: 152 mm, 4.8 kg/m².
 - .3 Acceptable manufactures and products:
 - .1 ROCKWOOL™, COMFORTBATT™.
 - .2 Owens Corning Thermafibre, UltraBatt
 - .3 Or acceptable substitution.

2.3 ACCESSORIES

- .1 Mechanical fasteners in accordance with insulation manufacturer's written recommendations.
- .2 Insulation clips:
 - .1 Impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.
- .3 Nails: galvanized steel, length to suit insulation plus 25 mm, to CSA B111.
- .4 Staples: As required

- .5 Tape: as recommended by manufacturer.
- .6 Acoustical sealant: in accordance with Section 07 92 00 Joint Sealants.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for blanket insulation application installation in accordance with manufacturer's written instructions.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
 - .3 Start of blanket insulation installation indicates installer's acceptance of substrate installation conditions.

3.2 INSTALLATION

- .1 Install insulation in accordance with manufacturer's written recommendations.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .3 Do not compress insulation to fit into spaces.
- .4 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .5 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of chimneys and vents.
- .6 Seal joints with acoustical joint sealant in accordance with Section 07 92 00 Joint Sealants.
- .7 Do not enclose insulation until before inspection and receipt of Consultant's written approval.

3.3 SITE QUALITY CONTROL

- .1 Coordinate field inspection in accordance with Section 01 10 00 – General Requirements.
- .2 Manufacturer's Services:
 - .1 Co-ordinate manufacturer's services with Section 01 10 00 – General Requirements.
 - .1 Arrange for payment for manufacturer's services.
 - .2 Have manufacturer review work involved in handling, installation, protection, and cleaning of insulation and accessories, and submit written reports in acceptable format to verify compliance of Work with Contract conditions.
 - .2 Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for product installation review in accordance with manufacturer's instructions.
 - .1 Report any inconsistencies from manufacturer's recommendations immediately to Consultant.

- .3 Schedule site visits to review work at stages listed:
 - .1 60% complete for one example of each distinct scenarios in the scope (one door and frame replacement and new opening at welding shop).
 - .2 Upon completion of Work, after cleaning is carried out.
 - .3 Obtain reports within three days of review and submit immediately to Consultant.

3.4 CLEANING AND WASTE MANAGEMENT

- .1 Proceed in accordance with Section 01 10 00 – General Requirements.
- .2 Leave Work area clean at end of each day.
- .3 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment

3.5 PROTECTION

- .1 Protect installed products and accessories from damage during construction.
- .2 Repair or replace damage to adjacent materials caused by work of this section.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Furnish all labour, materials, equipment, accessories and services necessary for the complete supply and installation of Sprayed Insulation as indicated on the drawings, scheduled and as specified.
- .2 Related Sections:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 07 23 13 Air and Vapour Membranes
 - .2 Section 08 11 00 Metal Doors and Frames

1.2 REFERENCE STANDARDS

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 ASTM International (ASTM)
 - .1 ASTM C1029: Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation.
 - .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102: Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC-S127: Standard Corner Wall Method of Test for Flammability Characteristics on Non-Melting Foam Plastic Building Materials.
 - .3 CAN/ULC-S705.1: Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification. Includes Amendment 1.2.
 - .4 CAN/ULC-S705.2: Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Application.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Architect's drawings, and are acceptable for product installation in accordance with the manufacturer's instructions.

1.4 SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
- .2 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Submit evaluation report, test reports and listing from an independent recognized evaluation service or testing laboratory, indicating compliance with specifications for specified performance characteristics and physical properties.
- .4 Submit test reports verifying compliance with CAN/ULC-S102 for surface burning characteristics.

- .5 Submit Manufacturer's Field Reports as described in PART 3 - FIELD QUALITY CONTROL. Submit manufacturer's written reports within 3 days of inspection. Submit Manufacturer's Field Reports as described in PART 3 - FIELD QUALITY CONTROL. Submit manufacturer's written reports within 3 days of inspection.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
 - .1 Product data and submittals for incorporation into architectural O & M Manual.
 - .2 Manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- .1 Proceed in accordance with 01 10 00 General Requirements
- .2 Qualifications:
 - .1 Manufacturer Qualifications:
 - .1 Minimum ten (10) years documented experience manufacturing similar products and size projects.
 - .2 Installer Qualifications:
 - .1 Minimum two (2) years documented experience installing similar products and size projects.

1.7 HEALTH AND SAFETY

- .1 Comply with requirements of Workplace Hazardous Materials Information System regarding use, handling, storage and disposal of insulation materials.
- .2 Protect workers in accordance with CAN-ULC-S705.2 and manufacturer's recommendations.
- .3 Ensure that workers wear gloves, supplied fresh air system, dust masks, long sleeved clothing, eye protection and protective clothing when applying foam insulation.
- .4 Ensure that workers do not eat, drink or smoke while applying foam insulation.

1.8 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Deliver, store and handle materials in accordance with Section 01 10 00 General Requirements and with manufacturer's written instructions.
- .2 Packaging Waste Management:
 - .1 Proceed in accordance with Section 01 10 00 General Requirements

1.9 SITE CONDITIONS

- .1 Ventilate area in accordance with Section 01 10 00 General Requirements
- .2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hour after application to maintain non-toxic, unpolluted, safe working conditions.

- .3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.
- .4 Protect adjacent surfaces and equipment from damage by overspray and fall-out.
- .5 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

Part 2 Products

2.1 MATERIALS

- .1 Description: Medium-density, closed-cell.
 - .1 Thermal Resistance (R-value per inch at 75 degrees F for 1 inch (25 mm) material): ASTM C518; 6.5 hr.sqft.degree F/BTU.
 - .2 Thermal Resistance (R-value per inch for 3.5 to 11.25 inch (89 mm to 285 mm) thickness based on 4 inches aged 180 days at 70 degrees F): ASTM C518; 6.3 hr.sqft.degreeF/BTU.
 - .3 Air Permeance (for 1 inch (25 mm) of material): ASTM E 283; Less than 0.02 L/s.m2 at 75 Pa.
 - .4 Water Vapor Transmission (for 1.5 inches (38 mm) of material): ASTM E 96 Dessicant Method; 0.9 perms.
 - .5 Flame Spread and Smoke Developed Rating: ASTM E 84.
 - .1 Flame Spread: Less than 25.
 - .2 Smoke Development: Less than 450.
 - .6 Bacterial and Fungal Growth and Food Value: ASTM C 1338; not a source of food for mold (no growth).
 - .7 Product Performance Evaluations:
 - .1 ICC/ES Evaluation Report No. ESR 3199
 - .2 Collaborative for High-Performance Schools (CHPS) "Low-emitting material" per CA 01350 Criteria.

2.2 EQUIPMENT

- .1 Spray equipment: in accordance with CAN-ULC-S705.2 and the equipment manufacturer's recommendations for specific type of application.
- .2 Provide a separate proportioner unit for each spray gun.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Comply with manufacturer's written instructions including data sheets, technical bulletins, catalogue installation instructions and carton installation instructions.

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for Sprayed Insulation application in accordance with manufacturer's written instructions.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
 - .3 Start of Sprayed Insulation application indicates installer's acceptance of substrate installation conditions.

3.3 PROTECTION OF IN-PLACE CONDITIONS

- .1 Mask and cover adjacent areas to protect from over spray.
- .2 Ensure any required foam stop or back up material are in place to prevent over spray and achieve complete seal.
- .3 Seal off existing ventilation equipment. Install temporary ducting and fans to ensure exhaust fumes. Provide for make-up air.
- .4 Erect barriers, isolate area and post warning signs to advise non-protected personnel to avoid the spray area.

3.4 SURFACE PREPARATION

- .1 Clean all surfaces free of oil, grease, dust and debris. Ensure surfaces are clean, dry and properly fastened to ensure adhesion of the foam to the substrate.
- .2 Ensure that all work by other trades that may penetrate through the insulation is in place and complete.

3.5 APPLICATION

- .1 Apply primer to surfaces where recommended by manufacturer. Apply primer in accordance with manufacturer's instructions.
- .2 Spray apply insulation to maintain continuity of thermal protection to building elements and spaces.
- .3 Spray apply insulation to primed surfaces in accordance with CAN-ULC-S705.2.
- .4 Record equipment settings on the Daily Work Record as required by CAN-ULC-S705.2.
- .5 Spray apply insulation to final thickness as indicated on drawings. Apply in consecutive passes to thicknesses as recommended by manufacturer. Minimum thickness: 15 mm.
- .6 Keep insulation away from heat emitting devices such as recessed light fixtures, chimneys and furnace vents. Maintain minimum distances as recommended by manufacturer's instructions.
- .7 Finished surface of foam insulation to be free of voids and imbedded foreign objects.
- .8 Remove masking materials and over spray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed under other sections.

- .9 Trim, as required, any excess thickness that would interfere with the application of cladding system by other trades.
- .10 Do not enclose insulation until it has been reviewed and approved by Consultant. Prepare one example of each distinct condition (i.e. one metal door frame on CMU wall) for review. After the review and approval of the mock-up, the remaining work in other similar conditions can be carried on.

3.6 FIELD QUALITY CONTROL

- .1 Coordinate field inspection in accordance with Section 01 10 00 General Requirements.
- .2 Provide Manufacturer's Field Services consisting of product use recommendations and periodic site visits for inspection of product installation to ensure compliance with manufacturer's instructions.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
- .2 Leave Work area clean at end of each day.
- .3 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment
 - .1 Remove insulation material spilled during installation and leave work area clean.

3.8 PROTECTION

- .1 Protect installed products and accessories from damage during construction.
- .2 Protect the spray foam from ultraviolet in accordance with manufacturer's requirements.
- .3 Repair or replace damage to adjacent materials caused by work of this section before Substantial Completion.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Furnish all labour, materials, equipment, accessories and services necessary for the complete supply and installation of air and vapour membranes as indicated on the drawings, scheduled and as specified.
- .2 Section Includes: requirements for supplying labor, materials, tools, and equipment to complete the Work as shown on the Drawings and as specified herein including, but not limited to, the following:
 - .1 Sheet vapour barriers.
 - .2 weather barrier
 - .3 Self-Adhesive membranes.
 - .4 Sealant.
- .3 Related Sections:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Cast in place concrete
 - .2 Section 05 40 00 Cold Formed Metal Framing
 - .3 Section 07 21 16 Blanket Insulation
 - .4 Section 07 46 46 Fiber-Cement Siding
 - .5 Section 08 11 00 Metal Doors and Frames
 - .6 Structural Drawings and Specifications
 - .7 Mechanical Drawings and Specifications
 - .8 Electrical Drawings and Specifications

1.2 REFERENCES

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
- .2 ASTM International (ASTM)
 - .1 ASTM D1709: Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.
 - .2 ASTM D882: Standard Test Method for Tensile Properties of thin plastic sheeting.
 - .3 ASTM E84: Standard Test Method for Surface burning Characteristics of Building Materials.
 - .4 ASTM E96: Water Vapour Transmission of Materials.
 - .5 ASTM E154: Standard Test Methods for Water Vapour Retarders Used in Contact with Earth Under Concrete Slabs.
 - .6 ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls, by Uniform Static Air Pressure Difference.
 - .7 ASTM E783: Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.

- .8 ASTM E1186: Standard Practices for Air Leakage Site Detection in Building Envelope and Air Retarder Systems.
- .9 ASTM E2178: Standard Test Method for Air Permeance of Building Materials.
- .10 ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
- .11 ASTM F1249: Standard Test Method for Water Vapour Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13M: Sealing Compound, One Component, Elastomeric Chemical Curing.
 - .2 CAN/CGSB-19.24M: Multi-Component, Chemical Curing Sealing Compound.
 - .3 CGSB 19-GP-14M, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
 - .4 CAN/CGSB-51.33: Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
 - .5 CAN/CGSB-51.34: Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.
 - .6 CAN/ULC S-741: Standard for Air Barrier Materials - Specification.
 - .7 CAN/ULC S-742: Standard for Air Barrier Assemblies - Specification.
- .4 National Air Barrier Association: Professional Contractor Quality Assurance Program

1.3 SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
- .2 Product Data: Manufacturer's data sheets on each product to be used, including:
 - .1 Product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Preparation instructions and recommendations.
 - .3 Storage and handling requirements and recommendations.
 - .4 Manufacturer's installation instructions.
- .3 Warranty:
 - .1 Sample warranty as specified.

1.4 QUALITY ASSURANCE

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
- .2 Supply product and accessories specified from one manufacturer to ensure total system compatibility and integrity.
- .3 Qualifications:
 - .1 Installer Qualifications:
 - .1 Minimum two (2) years documented experience installing similar products and size projects.
 - .2 Inspection: All work must pass inspection and approval of consultant, as well as the local codes and regulations or authorities having jurisdiction.

- .4 Installation:
 - .1 Install membrane using specified products and manufacturer approved installation methods, equipment and techniques.
 - .2 Allow 48 hours for a review of a typical membrane installation on each distinctive opening in the scope of work by Consultant before proceeding with cladding work and work for other openings.

1.5 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Deliver, store, handle and protect materials in accordance with Section 01 10 00 General Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
 - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

1.6 WARRANTY

- .1 For sealant and sheet materials the 12 months warranty period prescribed in subsection GC 32.1 of General Conditions "C" is extended to 24 months. → Do we have this? JN: Is this a CCDC 2 contract?
- .2 Provide [three] year warranty under provisions of Section [01 78 00 - Closeout Submittals] [and in accordance with General Conditions (GC) [CCDC 2 GC 12.3]].
- .3 Warranty: include coverage of installed [sealant] [and] [sheet materials] which:
 - .1 Fail to achieve air tight and watertight seal.
 - .2 Exhibit loss of adhesion or cohesion.
 - .3 Do not cure.

Part 2 Products

2.1 VAPOUR IMPERMEABLE MEMBRANES

- .1 Class I Vapour Retarder in accordance with ASTM E-96.
 - .1 0.1 perm (5.72 ng/Pa.s.m²) or less.
- .2 Heat Welded, Sheet Applied Membrane:
 - .1 Composed membrane of SBS modified bitumen with non-woven polyester or fiberglass reinforcement. Self-sealing membrane when penetrated with self-tapping screws.
 - .2 Acceptable products and manufactures:
 - .1 Refer to existing membrane to match, if possible. Otherwise, refer to the list below.
 - .2 Sopraseal 180 HD and 180 HD FF by Soprema.

- .3 Sopraseal 60 and 60 FF by Soprema.
- .4 Blueskin TG by Henry Company.
- .5 Or acceptable substitution.
- .3 Self-Adhesive Membranes.
 - .1 Self-adhesive air/vapour barrier membrane composed of SBS modified bitumen and a cross-laminated polyethylene film. Self-sealing membrane when penetrated with self-tapping screws
 - .2 Acceptable products and manufactures:
 - .1 Refer to existing membrane to match, if possible. Otherwise, refer to the list below.
 - .2 Sopraseal Stick 1100 T by Soprema.
 - .3 Sopraseal Stick 130 and 130-S by Soprema.
 - .4 Blueskin SA by Henry Company.
 - .5 Blueskin SA LT (low temperatures application) by Henry Company.
 - .6 Or acceptable substitution.

2.1 VAPOUR PERMEABLE MEMBRANES

- .1 greater than 10 perms (572.14 ng/Pa.s.m²).
- .2 Self-Adhesive Membranes.
 - .1 Self-adhered vapour permeable, water resistive air barrier consisting of an engineered film and a patented, permeable adhesive technology with release film. Fully adhered to the wall substrates in a weatherboard method without mechanical attachment.
 - .2 Acceptable products and manufactures:
 - .1 Sopraseal Stick VP by Soprema.
 - .1 Water Vapor Permeance (ASTM E96-B): 972 ng/Pa s m² (17 perms)
 - .2 Water Vapor Permeance (ASTM E96-A): 629 ng/Pa s m² (11 perms)
 - .2 Blueskin VP160 (Commercial) by Henry Company.
 - .1 Water Vapor Permeance (ASTM E96-A): 1659 ng/Pa s m² (29 perms)
 - .3 Blueskin VP100 (Residential) by Henry Company.
 - .1 Water Vapor Permeance (ASTM E96-A): 1888 ng/Pa s m² (33 perms)
 - .4 Or pre-approved substitution.

2.2 ACCESSORY MATERIALS

- .1 Primer For Self-Adhesive Membranes:
 - .1 Rubber based adhesive for self-adhered membranes.
 - .2 Acceptable products and manufactures:
 - .1 Sopraseal Stick Primer by Soprema (-30°C).
 - .2 Blueskin Adhesive by Henry Company (-12°C).
 - .3 Or acceptable substitution.

- .2 Tapes Around Wall Openings And Penetrations:
 - .1 Self-adhesive membrane composed of SBS modified bitumen and cross-laminated polyethylene film.
 - .2 Acceptable products and manufactures:
 - .1 Sopraseal Stick 1100 T in pre-cut rolls by Soprema.
 - .2 Blueskin SA(LT) by Henry Company.
 - .3 Or acceptable substitution.
- [OR]**
- .3 Termination Sealant:
 - .1 SBS modified bitumen, solvent based sealing compound for detailing around junctions and penetrations of membrane. Intended for applications temperatures above -10 degrees Celsius.
 - .2 Acceptable products and manufactures:
 - .1 Sopramastic by Soprema.
 - .2 Polybitume 570-05 by Henry Company.
 - .3 Or acceptable substitution.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied

3.2 INSTALLATION

- .1 Proceed in accordance with Section –01 10 00 General Requirements.
- .2 Comply with manufacturer's written recommendations and specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .3 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program.
- .4 Perform Work in accordance with Canadian Urethane Foam Contractor's Association - Professional Contractor Quality Assurance Program] and requirements for materials and installation.
- .5 Use sheets of largest practical size to minimize joints.
- .6 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

3.3 EXAMINATION AND PREPARATION OF SURFACES

- .1 Complete examination and preparation by ensuring that the following conditions are met: Surfaces to be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane. Strike masonry joints flush.
- .2 Do not proceed with application of liquid air barrier accessories when rain or frost is expected within 24 hours.
- .3 Sheathing boards substrate gaps larger than 6 mm need solid backing.
- .4 At deflection joints, a 150 mm wide reinforcement strip of self-adhesive membrane centered on the joints should be installed.

3.4 MEMBRANE INSTALLATION AT OPENINGS (Windows, doors, etc.)

- .1 Place specified self-adhesive flashing membrane across window sills. Pre-treat inside corners with a gusset. Install membrane and end dam terminations, seal cuts and terminations with termination sealant.
- .2 Wrap jamb of rough openings with specified self-adhesive air barrier flashing membrane as detailed.
- .3 Extend specified self-adhesive air barrier flashing membrane into rough window openings sufficient to provide a connection to window thermal break.
- .4 Prime surfaces as per manufacturers' instructions and allow to dry.
- .5 Align and position self-adhesive flashing membrane, remove protective film and press firmly into place.
- .6 Ensure minimum 50 mm overlap at all side laps and minimum 50 mm overlap at all end laps of membrane.
- .7 Roll all laps and membrane with a neoprene roller to ensure positive contact.
- .8 Applied to junctions, window frames, door frames, endings, and on the perimeter of the building, receiving a sprayed insulation, should be mechanically fastened to the substrate with a termination bar.

3.5 APPLICATION OF TERMINATION SEALANT

- .1 Apply termination sealant along the leading edge of the termination and cuts.
- .2 Trowel apply termination sealant over area and feather out to shed water.

3.6 PROTECTION

- .1 Do not inhibit damp substrates from drying out. Do not expose the backside of the substrate to moisture or rain.
- .2 Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane, including wall openings and construction activity above completed air barrier installations. Protect air barrier membrane from damage and inclement weather during the construction phase.
- .3 Air/vapour barrier membrane is not designed for permanent exposure.

- .4 Good practice calls for covering as soon as practical.
- .5 Special consideration must be given to the exposed un-insulated membrane during winter months of construction so as to avoid the risk of condensation.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Furnish all labour, materials, equipment, accessories and services necessary for the complete supply and installation of Roofing panels as indicated on the drawings, scheduled and as specified.
- .2 Section Includes:
 - .1 Metal roof panels.
 - .2 Sealant for metal roofs, and flashing.
- .3 Related Sections:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 06 10 00 Rough Carpentry
 - .2 Section 07 62 00 Sheet Metal Flashing and Trim
 - .3 Section 07 92 00 Joint Sealants

1.2 REFERENCES

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 ASTM International (ASTM):
 - .1 ASTM A653/A653M: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A792: Specification for Sheet Steel, Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .3 ASTM E1646: Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
 - .4 ASTM E1680: Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems.
 - .5 ASTM E2140: Standard Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head.
 - .2 Canadian Standard Association (CSA Group)
 - .1 CAN/CSA-S136: North American Specification for the Design of Cold-Formed Steel Structural Members.
 - .2 CSA S136.1: Commentary on North American Specification for the Design of Cold-Formed Steel Structural Members.
 - .3 Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
 - .1 Architectural Sheet Metal Manual.
 - .4 Underwriters Laboratory (UL)
 - .1 Roofing Materials and Systems Directory listings and classifications of Underwriter's Laboratory roofing construction assemblies.
 - .2 UL 580: Tests For Uplift Resistance of Roof Assemblies.
 - .3 UL 790: Standard Test Methods for Fire Tests of Roof Coverings.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Installation Meeting:
 - .1 Verify actual dimensions/openings by field measurements before fabrication and record on shop drawings. Coordinate with fabrication and construction schedule to avoid construction delays.
 - .2 Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Architect's drawings, and are acceptable for product installation in accordance with the manufacturer's instructions.
- .2 Sequencing:
 - .1 Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
 - .2 Determine Work of other trades that penetrates the roof is coordinated by location, in place, and accepted prior to installation of roofing system.

1.4 SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
- .2 Product data: Manufacturer's data sheets on each product to be used, including:
 - .1 Product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Preparation instructions and recommendations.
 - .3 Storage and handling requirements and recommendations.
 - .4 Installation instructions.
- .3 Shop drawings:
 - .1 Construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, maintenance instructions and finishes specified.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.

1.6 QUALITY ASSURANCE

- .1 Proceed in accordance with 01 10 00 General Requirements.
- .2 Supply product and accessories specified from one manufacturer to ensure total system compatibility and integrity.
- .3 Qualifications:
 - .1 Manufacturer and Installer Qualifications:
 - .1 Minimum five (5) years documented experience installing similar products and size projects.

1.7 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Deliver, store, handle and protect materials in accordance with Section 01 10 00 General Requirements and with manufacturer's written instructions.

1.8 WARRANTY

- .1 Furnish Contractor's Workmanship Warranty: 2 years
- .2 Furnish Manufactures Material Warranty: 40 years

Part 2 Products

2.1 MANUFACTURERS

- .1 Acceptable Manufacturers:
 - .1 Listed under RCABC Accepted Manufactures.

2.2 SYSTEM DESCRIPTION

- .1 The extent of each type of preformed metal roofing panel as indicated on the drawings shall include preformed metal roof panels, flashing required to weatherproof the system (ridge, drip sill, end wall, and other miscellaneous flashing), related accessories including but not limited to; underlayment, butyl tape, sealants used in conjunction with the roofing system, and necessary attachment hardware as required to meet the performance standards and complete the roofing system.
- .2 Design Requirements:
 - .1 Continuous, one-piece, preformed, prefinished single length roof panels.
 - .2 Panels, clips, and other components required for specific project conditions.
 - .3 Manufacturer is responsible for providing evidence acceptable to Architect that manufacturer's specified roof system is capable of meeting thermal, wind uplift, and performance requirements specified.
- .3 Thermal Movement:
 - .1 Complete metal roofing and flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.

2.3 METAL ROOFING SYSTEMS - GENERAL

- .1 Metal roof shall be fastened with concealed anchor clips.
- .2 Panel clips shall be as recommended by the manufacturer to meet the performance criteria of this specification.
- .3 All exposed adjacent flashing shall be of the same material and finish as the roof panels.
- .4 Fasteners:
 - .1 There shall be no exposed fasteners except to fasten flashing at fixing points, or for panel attachment as dictated by warranty requirements for longitudinal thermal expansion and contraction, or as indicated on the shop drawings.

2.4 METAL ROOFING SYSTEMS - FABRICATION

- .1 Panels shall be fabricated on fixed base machines located within a permanent fabrication facility in continuous lengths as required. No horizontal end lap joints will be accepted, unless panels exceed 27.5 m (90 feet) in length or jobsite conditions dictate.
- .2 Panel design shall incorporate concealed clips and fasteners. Exposed fasteners in roofing panels will not be accepted unless indicated on shop drawings.
- .3 Standing seam design shall prevent water infiltration by utilizing a capillary break or continuous non-curing sealant to prevent siphoning.
- .4 Fabricate roofing and related sheet metal work in accordance with approved shop drawings and applicable standards set forth in the Sheet Metal and Air Conditioning Contractors National Association - Architectural Sheet Metal Manual (current edition).
- .5 Roofing and sheet metal flashing shall be fabricated in minimum 3048 mm (10 feet) lengths except as noted otherwise. Flashing shall have a minimum 19 mm (3/4 inch) hemmed edges in exposed locations. Provide field fabricated miters for components that change direction on the project.

2.5 METAL ROOF PANEL

- .1 Sheet Steel Materials:
 - .1 Aluminum-zinc alloy coated steel sheet, conforming to ASTM A792 / A792M-06 SS Grade 33, AZM150 (AZ50) coating. Thickness tolerance as per ASTM A924 / A924M-06 ± 0.08 mm (0.003") for sheet widths not exceeding 1500 mm (60").
- .2 Minimum Thickness:
 - .1 Panel to meet all specified design loads, but not less than 0.58 mm (24 Gauge).
- .3 Profile: to match existing roofing.
 - .1 Continuous corrugation, rib dimension to be confirmed on site to match the existing roofing.
- .4 Texture: To match existing roofing.
- .5 Finish: to match existing roofing.
 - .1 70 percent PVDF fluorocarbon coating, applied on a continuous coil coating line. Top side dry film thickness of 1.1 plus or minus 0.01 mil dry film thickness. On reverse side, a wash coat and primer, .04 plus or minus .01 mil dry film thickness.
- .6 Apply strippable film to the topside of the painted coil to protect the finish during fabrication, shipping and field handling. Remove strippable film during installation.

2.6 MISCELLANEOUS MATERIALS

- .1 Concealed Anchor Clips:
 - .1 Concealed anchor clips to be the same as those used during the testing of the roof system. Clip bases shall have factory punched or drilled holes for attachment. Clips shall be made from multiple pieces with the allowance for the total thermal movement required within the clip. Fixed clips are permitted when the manufacturer can substantiate that the system can accommodate the thermal cyclic movement under sustained live or snow loads.

- .2 Fasteners:
 - .1 Fasteners for steel roof panels to be zinc-coated steel, aluminum, corrosion resisting steel, or nylon-capped steel, approved for the applicable requirements. Fasteners for accessories to be the manufacturer's standard. Exposed roof fasteners to be sealed or have sealed washers on the exterior side of the covering to waterproof the fastener penetration. Washer material to be compatible with the screw head, and gasket portion of fasteners or washers to be neoprene or other equally durable elastomeric material.
- .3 Components:
 - .1 Components to be compatible with the roof panel furnished. Flashing, trim, metal closure strips, caps, and similar metal components shall not be less than the minimum thickness specified by Manufacturer. Exposed metal components shall be finished to match the panels or trim, as furnished. Molded closure strips shall be closed-cell or solid-cell synthetic rubber or neoprene, or polyvinyl chloride pre-molded to match configuration of the covering and shall not absorb or retain water.
- .4 Sealants:
 - .1 All tape sealant to be a pressure sensitive, 100 percent solid, sealing tape with a release paper backing. Provide permanently elastic, non-sagging, non-toxic, non-staining tape sealant.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for metal roof panels installation in accordance with manufacturer's written instructions.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
 - .3 Start of product installation indicates installer's acceptance of substrate installation conditions.
- .2 Examine alignment and placement of building roof structure before proceeding with installation of preformed metal roofing.
- .3 Examine metal roof structure before starting installation. Metal structure to be clear, clean and smooth, dry and remain dry and free of ice and snow, after roofing application commences.
- .4 Field check dimensions and check support alignment with taut string or wire.
- .5 Do not proceed with installation until conditions are satisfactory. Notify the architect in writing of unsatisfactory conditions.

3.2 INSTALLATION

- .1 General Requirements:

- .1 Install roofing and flashing in accordance with approved shop drawings and manufacturer's product data, within specified tolerances.
 - .2 Isolate dissimilar metals, masonry and concrete from metal roof system with bituminous coating.
 - .3 Allow anchorage for thermal expansion and contraction without stress or elongation of panels, clips or anchors.
 - .4 Coordinate flashing and sheet metal work to provide watertight conditions at roof terminations. Fabricate and install in accordance with standards set forth in the SMACNA Manual using continuous cleats at all exposed edges.
- .2 Preformed Metal Panels:
- .1 Fasten anchor clips with fasteners as recommended by the manufacturer as required to meet the performance criteria specified.
 - .2 Install starter and edge trim before installing roof panels.
 - .3 Remove strippable plastic film prior to installation of roof panels.
 - .4 Erect metal roofing with lines, planes, rises and angles sharp and true, and plane surfaces free from objectionable warp, dents, buckle or other physical defects.
 - .5 Protect installed roof panels and trim from damage caused by adjacent construction until completion of installation.
 - .6 Remove and replace any panels or flashing components that are damaged beyond successful repair.
- .3 Flashing:
- .1 Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for installation work where the manufacturer's approved shop drawings do not define a specific detail.
 - .2 Conceal fasteners and expansion provisions wherever possible.
 - .3 Hem all exposed edges of sheet metal flashing that are exposed with at least 3/4 inch (19 mm) fold under.
 - .4 Insert metal flashing into reglets, anchor with wedges and seal all joints.
 - .5 Set sheet metal items level, true to line and plumb.
 - .6 Secure all metal flashing to wood nailers with screws as indicated on the approved shop drawings.
 - .7 Use cleats to keep flashing end laps closed when face width exceeds 8 inches (203 mm).

3.3 FIELD QUALITY CONTROL

- .1 Tolerances:
 - .1 Applicable erection tolerances: Maximum variation from true planes or lies shall be 6 mm (1/4 inch) in 6.1 m (20 feet) and 9.5 mm (3/8 inch) in 12.2 m (40 feet).
 - .2 Metal roof systems cannot correct any previously installed support or wood nailer problems that do not meet the above tolerances.

3.4 CLEANING

- .1 Proceed in accordance with Section 01 10 00 General Requirements.

- .2 Leave Work area clean at end of each day.
- .3 Clean exposed surfaces of work promptly after completion of installation. To prevent rust from staining the painted finish, immediately remove filings produced by drilling or cutting.
- .4 Clean roof in accordance with manufacturer's recommendations.
- .5 Touch up minor abrasions and scratches in finish with the manufacturer's supplied PVDF touch up paint.
- .6 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment

3.5 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair or replace damage to adjacent materials caused by work of this section before Substantial Completion.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section includes;
 - .1 Factory-finished fiber cement siding finished with CREATIV™ coating.
 - .2 ZAM® coated panel clip system.
 - .3 Galvanized steel Starter Bar.
 - .4 ZAM® coated Metal Caulking Joiner with bond breaker tape.
 - .5 Concrete Cut Edge Sealer
 - .6 Stainless Steel Fasteners.
 - .7 Low Modulus Sealant.
 - .8 Touch-up paint.

1.2 RELATED REQUIREMENTS

- .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 01 10 00 General Requirements
 - .2 Section 05 40 00 Cold Formed Metal Framing
 - .3 Section 07 21 16 Blanket Insulation

1.3 REFERENCES

Proceed in accordance with the current edition of the following:

- .1 ASTM C 1186: Standard Specification for Flat Fiber Cement Sheets.
- .2 ASTM E 136: Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C.
- .3 ICC Evaluation Services Inc. Evaluation Report ESR-1627.
- .4 Canadian Construction Material Centre CCMC-13084-R.
- .5 PS 1 – Construction and Industrial Plywood.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Verify project requirements.
- .2 Review installation and substrate conditions.
- .3 Co-ordination with other construction subtrades.
- .4 Review [manufacturer's] written installation instructions and warranty requirements.

1.5 SUBMITTALS

Submit the following items in accordance with Section 01 10 00 General Requirements.

- .1 Product data.

- .2 Manufacturer's installation and maintenance instructions
- .3 Warranty: Provide manufacturer's warranty documents

1.6 QUALITY ASSURANCE

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
- .2 Product Performance Requirements: Fiber Cement Siding panels shall meet the typical properties:
 - .1 Confirm on site to match existing siding panel sizes.
- .3 Workmanship shall be adequate quality to meet project specifications as determined by Owner.
- .4 Manufacturer and Applicator: Company specializing in work of this section with a minimum of three (3) years uninterrupted experience.

1.7 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
- .2 Deliver manufactured materials in original unopened packages or containers, with manufacturer's labels intact and legible.
- .3 Protect materials from damage.
- .4 Store siding panels horizontally and under cover. Keep siding panels dry and off the ground prior to installation to avoid moisture conditions that could affect the quality of work. Siding panels are not to be stacked more than 2 pallets high.
- .5 Carry panels at mid span and on edge for ease of handling and to avoid breakage.
- .6 Siding panels contain silica. When drilling, cutting, or abrading siding panels during installation or handling, observe the following precautions:
 - .1 Work outdoors when feasible or in well ventilated indoor space.
 - .2 Wear a dust mask or use a respirator.
 - .3 Warn other workers and building occupants in the area.
 - .4 Advise building occupants to close windows in the immediate area of work.

1.8 CLOSEOUT SUBMITTALS

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
- .2 Operation and Maintenance instructions, precautions regarding cleaning, product data, samples, instructions and shop drawing for incorporation into architectural O & M Manual.

1.9 PROJECT CONDITIONS

- .1 Field Measurements: Verify actual dimensions/openings by field measurements before fabrication and record on shop drawings. Coordinate with fabrication and construction schedule to avoid construction delays.
- .2 Ambient Conditions: Solid core fiber cement panels are not to be installed in regions averaging more than 80 freeze thaw cycles per year. Hollow core fiber cement panels do not have this restriction. Contact the manufacturer for more information.

1.10 WARRANTY

- .1 Product Performance: 50 YEAR LIMITED WARRANTY – The Product shall not incur structural cracking, rot or delaminate under normal use and wear and shall resist damage caused by termites for a period of 50 years under normal use.
- .2 CREATIV™ Product finish: 15 YEAR LIMITED WARRANTY – The CREATIV™ Product finish shall not significantly peel, incur structural cracking or chip for a period 15 years under normal use.
- .3 See Warranty Card for full product warranty details.

Part 2 Products

2.1 MANUFACTURERS

- .1 Acceptable manufactures and products:
 - .1 Basis of Design: KMEW USA Inc., Ceraclad
 - .1 Contacts:
 - .1 Alana Evans (604) 378-1074 Alana.Evans@ceraclad.com
 - .2 Richard Campbell (604) 679-7849 rcampbell@paneltek.ca
 - .3 Ron Loyd, CDT. (425) 553-5780. Ron.Loyd@Ceraclad.com
 - .2 James Hardie
 - .2 Substitutions: in accordance with Section 01 10 00 General Requirements

2.2 PERFORMANCE REQUIREMENTS

- .1 General Performance: Installed Fiber Cement Siding shall withstand exposure to weather and normal use without failure due to defective manufacture.
 - .1 Combustion Characteristics: Fiber cement siding shall be classified non-combustible according to ASTM E 136 – Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees Celsius or CAN/ULC-S114- Standard Method of Test for the Determination of Non-Combustibility in Building Materials.
 - .2 Flame Spread Characteristics: Fiber cement siding shall be classified “A” according to ASTM E84 – Standard Test Method for Surface Burning Characteristics.
 - .1 Flame Spread: 0
 - .2 Smoke Developed: 0
 - .3 Wind Loaded Strength Characteristics: Fiber cement siding system shall resist wind load pressures in accordance with testing conducted per ASTM E 330 -Standard Test Method for Structural Performance of Exterior Building Products by Uniform Static Pressure.
 - .4 Ignition Characteristics: Fiber cement siding system shall not ignite when tested according to NFPA 268 – Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source.
 - .5 Weathering and Color Fastness: Fiber cement siding system color fade shall not exceed color No. 1- 2 and E= 9.6 in accordance with ISO 105-A02:1990, Test for Color Fastness- Part A02; Grey scale for assessing change in color.

2.3 FIBER CEMENT SIDING MATERIAL

- .1 Blend of Portland Cement, Wood Fiber and Lightweight Materials and Recycled Materials including Fly Ash, extruded into panels and pre-finished for installation in a Rain-Screen Exterior siding system suitable for new construction and renovation applications.
- .2 Profile: Contemporary Smooth CERACLAD™ by KMEW.
- .3 Color: To be selected from Manufacturer's CREATIV™ Color Swatch to match the existing cladding colour.
- .4 Recycled Content: Minimum 44%
- .5 VOC: Zero Emissions.

2.4 AUXILIARY INSTALLATION MATERIALS

- .1 General: Auxiliary installations materials recommended by fiber cement siding manufacturer for intended use and compatible with Rain Screen Exterior Siding System.
- .2 Starter Bar: CERACLAD™ Galvanized Horizontal Starter Bar by KMEW.
- .3 Panel Clip: CERACLAD™ ZAM® coated Panel Clip by KMEW.
- .4 Metal Caulking Joiner: CERACLAD™ ZAM® coated Metal Caulking Joiner by KMEW.
- .5 Cut Edge Sealer: Concrete Sealer, locally purchased.
- .6 Caulk: Low Modulus Silicone Joint Sealant in matching color, locally purchased.
 - .1 Ultra Low Modulus Sealant, 790 Silicone Building Sealant by Dow Corning.
 - .2 Low Modulus Silicone Join Sealant, Spectrem 1 by Tremco.
- .7 Touch-up Paint Kit: CERACLAD™ 3 part kit consisting of 1 bottle primer, 1 bottle acrylic color base and 1 bottle hardener by KMEW.

2.5 SOURCE QUALITY CONTROL

- .1 Single Source Responsibility: Supply panels and accessories as manufactured, distributed or approved for use by KMEW. No substitutions allowed.

Part 3 Execution

3.1 GENERAL

- .1 Proceed in accordance with Section 01 –10 00 General Requirements

3.2 EXAMINATION

- .1 Verify conditions ready to receive work of this Section. Do not begin work until correction of unsatisfactory conditions.
- .2 Examine substrate to ensure that finished surfaces will be true, level, and plumb without requiring additional steps. Notify proper authority in writing of discrepancies found in the substrate. Beginning of installation indicates acceptance of existing conditions.

3.3 PREPARATION

- .1 Substrate:
 - .1 Provide work to make corrections to substrate conditions suitable for installation, and able to withstand normal construction and live loads.
 - .2 Substrate Flatness: 1.6 mm (1/16") within every 813 mm (32") span.
 - .3 Report and document defects and do not proceed until defects are corrected.
 - .4 Do not install directly to stucco, brick, concrete masonry, tile or similar substrates. Wood battens or Z-girts can be used to provide a suitable substrate for attachment.
- .2 Starter Bar:
 - .1 Mark a level line for starter bar to end up with approximately 13 mm ventilation gap between bottom of siding panels and header flashing.
 - .2 Fasten starter bar securely along mark with clip screws. Starter bar must fully support first panel
 - .3 Maximum distance between screws must not exceed 16" unless otherwise specified by licensed structural engineer.

3.4 INSTALLATION

- .1 General:
 - .1 Install products in accordance with manufacturers most recently published installation guidelines, applicable building codes and other laws, rules, regulations and ordinances.
 - .2 Review all manufacturer installation and maintenance instructions and other applicable documents.
 - .3 CAUTION: Siding panels contain silica. When drilling, cutting, or abrading siding panels during installation or handling. Observe the following precautions:
 - .1 Work outdoors when feasible or in a well-ventilated area when indoors.
 - .2 Wear a dust mask or use a respirator.
 - .3 Warn other workers and building occupants in the area.
 - .4 Advise building occupants to close windows in the immediate area of work.
- .2 First Panel Installation:
 - .1 Vertical Orientation:
 - .1 Begin installing the panel from the edge of the cut panel to the corner of the opening. Seat flat edge of panel on horizontal starter bar. Always install the first clip as close to the starter bar as possible, and no more than 76 mm (3") above the starter bar.
- .3 Subsequent Panel Installation:
 - .1 Fit panels tightly together on both horizontal and vertical joints ensuring that panel edges are properly seated in clips.
 - .2 Continue using panel clips on ship lapped edges of panel as work proceeds along the wall. Correct installation of panels into clips will create desired air cavity which allows for circulation of air. Clip must be attached within 3 inches of any panel end. Fasten

clips to studs using one screw per clip. Fasten clips to sheathing using two screws per clip.

- .3 . Install panels working from cut panel to edge of opening and top to bottom.
- .4 Apply sealer to field cut edges.
- .5 Pre-drill panels prior to attaching with face nails or screws.
- .6 Do not directly fasten any item to panels. Provide blocking behind panel and fasten objects through panels into blocking and building frame. Panels are not structural sheathing.

3.5 CLEANING AND WASTE MANAGEMENT

Proceed in accordance with Section 01 10 00 General Requirements.

- .1 Wipe off dirt with a cloth dampened with diluted neutral mild detergent. Do not use a solvent, such as thinner, or scrub panels with steel wool pad as this will damage the surface. Do not use a steam cleaner or power washer, which can also damage the surface of the panels.
- .2 If nailed or screwed sections become cracked, replace with new panels. Alternatively, minor surface cracks may be repaired with putty. Contact your local CERACLAD™ representative.

3.6 MAINTENANCE

- .1 Review technical documentation for detailed instructions on care and maintenance of manufacturer fiber cement panels.

END OF SECTION

Part 1 General

1.1 SUMMARY (RENOVATION)

- .1 Provide the necessary labour and materials to prepare the existing roof surface to receive new roof system.
- .2 Provide the necessary labour and materials to install the new vent pipes through the existing roof as per Architectural and Mechanical drawings, including but not limited to: overlay board, roof membranes, fasteners, adhesives, roof membrane flashings, sealants, etc., required to complete the Work and waterproof all tied in elements.
- .3 Related Sections:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 00 10 00 General Requirements
 - .2 Section 06 10 00 Rough Carpentry
 - .3 Section 07 62 00 Sheet Metal Flashing and Trim
 - .4 Section 07 92 00 Joint Sealants
 - .5 Mechanical Drawings and Specifications

1.2 PRICE AND PAYMENT PROCEDURES

- .1 Provide as Separate Price Items, the membrane manufacturer's extended warranty covering the roofing material, installation and workmanship for each of the following durations:
 - .1 Fifteen (15) year period.
 - .2 Twenty (20) year period.
 - .3 RCABC RGC RoofStar Ten (10) Year Guarantee

1.3 REFERENCES

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
- .2 American Society for Testing and Materials (ASTM International)
 - .1 ASTM D6162: Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
 - .2 ASTM D6163: Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
 - .3 ASTM D6164: Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
 - .4 ASTM D6222: Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcement.
 - .5 ASTM D6223: Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcement.

- .6 ASTM D6509: Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcement.
- .3 Canadian General Standards Board (CGSB)
 - .1 CGSB 37-GP-9Ma: Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
 - .2 CGSB 37-GP-56M: Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
 - .3 CAN/CGSB-51.33: Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
- .4 Canadian Roofing Contractors Association (CRCA)
 - .1 CRCA Roofing Specifications Manual.
- .5 Canadian Standard Association (CSA Group)
 - .1 CSA-A123.4: Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.
- .6 Factory Mutual (FM Global)
 - .1 FM Approvals - Roofing Products.
- .7 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Safety Data Sheets (SDS).
- .8 Roofing Contractors Association of British Columbia (RCABC)
 - .1 Roofing Practice Manual (RPM)

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Consultant's drawings, and are acceptable for product installation in accordance with the manufacturer's instructions.

1.5 SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
- .2 Product data: Manufacturer's data sheets on each product to be used, including:
 - .1 Construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, maintenance instructions and finishes specified.
 - .2 Preparation instructions and recommendations.
 - .3 Storage and handling requirements and recommendations.
 - .4 Installation and maintenance instructions.
- .3 Manufacturer's Certificate: certify that products meet or exceed specified requirements.

1.6 CLOSEOUT SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements for incorporation into architectural O & M Manual.
 - .1 Warranty documentation.

1.7 QUALITY ASSURANCE

- .1 Proceed in accordance with 01 10 00 General Requirements.
- .2 Supply product and accessories specified from one manufacturer to ensure total system compatibility and integrity.
- .3 Single Source Manufacturer: All SBS modified bitumen membrane and flashing sheets shall be manufactured by a single supplier with 10 years or more manufacturing history.
 - .1 Comply with the Manufacturer's requirements as necessary to provide the specified warranty.
- .4 Qualifications:
 - .1 Manufacturers: Company to be recognized by membrane manufacturer as being qualified to install their roofing systems.
 - .2 Installer qualifications: Company and person specializing in application of modified bituminous roofing systems with five [5] years [documented] experience.
 - .3 Project Foreman: Provide a competent project foreman with minimum five (5) years' experience in supervision of roofing system installation, knowledgeable in roofing type specified herein. Ensure foreman is present at job site during majority of work hours and is accessible to ensure good project coordination.
- .5 Conform to latest Guarantee Standards of Roofing Contractors Association of British Columbia (RCABC) as published in the RGC Roofing Practices Manual, unless modified by contract documents to exceed those minimums.
- .6 Be a member in good standing with the Roofing Contractors Association of British Columbia (RCABC).

1.8 FIRE PROTECTION

- .1 Prior to the start of work, conduct a site inspection to ensure its safety in order to minimize fire risks and hazards.
- .2 Fire watch:
 - .1 Maintain fire watch for at least one (1) hour after each day's roofing operations cease.
 - .2 Maintain fire watch any time when sprinklers are not functioning.
 - .3 Coordinate fire watch with Authority Having Jurisdiction (AHJ).
- .3 At the end of each workday, use a heat detector gun to spot any smouldering or concealed fire. Job planning must be organized to ensure workers are still on location at least 2 hours after welding works. An inspection must be performed by an employee of the roofing contractor who specializes in this kind of job at the end of works and, if necessary, with the help of a member of the fire protection service of the city.
- .4 Never apply the torch directly to flammable materials.
- .5 Throughout roofing installation, maintain a clean site and have a fire hose (when possible) and at least one ULC-approved Class A, B or C fire extinguisher, charged and in perfect operating condition, within 6 m (20 ft) of each torch. Respect all safety measures described in technical data sheets of sealants. Welding torches must never be placed near

combustible or flammable products, nor be used where the flame is not visible or cannot be easily controlled.

1.9 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Deliver, store, handle and protect materials in accordance with Section 01 10 00 General Requirements and with manufacturer's written instructions.
- .2 Packaging Waste Management:
 - .1 Proceed in accordance with Section 01 10 00 General Requirements.

1.10 SITE CONDITIONS

- .1 Ambient Conditions:
 - .1 Do not install roofing when temperature remains below -18 degrees C for torch application, or to manufacturers' recommendations for mop application.
 - .2 Minimum temperature for solvent-based adhesive is -5 degrees C.
 - .3 Do not apply roof system during inclement weather or when ambient temperatures are expected to be below 5°C (40°F). For temperatures below this practice cold weather application techniques as recommended by membrane manufacturer.
- .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 Existing Conditions:
 - .1 Modifications are to take place on existing adjacent roof areas as part of work of this Section. Do not use existing roof areas as storage, except to extent required for removal, alteration and replacement of work.
 - .2 Existing roofing is covered by roofing warranty. Obtain from Consultant necessary information regarding such warranty and notify manufacturer of existing roof by letter before work is commenced on existing roof.
 - .3 Execute alteration work in manner to maintain existing warranty.
 - .4 Provide temporary protection of existing roof while existing construction is open.

1.11 WARRANTY

- .1 For Work of this Section, 12 months warranty period is extended to 24 months
- .2 Roofing System Installers Warranty:
 - .1 Remedy all defects in the modified bituminous membrane roofing and related membrane flashings installed hereunder which appear within a period of five (5) years from the date of Substantial Completion, with the first two (2) years secured by bond and unsecured for the remaining three (3) years. Defects include but not limited to: ponding (maximum 2 square meters, maximum 10 mm deep), blisters, edge laps, fish mouths, failed tie-ins to adjacent assemblies, leaks, etc. Verify that slope package provides adequate slope before covering with cap sheet.
 - .2 Make all necessary repairs and replacements within 48 hours of receipt of written notification.
 - .3 Provide a written Contractor's warranty confirming the above, issued on the corporate letterhead, signed and sealed by an authorized signing officer.

- .4 Nothing contained in this article shall be construed as in any way restricting or limiting the liability in common law and statutory liability of the Contractor.
- .3 **Roof Membrane Manufacturer's Warranty**
 - .1 Obtain from the membrane manufacturer a material warranty stating that the roofing membrane shall be free of manufacturing defects and premature deterioration for the warranty period.
 - .2 Warranty shall be issued in the joint names of the Owner and the Contractor.
 - .3 Provide as Separate Price Items, the membrane manufacturer's extended warranty covering the roofing material, installation and workmanship for each of the following durations:
 - .1 Fifteen (15) year period.
 - .2 Twenty (20) year period.
- .4 **RCABC RGC RoofStar Guarantee:**
 - .1 Provide to the Owner the RGC RoofStar Ten (10) Year Guarantee. The Cost of the RCABC Guarantee administration fee and milestone reviews is to be included in the Bid price.
 - .1 Cost of all Field Reviews to be paid by Owner.

Part 2 Products

2.1 MANUFACTURERS

- .1 Acceptable manufactures:
 - .1 SOPREMA
 - .2 IKO Industries Ltd.
 - .3 Siplast
- .2 Or acceptable substitution.
- .3 Supply membrane, primer products and accessories specified from one manufacturer to ensure total system compatibility and integrity.

2.2 PERFORMANCE REQUIREMENTS / DESIGN CRITERIA

- .1 **Roof Assembly Summary: AARS (Adhesive Applied Roofing System)**
 - .1 Cap membrane: Touch-applied
 - .2 Base membrane: Torch-applied
 - .3 Cover board: mechanically fastened
 - .4 Insulation (top layer): Adhered
 - .5 Insulation (bottom layer): Adhered
 - .1 Insulation slope package: Adhered
 - .6 Air/Vapour control layer: Self-adhered
 - .7 Deck overlay: Adhered
 - .8 Roof deck

- .2 Compatibility between components of roofing system is essential. Provide written declaration to Owner and Consultant stating that materials and components, as assembled in system, meet this requirement.
- .3 Sealants:
 - .1 The system shall satisfy the following requirements for the duration of the warranty.
 - .2 The installed sealant shall be totally waterproof, flexible and thermally compatible with the substrate under applicable service conditions.
 - .3 The system shall not debond, crack or craze.
- .4 Adhesives and Mechanical Fasteners:
 - .1 Shall resist the following unfactored wind uplift loads as defined by the Part 4 of the 2024 BC Building Code:
 - .1 Field Areas: 1.3 kPa (27 psf)
 - .2 Edge Areas: 1.7 kPa (36 psf)
 - .3 Corner Areas: 3.4 kPa (70 psf)

2.3 MEMBRANE

- .1 The listed specifications are based on an assumption of the existing assembly. Please check the existing condition to confirm if the specifications line up. Inform Owner and Consultant when a discrepancy is found and proceed after obtaining a resolution from Owner and/or Consultant.
- .2 Base sheet membrane: to CGSB 37-GP-56M
 - .1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer prefabricated sheet, glass reinforcement, having nominal weight of 95 g/m² minimum.
 - .2 Type 1
 - .3 Class C-plain surfaced.
 - .4 Grade 1-standard service.
 - .5 Top and bottom surfaces:
 - .1 Sanded/sanded.
 - .6 Base sheet membrane properties: to CGSB 37-GP-56M.
 - .1 Strain energy (longitudinal/transversal): 9.0/7.0kN/m.
 - .2 Breaking strength (longitudinal/transversal): 17.0/18.0N/5 cm.
 - .3 Ultimate elongation (longitudinal/transversal): 60/70 %.
 - .4 Tear resistance: 85N.
 - .5 Cold bending at -30 degrees C: no cracking.
 - .6 Softening point: ³ 110 degrees C.
 - .7 Static puncture resistance: 400

- .8 Dimensional Stability: -0.3 / 0.3 %.
- .9 Minimum thickness: 2.5 mm
- .7 ULC certification: Class A
- .8 Acceptable manufacture and product:
 - .1 Soprema, Sopraply Base 520 (high performance composite)
 - .1 In accordance with:
 - .1 CSA A123.23-15, Type C, Grade 3.
 - .2 Soprema, Elastophene Flam (glass fibre reinforcements)
 - .1 In accordance with:
 - .1 CSA A123.23-15, Type A, Grade 3.
 - .3 IKO Industries, Torchflex TP-180-FF-Base (polyester fibres)
 - .1 In accordance with:
 - .1 CGSB-37.56-M for Class P, Type 2, and Grade 2
 - .2 ASTM D6164 for Type I, Grade S
 - .4 Siplast; Paradiene 20 TG (glass fibre reinforcements)
 - .1 In accordance with:
 - .1 ASTM D6163 Type I, Grade S
 - .2 CSA A123.23-15 Type A, Grade 1
- .3 Cap sheet membrane: to CGSB 37-GP-56M.
 - .1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, glass reinforcement, having nominal weight of 250g/m² minimum.
 - .2 Type 1
 - .3 Class C-plain surfaced.
 - .1 Colour for granular surface: black or match existing if the information is available.
 - .4 Grade 1-standard service.
 - .5 Bottom surface sanded.
 - .6 Cap sheet membrane properties: to CGSB 37-GP-56M
 - .1 Strain energy (longitudinal/transversal): 13.0/10.0 kN/m.
 - .2 Breaking strength (longitudinal/transversal): 25.0 kN/m.
 - .3 Ultimate elongation (longitudinal/transversal): 63/73 %.
 - .4 Tear resistance: 80 N.
 - .5 Cold bending at -30 degrees C: No cracking.
 - .6 Softening point: ³ 110 degrees C.
 - .7 Static puncture resistance: 400
 - .8 Dimensional Stability: -0.2 / 0.2 %.
 - .9 Minimum thickness: 4.0 mm
 - .7 ULC certification: Class A
 - .8 Acceptable manufacture and product:

- .1 Soprema, Sopraply Traffic Cap (high performance composite)
 - .1 In accordance with:
 - .1 CSA A123.23-15, Type C, Grade 1
 - .2 IKO Industries, Torchflex TP-250-Cap (polyester fibres)
 - .1 In accordance with:
 - .1 CGSB-37.56-M for Class G, Type 2 and Grade 2
 - .2 ASTM D6164 for Type II, Grade G
 - .3 Siplast; Parafor 30 TG (glass fibre reinforcements)
 - .1 In accordance with:
 - .1 CSA A123.23-15, Type B, Grade 1
- .4 Base Sheet Membrane for Flashings: same as Base sheet membrane.
- .5 Roofing Cap Sheet Membrane for Flashings: Same as cap sheet membrane.

2.4 BITUMEN

- .1 Asphalt: to CAN/CSA A123.4, Type 2

2.5 SEALERS

- .1 Plastic cement: asphalt
- .2 Sealing compound: rubber asphalt type.
- .3 Sealants and Caulking - see Section 07 92 00 - Joint Sealants

2.6 ROOFING ACCESSORIES

- .1 Vent Stack Flashings: To be a spun aluminum sleeve to fit over the vent stack with sufficient space to insulate. A spun aluminum cap to fit outside the sleeve and inside the vent stack. The cap is not to restrict the vent stack inside diameter.
- .2 Roof Vents: See Mechanical

2.7 CARPENTRY

- .1 Refer to Section 06 10 00 Rough Carpentry.

2.8 FILTER FABRIC

- .1 UV resistant, black woven water pervious polyolefin fabric for installation between insulation and stone ballast in protected membrane system. Fabric to meet approval of insulation manufacturer.
 - .1 Product weight 93.5 gm/m².

2.9 BALLAST

- .1 Stone: 19 to 32 mm size, well graded crushed stone opaque, non-porous, washed, free from fines, long splinters, moisture, ice and snow.

2.10 SHEET METAL FLASHINGS AND TRIM

- .1 Refer to section 07 62 00 Sheet Metal Flashing and Trim

2.11 SEALANTS

- .1 Refer to section 07 92 00 Joint Sealants

Part 3 Execution

3.1 QUALITY OF WORK

- .1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual and CRCA Roofing Specification Manual.
 - .1 Comply with reviewed signed and sealed shop drawings, manufacturer's written recommendations and specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
 - .2 Please assess existing condition and confirm the scope of demo and new construction for the installation of the new Mechanical pipes.
- .2 Do priming in accordance with manufacturers written recommendations.
- .3 The interface of the roof assemblies will be fitted with durable rigid material, sheet metal providing connection point for continuity of air barrier.
- .4 Assembly, component and material connections will be made in consideration of appropriate design loads, with reversible mechanical attachments.

3.2 EXAMINATION OF ROOF DECKS

- .1 Verification of Conditions:
 - .1 Inspect with Owner for deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed.
- .2 Evaluation and Assessment:
 - .1 Prior to beginning of work ensure:
 - .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris. Do not use calcium or salt for ice or snow removal.
 - .2 Curbs have been built.
 - .3 Roof drains have been installed at proper elevations relative to finished roof surface.
 - .4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.
- .3 Do not install roofing materials during rain or snowfall.

3.3 PROTECTION OF IN-PLACE CONDITIONS

- .1 Cover walls, walks, 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 or hoppers installed and connected.
- .5 Protect roof from traffic and damage.
- .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.

3.4 (EXPOSED) CONVENTIONAL MEMBRANE ROOFING (CMR) APPLICATION

- .1 Insulation: fully adhered, adhesive application:
 - .1 Adhere insulation to [steel deck] [laminated vapour barrier] using solvent-based adhesive.
 - .2 Place boards in parallel rows with ends staggered, and in firm contact with one another.
 - .3 Cut end pieces to suit.
 - .4 Apply adhesive in continuous ribbons at 300 mm on centre.
 - .5 Separate the membrane and insulation with a drainage layer or slipsheet.
- .2 Flashings:
 - .1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.
 - .2 Nail, mop or torch base and cap sheet onto substrate in 1 metre wide strips.
 - .3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal by mopping or torch welding.
 - .4 Lap flashing cap sheet to membrane cap sheet 250 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 and Section 07 62 00 - Sheet Metal Flashing and Trim.
- .3 Roof penetrations:
 - .1 Install roof drain pans, vent stack covers and other roof penetration flashings and seal to membrane in accordance with manufacturer's recommendations and Section 07 62 00 - Sheet Metal Flashing and Trim.

3.5 BALLAST AND PROTECTIVE COVERING

- .1 Apply stone ballast, dry, as soon as possible after placement of fabric, at minimum rate of 50 kg/m², [following insulation manufacturer's recommendations].
- .2 Spread stone ballast to an even thickness over entire roof area.
- .3 Spread additional stone ballast around perimeter of roof for width of 1200 mm to increase ballast weight to 100 kg/m².

- .4 Install paving slabs over fabric on paver levelling pads.
 - .1 Allow slight space between slabs to permit drainage of surface water.
 - .2 Shim up as required to obtain smooth surface transition from slab to slab.
 - .3

3.6 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.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Furnish all labour, materials, equipment, accessories and services necessary for the complete supply and installation of sheet metal flashing as indicated on the drawings, scheduled and as specified.
- .2 Related Sections:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 06 10 00 Rough Carpentry
 - .2 Section 07 13 52 Modified Bituminous Sheet Waterproofing
 - .3 Section 07 25 13 Air and Vapour Membranes
 - .4 Section 07 41 13 Metal Panels
 - .5 Section 07 46 46 Fibre-Cement Siding
 - .6 Section 07 52 00 Modified Bituminous Membrane Roofing
 - .7 Section 07 92 00 Joint Sealants
 - .8 Section 08 11 00 Metal Doors and Frames

1.2 REFERENCES

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 American Architectural Manufacturers Association (AAMA)
 - .1 AAMA 621: Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Substrates.
 - .2 ASTM International (ASTM)
 - .1 ASTM A240/A240M: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - .2 ASTM A606/A606M: Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
 - .3 ASTM A 653/A 653M: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM A755/A755M: Standard Specification for Steel Sheet, Metallic coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
 - .5 ASTM A 792/A 792M: Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .6 ASTM B32: Standard Specification for Solder Metal.
 - .7 ASTM D 523: Standard Test Method for Specular Gloss.

- .8 ASTM D1970/D1970M: Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- .9 ASTM D4587: Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings.
- .10 ASTM F1667: Standard Specification for Driven Fasteners: Nails, Spikes and Staples.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.32: Sheathing, Membrane, Breather Type.
- .4 Canadian Roofing Contractors Association (CRCA)
 - .1 Roofing Specifications Manual.
- .5 Canadian Sheet Steel Building Institute (CSSBI)
 - .1 CSSBI S8-2008 Quality and Performance Specification for Prefinished Sheet Steel Used for Building Products.
 - .2 CSSBI B17-2002 Barrier Series Prefinished Steel Sheet: Product Performance & Applications.
 - .3 CSSBI Sheet Steel Facts #12 Fastener Guide for Sheet Steel Building Products.
- .6 CSA Group (CSA)
 - .1 CSA A123.22: Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- .7 FM Global
 - .1 Property Loss Prevention Data Sheets 1-49 Perimeter Flashing.
- .8 Green Seal Environmental Standards
 - .1 Standard GS-11: Paints, Coatings, Stains, and Sealers.
 - .2 Standard GS-36: Adhesives for Commercial Use.
- .9 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Safety Data Sheets (SDS).
- .10 Roofing Contractors Association of British Columbia (RCABC)
 - .1 Roofing Practice Manual (RPM)
- .11 Sheet Metal and Air Conditioning Contractors Association of North America (SMACNA)
 - .1 Architectural Sheet Metal Manual
 - .2 Residential Sheet Metal Guidelines

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Consultant's drawings, and are acceptable for product installation in accordance with the manufacturer's instructions.

1.4 SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
- .2 Product Data:

- .1 Submit manufacturer's printed product literature including product specifications and technical data sheets for sheet metal flashing fasteners and accessory materials. Include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit two copies WHMIS SDS - Safety Data Sheets in accordance with Section 01 10 00 General Requirements.
- .3 Shop Drawings:
 - .1 Submit shop drawings for all sheet metal fabrications.
 - .2 Indicate sheet thickness, flashing dimensions and fastenings. Include anchorage, expansion joints and other provisions for thermal movement.
 - .3 Submit manufacturer's catalogue cut sheets for manufactured items.
- .4 Samples:
 - .1 Submit 50 x 50 mm samples of each type of sheet metal material, finishes and colour.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
 - .1 Product data and reviewed submittals for incorporation into architectural O & M Manual.

1.6 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Manufacturer and Installer Qualifications:
 - .1 Minimum five (5) years documented experience installing similar products and size projects.
- .2 Mock-ups for door and frame installations:
 - .1 Construct mock-up in accordance with Section 01 10 General Requirements.
 - .2 Install at project site a job mock-up using specified products and manufacturer approved installation methods, equipment and techniques.
 - .1 Maintenance: Maintain mock-up during construction for workmanship comparison.
 - .3 Install a mock-up for each distinct condition of the openings and allow 48hours for review of mock-up by Consultant before proceeding with the rest of the door installations.
 - .4 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.
- .3 RoofStar 15-year Guarantee:
 - .1 All penetration flashing must be incorporated into a split panel detail; flexible boot flashings secured with gasketed screws are not permitted.
 - .2 All penetration flashings that do not incorporate a settlement cap must be fitted with two storm collars separated by no more than 75 mm (3"). Seal each storm collar with an untooled bead of sealant.

1.7 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Deliver, store, handle and protect materials in accordance with Section 01 10 00 General Requirements and with manufacturer's written instructions.

1.8 PROJECT CONDITIONS

- .1 Field Measurements: Verify actual dimensions/openings by field measurements before fabrication and record on shop drawings. Coordinate with fabrication and construction schedule to avoid construction delays.

1.9 WARRANTY

- .1 Sheet Metal Flashings:
 - .1 Material and Workmanship Warranty covering sheet metal flashing material and workmanship for two (2) years on Contractor's letterhead.

Part 2 Products

2.1 BASE SHEET METAL MATERIALS

- .1 Provide sheet metal in base metal thickness specified. Where no thickness specified, provide base sheet metal in thickness recommended in SMACNA Architectural Sheet Metal Manual for type of item being fabricated, but not less than the thickness required by the authority having jurisdiction.
- .2 Zinc coated (galvanized) steel sheet: Commercial quality to ASTM A653/A653M, with G90 (Z275) designation zinc coating.
 - .1 Design Thickness:
 - .1 0.759 mm (22 gauge)

2.2 ACCESSORIES

- .1 Flashing Support:
 - .1 Zinc coated (galvanized) steel sheet: Commercial quality to ASTM A653/A653M, with G90 (Z275) designation zinc coating.
 - .2 Minimum, design (nominal) base thickness:
 - .1 1.518 mm (16 gauge)
 - .3 Profile as detailed.
- .2 Isolation coating: alkali resistant bituminous paint.
- .3 Pourable sealer: proprietary two-part polyurethane pourable sealer designed for sealing penetration pockets.
- .4 Plastic cement: In accordance with CAN/CGSB 37.5.
- .5 Loose laid underlay for metal flashing: dry sheathing to CAN/CGSB-51.32
- .6 Self-adhesive membrane underlay and tie-in membrane for metal flashings: To CSA A123.22 or ASTM D1970.
 - .1 In accordance with Section 07 25 13 - Air and Vapour Membranes.

- .7 Underlay for horizontal surfaces under metal cap flashings:
 - .1 Insulation Overlay Board: as used in the field of the roof and as specified.
 - .2 Membrane: 2-ply modified bitumen roofing, or self-adhered, high temperature membrane as recommended by manufacturer with compatible primers and sealants as required.
- .8 Sealants: in accordance with Section 07 92 00 - Joint Sealants, in colour to match flashing finish colour.
- .9 Cleats and hook strips: of same material, and temper as sheet metal, minimum 150 mm wide. Thickness 0.76 mm
- .10 Nails: of same material as sheet metal, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .11 Fasteners: of same material as sheet metal, Suitable for substrate and material being fastened, galvanized head.
 - .1 Rated for 2000 hour salt spray, as per ASTM B117
- .12 Washers: of same material as sheet metal, 1.0 mm thick with rubber packings.
- .13 Solder: to ASTM B32, alloy composition to suit intended use
- .14 Flux: rosin, cut hydrochloric acid, or commercial preparation suitable for materials to be soldered.
- .15 Touch-up paint: as recommended by prefinished material manufacturer.

2.3 FABRICATION

- .1 Fabricate sheet steel flashings and other sheet steel work in accordance with applicable RCABC and SMACNA details and as indicated on the Drawings.
- .2 Form pieces in 2400 mm maximum lengths.
 - .1 Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 12 mm.
 - .1 Mitre and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Use flat-lock folded seams for all joints and splices of thru-cavity flashings. If all surfaces of flashings are sloped greater than 3:1, S-lock may be used.
- .6 Use standing seams for all corner joints and splices for cap flashings. Flatlock or S-pocket joints to be used where cap flashings are accessible to occupants.
- .7 Ends of thru-cavity flashing to have 12 mm folded upturn, creating an end dam. Cutting and caulking of upturns will not be accepted.
- .8 Metal flashing shall be formed on a bending brake with shaping trimmed. Hand seaming shall be done on a bench, as far as practicable, with proper sheet metal working tools. Angles of bends and folds for interlocking metal shall be made with full regard to expansion and contraction to avoid buckling and damage to metal.

- .9 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.4 METAL FLASHINGS

- .1 Form flashings to profiles indicated of a minimum 0.483mm thick galvanized.

2.5 CAP FLASHINGS

- .1 Form metal ridge cap flashing] of minimum 0.483mm thick sheet metal.
 - .1 Provide slotted fixing holes and steel/plastic washer fasteners.

2.6 SHEET METAL MATERIALS

- .1 Prefinished Sheet Material:
 - .1 Minimum CSSBI/MGS 0.610 mm (24 gauge), design (nominal) base thickness.
 - .2 Zinc coated sheet, commercial grade A to ASTM A653M or 'Galvalume Plus' aluminum zinc alloy coated to ASTM A792M both sides.
 - .3 Profile as detailed.
- .2 Finish coating:
 - .1 Pre-finished, one side.
 - .2 Kynar 500, Hylar 5000 PVDF or WeatherXL finish.
 - .3 Colour to be selected by consultant from manufacturer's standard colour range.
 - .4 Finish: Selected from manufacturer's standard offering.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Comply with manufacturer's written instructions including data sheets, technical bulletins, catalogue installation instructions and carton installation instructions.

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sheet metal flashing and trim installation in accordance with manufacturer's written instructions.
 - .1 Inform Owner and Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
 - .3 Start of sheet metal flashing and trim installation indicates installer's acceptance of substrate installation conditions.

3.3 INSTALLATION

- .1 General:

- .1 Install sheet metal working accordance with applicable RCABC specifications and as detailed.
- .2 Use concealed fastenings throughout, except where approved by the Consultant prior to start of the work.
- .3 Provide underlay beneath sheet metal as detailed with an insulation overlay board, mechanically fastened in place with continuous cleats.
- .2 Metal flashings:
 - .1 Form flashings, copings and as required to complement and finish membrane – roofing and wall systems.
 - .2 Secure metal flashing with continuous cleats fastened at 305 mm o/c. Use fasteners of sufficient length to penetrate at least 25 mm into substrate.
- .3 Counter flashings:
 - .1 Install metal counter flashings as soon as possible after membrane flashings are in place and reviewed by the Consultant.
 - .2 Counter flashing shall have crimped bottom edge, stiffening break and shall extend at least 406 mm up verticals or as detailed and extend down to horizontal plane of roof surface.
 - .3 Where detailed turn top edge of flashing into walls and friction fit pins into reglet and caulk at joint to wall.
 - .4 Secure sections in S-pocket joints and allow sufficient tolerance for expansion and contraction between each piece.
 - .5 Secure metal counter flashing a minimum of 305 mm above roof membrane or as detailed. Use fasteners of sufficient length to penetrate at least 25mm into substrate.
- .6
- .4 Cap flashings:
 - .1 Supply and install continuous metal cleats, secure at 305 mm o.c. maximum of 50 mm above drip edge, with fastener of sufficient length to penetrate a minimum of 25 mm into the substrate.
 - .2 Form cap flashings to profiles as shown on the detail drawings and ensure positive drainage of a minimum of 2% slope to the interior (roof surface) areas.

3.4 CLEANING AND WASTE MANAGEMENT

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment
- .3 Remove undue grime and dirt from flashing materials by dry wiping as the material is installed.
- .4 Remove all excess solder and sealants with recommended solvent.
- .5 Leave work areas clean, free from grease, finger marks and stains.
- .6 Remove and replace all dented and damaged materials.

3.5 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair or replace damage to adjacent materials caused by work of this section before Substantial Completion.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Caulking is required wherever necessary to conform to sound construction practice and between dissimilar materials to make the building water resistant, whether specifically indicated on the drawings or not.

1.2 RELATED REQUIREMENTS

- .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .2 Section 07 46 46 Fiber-Cement Siding
 - .3 Section 7 52 00 Modified Bituminous Membrane Roofing
 - .4 Section 07 62 00 Sheet Metal Flashing and Trim
 - .5 Section 08 11 00 Metal Doors and Frames
 - .6 Section 09 21 16 Gypsum Board Assemblies
 - .7 Section 09 91 00 Painting

1.3 REFERENCES

Proceed in accordance with the current edition of the following:

- .1 ASTM C834: Standard Specification for Latex Sealants.
- .2 ASTM C882: Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.
- .3 ASTM C920: Standard Specification for Elastomeric Joint Sealants.
- .4 ASTM C1330: Standard Specification for Cylindrical Sealant Backing for use with Cold Liquid Applied Sealants.
- .5 ASTM C1521: Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints
- .6 CGSB 19-GP-5M: Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
- .7 CAN/CGSB-19.13: Sealing Compound, One-component, Elastomeric, Chemical Curing.
- .8 CGSB 19-GP-14M: Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
- .9 CAN/CGSB-19.17: One-Component Acrylic Emulsion Base Sealing Compound.
- .10 CAN/CGSB-19.21: Sealing and Bedding Compound Acoustical.
- .11 CAN/CGSB-19.24: Multi-component, Chemical Curing Sealing Compound.
- .12 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
 - .1 Material Safety Data Sheets (MSDS).

1.4 CLOSEOUT SUBMITTALS

- .1 Submit the following items for incorporation into architectural O & M Manual.
 - .1 Warranty documentation.

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Manufacturer Qualifications:
 - .1 Minimum ten (10) years documented experience manufacturing similar products.
 - .2 Installer Qualifications:
 - .1 Minimum three (3) years documented experience installing similar products and size projects.
 - .3 Inspection: All work must pass review and approval of consultant.

1.6 FIELD ADHESION/COHESION TESTS

- .1 Test Frequency:
 - .1 Perform a field test each type of sealant and substrate combination, for all interior and exterior sealants associated with the building envelope.
 - .2 Perform three (3) additional tests for each failed test.
- .2 Test joint sealants by hand-pull methods #1 and # 2. Record test results in Field Adhesion/Cohesion Test Form.
 - .1 Test Method #1:
 - .1 Make a knife cut horizontally from one side of the joint to the other.
 - .2 Make two (2) vertical cuts (from the horizontal cut) approximately 75 mm long on each side of the joint.
 - .3 Pry out flap created from cuts.
 - .4 Firmly grasp flap and slowly pull at 90° from sealant plane.
 - .5 Pull flap until adhesive or cohesive failure occurs.
 - .1 Adhesive failure will be evidenced by the sealant pulling off clean from the substrate.
 - .2 Cohesion failure will be evidenced by the sealant ripping or failing within itself, leaving well-adhered sealant to the substrate.

(Cohesive failure is considered a positive result).
 - .2 Test Method # 2:
 - .1 Follow steps one (1) through four (4) of Test Method # 1.
 - .2 Mark a benchmark on the sealant 25 mm (1") from the plane of the installed sealant.
 - .3 Firmly grasp the flap and pull slowly, while holding a ruler parallel to the sealant flap. Note the position of the benchmark on the ruler.
 - .4 Refer to manufacturer's printed literature for each sealant tested for the required extension factor pass criteria; (i.e.: if the 25 mm (1") benchmark on

the sealant can be pulled to 100 mm (4") and held with no failure of sealant, 400% elongation is achieved.)

- .5 **If no failure occurs prior to the manufacturer's stated extension factor, the test is successful.** Extension factor should be three (3) times the movement capability of the sealant.
- .3 Inspect joints for:
 - .1 Complete fill,
 - .2 Absence of voids,
 - .3 Primer,
 - .4 Proper width/depth ratio, and
 - .5 Back up material.
- .4 Repair sealants pulled in test area by applying new sealants following same procedures used to original seal joints.
- .5 Contractor shall repair test areas at no additional cost to the Owner.

1.7 DELIVER, STORAGE, HANDLING AND PROTECTION

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

1.8 PROJECT CONDITIONS

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

Part 2 Products

2.1 MANUFACTURERS

- .1 Acceptable manufactures:
 - .1 Tremco.
 - .2 Sika.
 - .3 Dow Corning.

2.2 SEALANT MATERIALS

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

2.3 SEALANT MATERIAL DESIGNATIONS

- .1 Single component, low odor, moisture cure, medium modulus, low VOC sealant for use in sealing air/vapour barrier penetrations, to ASTM C920, Type S, Grade NS, Class 35.
 - .1 ASTM C719: $\pm 35\%$.
 - .2 Ultimate Elongation: 450 - 550%.
 - .3 Modulus, 100%: 275 - 345 kPa.
 - .4 Shore A Hardness: 25 ± 5 .
 - .5 Tensile Strength: 1034 – 1378 kPa.
 - .6 Maximum VOC: 5 g/L.
- .2 Single component, medium modulus, high-performance, neutral-cure silicone sealant for general purpose exterior use, to ASTM C920, Type S, Grade NS, Class 35, Use NT, M, A and O.
 - .1 ASTM C719: $\pm 25\%$.

- .2 Ultimate Elongation: 550%.
 - .3 Modulus, 50% extension: 380 kPa.
 - .4 Shore A Hardness: 25 ± 5.
 - .5 Tensile Strength: 1240 kPa.
 - .6 Maximum VOC: 35 g/L.
 - .7 Colour to be selected from manufacturer's standard range.
- .3 Single component, low modulus, neutral-cure silicone sealant for general purpose masonry use, to ASTM C920, Type S, Grade NS, Class 50, Use T, NT, M, G, A and O.
- .1 ASTM C719: ± 50%.
 - .2 Ultimate Elongation: 1600%.
 - .3 Modulus, 50% extension: 193 kPa.
 - .4 Shore A Hardness: 15.
 - .5 Tensile Strength: 690 kPa.
 - .6 Maximum VOC: 22 g/L.
 - .7 Colour to be selected from manufacturer's standard range.
- .4 Single component, medium modulus, neutral-cure silicone sealant for general roofing applications, to ASTM C920, Type S, Grade NS, Class 50, Use NT, G, A and O.
- .1 ASTM C719: ± 50%.
 - .2 Shore A Hardness: 35.
 - .3 Tensile Strength: 415 kPa.
 - .4 Maximum VOC: 28 g/L.
 - .5 Colour to be selected from manufacturer's standard range.
- .5 Single component, chemical cure, silicone rubber sealant, for use with plumbing fixtures, showers, sinks, tubs, and junction of counter tops and adjacent wall finishes, to ASTM C920, Type S, Grade NS, Class 25, Use NT.
- .1 Shore A Hardness: 25.
 - .2 Tensile Strength: 2100 kPa.
 - .3 Maximum VOC: 36 g/L.
 - .4 Colour to be selected from manufacturer's standard range.
- .6 Two-component, non-sag, tamper resistant, elastomeric polyurethane sealant, for use in interior joints, penetrations, doors, windows, perimeters of fixtures, where a flexible security sealant is required due to idle tampering or vandalism, to ASTM C920, type M, Grade NS, Class 12.5, Use T₁, M and O.
- .1 Ultimate Elongation: 175 - 200%.
 - .2 Shore A Hardness: 40 - 45.
 - .3 Tensile Strength: 2000 to 2400 kPa.
 - .4 Maximum VOC: Activator - < 25 g/L, Base - < 100 g/L.
 - .5 Colour to be selected from manufacturer's standard range.

2.4 ACCESSORIES

- .1 Primer: Type as recommended by sealant manufacturer. Primer to be compatible with joint forming materials.
- .2 Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer and compatible with joint forming materials.
- .3 Preformed Compressible and Non-Compressible back-up materials.
 - .1 Polyethylene.
 - .1 Extruded closed cell foam backer rod.
 - .2 Size: oversize 30 to 50 %.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sealant installation in accordance with manufacturer's written instructions.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
 - .3 Start of sealant installation indicates installer's acceptance of substrate installation conditions.

3.2 SURFACE PREPARATION

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

3.3 PRIMING

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

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

3.5 MIXING

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

3.6 APPLICATION

- .1 Apply sealants primers, joint fillers, bond breakers to manufacturer's instructions. Apply sealant using gun with proper size nozzle. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.
- .2 Form surface of sealant with full continuous bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities. Neatly tool surface to a recessed, in accordance with the drawings, slight concave joint, unless otherwise indicated
- .3 Apply Polyurethane sealant to joints between adjacent building components around interior perimeter and exterior perimeter of every external window, louver, door or other opening, and where indicated. Do not block drainage holes.
- .4 At exterior, caulk with Polyurethane sealant at all junctions of different materials, around all work built into and passing through cladding, concrete, or wood and at joints between metal surfaces, and elsewhere as indicated or required.
- .5 At interior, after painting, caulk with Polyurethane sealant joints between concrete and wood, concrete and metal, wood and metal and elsewhere as indicated on the drawings or as required to provide finished joints between finish materials.
- .6 Caulk with Silicone sealant joints between walls and countertops/splash backs, plumbing fixtures and floors/walls, ceramic tile joints, control joints and edges and elsewhere as indicated on the drawings or as required to provide finished joints between finish materials where moisture may be present.
- .7 Apply acoustic caulk at base and ceiling of all gypsum board walls.
- .8 Caulk with Polyurethane sealant joints between window frames and walls, door frames at walls and floors, and elsewhere as indicated on the drawings or as required to provide finished joints between finish materials where moisture will not be present.
- .9 Clean adjacent surfaces immediately and leave work neat and clean. Remove excess sealant and droppings using recommended cleaners as work progresses. Remove masking after tooling of joints.
- .10 Do not caulk under side of flashings, leave clear for drainage.
- .11 Do not caulk drainage holes and spaces from cladding system drain screen.
- .12 Do not caulk drainage holes in aluminum window sections.
- .13 Cure sealants in accordance with sealant manufacturer's instructions.
- .14 Do not cover up sealants until proper curing has taken place.

3.7 CLEANING AND WASTE MANAGEMENT

- .1 Leave Work area clean at end of each day.
- .2 Clean adjacent surfaces immediately and leave Work neat and clean.
- .3 Remove excess and droppings, using recommended cleaners as work progresses.
- .4 Remove masking tape after initial set of sealant.
- .5 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment

3.8 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Protect installed Work of other trades from staining or contamination.
- .3 Repair damage to adjacent materials caused by joint sealants installation.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Furnish all labour, materials, equipment, accessories and services necessary for the complete supply and installation of metal doors and frame as indicated on the drawings, scheduled and as specified.
- .2 As detailed and scheduled in the contract documents, supply of:
 - .1 Steel frame products.
 - .2 Steel panels.
- .3 Steel doors, swing type, with or without glazed, and non-rated.

1.2 RELATED SECTIONS

- .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 05 40 00 Cold Formed Metal Framing
 - .2 Section 07 92 00 Joint Sealants
 - .3 Section 08 36 13 Overhead Sectional Door
 - .4 Section 08 71 00 Door Hardware.
 - .5 Section 09 21 16 Gypsum Board Assemblies.
 - .6 Section 09 91 00 Painting
 - .7 Electrical Drawings and Specifications

1.3 DEFINING OPENING SIZES

- .1 Width: Measure widths of openings from inside to inside of frame jamb rabbets. (Referred to as "frame rabbet width" or "nominal door width")
- .2 Height: Measure heights of openings from the finished floor (exclusive of floor coverings) to the head rabbet of the frame. (Referred to as "frame rabbet height" or "nominal door height")
- .3 Door Sizes: Size doors so as to fit the above openings and allow a 3 mm (0.125") nominal clearance at jambs and head of frame. Allow a clearance of 19 mm (0.75") maximum between the bottom of the door and the finished floor (exclusive of floor coverings).
- .4 Tolerances: Manufacture and install doors and frame product in accordance with the CSDMA's, "Recommended Dimensional Standards for Commercial Steel Doors and Frames".

1.4 REFERENCES

Proceed in accordance with the current edition of the following:

- .1 ASTM A653/A653M: Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
- .2 CSA W59: Welded Steel Construction (Metal Arc Welding)
- .3 CSDMA: Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2000

- .4 CSDMA: Selection and Usage Guide for Steel Doors and Frames, 1990
- .5 CSDMA: Recommended Specifications for Commercial Steel Door and Frame Products - 08 11 00, 2006

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Verify actual dimensions/openings by field measurements before fabrication and record on shop drawings. Coordinate with fabrication and construction schedule to avoid construction delays.
- .2 Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Consultant's drawings, and are acceptable for product installation in accordance with the manufacturer's instructions.

1.6 SUBMITTALS

- .1 Product data: Manufacturer's data sheets on each product to be used, including:
 - .1 Product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Preparation instructions and recommendations.
 - .3 Storage and handling requirements and recommendations.
 - .4 Installation and maintenance instructions.
- .2 Shop drawings:
 - .1 Indicate each type of door, frame, steel, construction and core.
 - .2 Indicate material thickness, mortises, reinforcements, anchorages, locations of exposed fasteners, openings (glazed, paneled or louvered) and arrangement of standard hardware.
 - .3 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule of the Architect.
- .3 Shop drawings, design notes and calculations, stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada. Submit BCBC Schedule S-B and S-C, for design and field review and compliance to the Consultant.

1.7 CLOSEOUT SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements for incorporation into architectural O & M Manual.
 - .1 Product data and reviewed submittals.
 - .2 Operation and Maintenance data.
 - .3 Include manufacturer, product number, dimensions, finish, texture and colour for each product and type of this section installed in this project.
 - .4 Warranty documentation.

1.8 QUALITY ASSURANCE

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
- .2 Supply product and accessories specified from one manufacturer to ensure total system compatibility and integrity.

- .3 Qualifications:
 - .1 Manufacturer Qualifications:
 - .1 Minimum ten (10) years documented experience manufacturing similar products and size projects.
 - .2 Installer Qualifications:
 - .1 Minimum two (2) years documented experience installing similar products and size projects.
- .4 Mock-ups:
 - .1 Construct mock-up in accordance with Section 01 45 00 Quality Control10 General Requirements.
 - .2 Install at project site a job mock-up using specified products and manufacturer approved installation methods, equipment and techniques.
 - .1 Maintenance: Maintain mock-up during construction for workmanship comparison.
 - .3 Install a mock-up for each distinct condition of the openings and Allow 48hours for review of mock-up by Consultant before proceeding with the rest of the door installations.
 - .4 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.9 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Deliver, store, handle and protect materials in accordance with Section 01 10 General Requirements. and with manufacturer's written instructions.

1.10 WARRANTY

- .1 Materials and workmanship: Warranted by the manufacturer for a period of one (1) year from date of shipment, when stored and installed in accordance with the manufacturer's recommendations, and Sections 3.3 and 3.4 of this Specification.

Part 2 Products

2.1 MATERIALS

- .1 Acceptable Materials:
 - .1 Steel doors and frame product manufactured in accordance with this Specification by CSDMA members, are eligible for use on this project.
- .2 Steel:
 - .1 Commercial grade steel to ASTM A653, CS, Type B, Coating Designation ZF75 (A25) minimum. Minimum steel thicknesses in accordance with Appendix 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".
- .3 Door Core Materials – Standard:
 - .1 Polystyrene:

- .1 Rigid extruded fire retardant, closed cell board. Density; 16 to 32 kg/m³ (1 to 2 pcf), thermal values; RSI 1.0 (R 6.0) minimum, Type 1, in accordance with ASTM C578.
- .4 Primers:
 - .1 Rust inhibitive touch-up only.
- .5 Accessories:
 - .1 Door Silencers: Single stud rubber/neoprene type.
 - .2 Exterior Top Caps: Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.
 - .3 Frame Thermal Breaks: Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.

2.2 FRAME - FABRICATION - GENERAL

- .1 Exterior frame product:
 - .1 Welded type construction 14 gauge, 1.7mm.
- .2 Reinforce frame product only, where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware. Drilling and tapping is by others, on site, at time of installation.
- .3 Provide anchorage appropriate to floor, wall and frame construction. Locate each wall anchor immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb. For rebate opening heights up to and including 1520 mm provide two (2) anchors, and an additional anchor for each additional 760 mm of height or fraction thereof, except as indicated below. Provide frames in previously placed concrete, masonry or structural steel with anchors located not more than 150 mm from the top and bottom of each jamb, and intermediate anchors at 660 mm on centre maximum.
- .4 Minimum reinforcing, anchor and other component gauges in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".
- .5 Prepare each door opening for single stud rubber door silencers, three (3) for single door openings, two (2) for double door openings, except on gasketed frame product.
- .6 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.

2.3 FRAME - WELDED TYPE

- .1 Frame product: Accurately mitered or mechanically jointed.
- .2 Frame product perimeter corner joints as defined in Appendix 2 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products":
 - .1 Profile welded; punch-mitered - continuously welded on the profile faces, rabbets, returns and soffit intersections, or saw-mitered - continuously welded on the profile faces, rabbets, returns, stops and soffit intersections. Punch or saw-mitered, at the manufacturer's discretion. Fill and ground to a smooth, uniform, and seamless surface profile welded frame product exposed faces

- .3 Welding in accordance with CSA W59.
- .4 Where frame product is to be installed prior to the adjacent partition, securely attached a floor anchor to the inside of each jamb profile. Provide each floor anchor with two (2) holes for securing to the floor. Substitute for conditions that do not permit the use of a floor anchor, an additional wall anchor, located within 150 mm of the base of the jamb.
- .5 Weld in two (2) temporary jamb spreaders per door opening to maintain proper alignment during shipment and handling, do not use for installation.
- .6 Glazing stops: Formed steel channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
 - .1 Glazing stops on the exterior side of the frame.
- .7 When required due to site access, when advised by the contractor responsible for coordination or installation, as specified on the Consultant's drawings or due to shipping limitations, fabricate frame product for large openings in sections as designated on the approved submittal drawings, with splice joints for field assembly and welding by others.
- .8 Prior to shipment, mark each frame product with an identification number as shown on the approved submittal drawings.

2.4 DOORS - FABRICATION - GENERAL

- .1 Exterior doors: laminated core construction.
- .2 Longitudinal edges: mechanically interlocked, tack welded at top and bottom of door, above and below each edge cutout and at 150 mm on center] with visible edge seams
- .3 Doors:
 - .1 Reinforced only, where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware. Drilling and tapping is by others, on site, at time of installation.
- .4 Holes 12.7 mm diameter and larger: Factory prepared, except mounting and through-bolt holes, which are by others, on site, at time of hardware installation.
- .5 Holes less than 12.7 mm diameter: Factory prepared only when required for the function of the device (for knob, lever, cylinder, thumb or turn pieces) or when these holes over-lap function holes.
- .6 Glazing stops: Formed steel channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to door sections with counter-sunk oval head sheet metal screws.
 - .1 Glazing stops on the exterior side of the door.
- .7 Full View Metal Glazing Sections:
 - .1 1/2 inch (12.5 mm) Tempered Double Insulating glass.
- .8 Top and bottom of doors: Provide with inverted, recessed, welded steel channels.
 - .1 Provide exterior doors, and where otherwise scheduled by the Consultant with flush steel top caps.
- .9 Minimum reinforcing and component gauges in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".

- .10 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .11 Prior to shipment, mark each door with an identification number as shown on the approved submittal drawings.

2.5 FABRICATION EXTERIOR DOORS

- .1 Refer to drawings for door sizes, elevations glazing and panel locations.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for metal doors and frames installation in accordance with manufacturer's written instructions.
 - .1 Inform Owner and Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
 - .3 Start of metal doors and frames installation indicates installer's acceptance of substrate installation conditions.

3.2 PREPARATION

- .1 Verify actual dimensions/openings by field measurements before fabrication and record on shop drawings. Coordinate with fabrication and construction schedule to avoid construction delays.
- .2 Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Architect's drawings, and are acceptable for product installation in accordance with the manufacturer's instructions.

3.3 SITE STORAGE AND PROTECTION OF MATERIALS

- .1 Remove doors and frame product from their wrappings or coverings upon receipt on site, be stored in a vertical position, and be spaced with blocking to permit air circulation between them.
- .2 Thoroughly inspected materials upon receipt and immediately reported in writing, to the supplier discrepancies, deficiencies and damages.
- .3 Denote damages incurred during shipment on the carrier's Bill of Lading and immediately reported, in writing, to the supplier.
- .4 Promptly clean and touched-up with a zinc-rich primer any scratches or disfigurement of doors or frame product caused by shipping or handling.
- .5 Store materials properly on planks or dunnage, out of water and covered to protect from damage from any cause.

3.4 INSTALLATION

- .1 Comply with reviewed signed and sealed engineered shop drawings, manufacturer's written recommendations and specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .2 Prior to installation, remove temporary shipping spreaders.
- .3 Prior to installation, check and correct for flatness the area of floor on which the frame is to be installed, and within the path of the door swing.
- .4 Check door and frame product for correct size, swing, rating and opening number.
- .5 Advise the supplier of any discrepancies prior to installation.
- .6 Set frames plumb, square, level and at correct elevation.
- .7 Secure anchorages and connections to adjacent construction.
- .8 Brace frames rigidly in position while building-in. Install wood spreaders at third points of frame rebate height to maintain frame width. Provide vertical support at centre of head for openings exceeding 1200 mm in width.
- .9 During the setting of frame product, check and correct as necessary for opening width, opening height, square, alignment, twist and plumb, in accordance with the CSDMA, "Recommended Dimensional Standards for Commercial Steel Doors and Frames".
- .10 Remove wood spreaders after frames have been built-in.
- .11 Make allowance for deflection to ensure structural loads are not transmitted to frame product.
- .12 Install doors, and hardware in accordance with hardware templates and manufacturer's instructions.
- .13 Adjust operable parts for correct clearances and function.
- .14 Install glazing and door silencers.

3.5 CLEANING AND WASTE MANAGEMENT

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
- .2 Leave Work area clean at end of each day.
- .3 Upon completion remove surplus materials, rubbish, tools and equipment

3.6 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair or replace damage to adjacent materials caused by work of this section.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Furnish all labour, materials, equipment, accessories, and services necessary for the complete supply and installation of overhead sectional doors as indicated on the drawings, scheduled, and as specified.
- .2 Related Requirements:
 - .1 Coordinate and provide related trades with brackets, fasteners, etc. which will be required to be installed by the affected trades in order to allow for a complete installation of the doors.
- .3 Related Sections:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 06 11 4 Rought Carpentry
 - .2 Section 07 90 00 Joint Sealers
 - .3 Section 08 71 00 Door Hardware
 - .4 Section 09 91 00 Painting
 - .5 Electrical Drawings and Specifications

1.2 REFERENCES

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 American National Standards Institute (ANSI)
 - .1 ANSI/DASMA 102: American National Standard Specifications for Sectional Overhead Type Doors.
 - .2 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A 653/A 653M: Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM B 209/209M: Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - .3 ASTM B 221/221M: Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
 - .4 ANSI/DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors.
 - .5 ASTM A 123 – Zinc hot-dipped galvanized coatings on iron and steel products.
 - .6 ASTM A 216 - Specifications for sectional overhead type doors.
 - .7 ASTM A 229 - Steel wire, oil-tempered for mechanical springs.
 - .8 ASTM A 653 - Steel sheet, zinc-coated galvanized by the hot-dipped process, commercial quality.
 - .9 ASTM D 1929 - Ignition temperature test to determine flash and ignition temperature of foamed plastics.
 - .10 ASTM E 84 - Tunnel test for flame spread and smoke developed index.

- .11 ASTM E 330 - Structural performance of exterior windows, curtain walls, and doors by uniform static air pressure difference.
- .12 ASTM E 413 - Classification for Rating Sound Insulation
- .13 ASTM E 1332 - Standard Classification for Rating Outdoor-Indoor Sound Attenuation.
- .14 ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Verify actual dimensions/openings by field measurements before fabrication and record on shop drawings. Coordinate with fabrication and construction schedule to avoid construction delays.
- .2 Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Architect's drawings, and are acceptable for product installation in accordance with the manufacturer's instructions.

1.4 SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
- .2 Product data: Manufacturer's data sheets on each product to be used, including:
 - .1 Product characteristics, performance criteria, physical size, finish, and limitations.
 - .2 Preparation instructions and recommendations.
 - .3 Storage and handling requirements and recommendations.
 - .4 Installation and maintenance instructions.
 - .5 Manufactures Construction details, material descriptions, dimensions of individual sub-assemblies (side frames, header, control panel, motor), profiles for slats, and finishes.
 - .6 Include operating characteristics, electrical characteristics, and furnished accessories.
 - .7 Include description of automatic closing device and testing and resetting instructions.
- .3 Shop drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in British Columbia, Canada.
 - .1 Submit Schedule S-B, Assurance of professional design and commitment for field review.
 - .2 Submit Schedule S-C, Assurance of professional field review and compliance.
 - .2 Include plans, elevations, sections, and mounting details.
 - .3 Show locations of controls, locking devices, and other accessories.
 - .4 Include diagrams for power, signal, control wiring and electrical connection requirements.
 - .5 Provide design loads transferred to supporting members including point loads.

- .6 Clearly indicate materials, operating mechanisms, supporting elements, required clearances and electrical connection requirements.
- .7 ANSI/DASMA 102 compliance testing
- .8 Indicate BCBC requirements and provided corresponding values.
- .4 Samples for Initial Selection: Manufacturer's finish charts showing full range of colours and textures available for units with factory-applied finishes.
- .5 Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
 - .1 Submit manufacturer's paint chip samples of selected colours.
- .6 Warranty:
 - .1 Executed copy of manufacturer's standard warranty.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements for incorporation into architectural O & M Manual.
 - .1 Product data and reviewed submittals.
 - .2 Operation and Maintenance data.
 - .3 Include manufacturer, product number, dimensions, finish, texture and colour for each product and type of this section installed in this project.
 - .4 Warranty documentation.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- .1 Proceed in accordance with 01 10 00 General Requirements
- .2 Provide maintenance data for overhead door hardware for incorporation into Operation and Maintenance manual.

1.7 QUALITY ASSURANCE

- .1 Proceed in accordance with section 01 10 00 General Requirements.
- .2 Source Limitations:
 - .1 Supply product and accessories specified from one manufacturer to ensure total system compatibility and integrity or approved in writing by single manufacturer.
- .3 Qualifications:
 - .1 Manufacturer Qualifications:
 - .1 Minimum ten (10) years documented experience manufacturing similar products and size projects and that have a proven record of successful in-service performance.
 - .2 Acceptable Manufacturer: Wayne Dalton; 2501 S. State Highway 121 Business, Suite 200, Lewisville, TX 75067. ASD. Phone: (800) 827-3667; Web Site: www.wayne-dalton.com. Email: info@wayne-dalton.com.
 - .3 C. Requests for substitutions will be considered in accordance with provisions of Section 01 10 00 General Requirements.

.2 Installer Qualifications:

- .1 Minimum three (3) years documented experience installing similar products and size projects on not less than five (5) similar installations and whose work has resulted in construction with a record of successful in-service performance.

1.8 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Deliver, store, handle and protect materials in accordance with Section 01 10 00 General Requirements and with manufacturer's written instructions.
- .2 Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- .3 Delivery and Acceptance Requirements:
- .1 Deliver materials to site in unopened original factory packaging, labelled with manufacturer's name and address.
- .4 Storage, Handling and Protection Requirements:
- .1 Store materials in accordance with manufacturer's recommendations in clean, dry, free from dampness, and well-ventilated area.
- .2 Store, protect and prevent product from damage.
- .3 Replace defective or damaged materials with new.

1.9 PROJECT CONDITIONS

- .1 Field Measurements: Verify actual dimensions/openings by field measurements before fabrication and record on shop drawings. Coordinate with fabrication and construction schedule to avoid construction delays.
- .2 Electrical: Verify actual job site power (voltage, phase and Hertz).
- .3 Verify environmental condition extremes. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- .4 Verify door sequence of operations.

1.10 WARRANTY (from product spec)

- .1 Warranty: Manufacturer's limited door and operators System warranty for 10 years against cracking, splitting or deterioration of steel skin due to rust.
- .2 Warranty: Manufacturer's limited door and operators System warranty for 8 years against cracking, splitting or deterioration due to rust-through.

Part 2 Products

2.1 DESIGN REQUIREMENTS

- .1 Design Engineer by this Section. Comply with the most restrictive requirement noted below:

- .1 Comply with wind (W) and earthquake (E) requirements resulting from BCBC 2024 Specified Loads and Effects 4.1.2, Sentence 4.1.2.1(3), Table 4.1.2.1 Importance Categories for Buildings: Importance Category Normal
 - .2 Design exterior door panels to withstand wind load a maximum horizontal deflection of 1/240 of opening width.
 - .3 Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with applicable code.
 - .4 Design Hourly Wind pressure: BCBC 2024.
 - .5 Design interior door panels to withstand pressure differential of 0.49 kilogram per square meter with a maximum horizontal deflection of 1/240 of opening width.
 - .6 Design system to be free of: vibration, wind noise, thermal movement noise, damage to adjoining building components.
 - .7 Design systems to allow for thermal movement of the components caused by surface temperature range of -15 degrees C to +60 degrees C without causing deterioration of the system or its supports.
 - .8 Comply with BCBC 2024 Part 5 envelope and energy requirements including ASHRAE 90.1-2010 Energy Standard for Buildings Except Low-Rise Residential Buildings
- .2 Wiring Connections: Requirements for electrical characteristics -115 volts, single phase, 60 Hz
 - .3 Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components

2.2 INSULATED STEEL SECTIONAL DOORS

- .1 Insulated Steel Sectional Overhead Doors: Wayne Dalton ThermoMark 5150 insulated sectional overhead steel doors. Units shall have the following characteristics:
 - .1 Door Sections: Shall be of steel/polyurethane/steel sandwich type construction with thermal break.
 - .1 Panel Thickness: 1-3/8 inches (34.92 mm).
 - .2 Exterior Surface:
 - .1 Flush with non-repeating wood grain texture.
 - .3 Exterior Steel: .015 inch (0.38 mm), hot-dipped galvanized.
 - .4 Thermal Values: R-value of 12.12; U-value of 0.0825.
 - .5 Air Infiltration: 0.23 cfm at 15 mph.
 - .6 Sound transmission class 20 when tested in accordance with ASTM E 413.
 - .7 Outdoor-indoor transmission class 20 when tested in accordance with ASTM E 1332.
 - .8 Insulation: CFC-free and HCFC-free polyurethane, fully encapsulated.
 - .1 Insulated sections tested in accordance with ASTM E 84 and achieve a Flame spread Index of 10 or less, and a Smoke Developed Index of 210 or less.

- .2 Insulation material tested in accordance with ASTM D 1929 and achieve a minimum Flash Ignition temperature of 734 degrees F, and a minimum Self Ignition temperature of 950 degrees F.
- .3 Insulated sections shall meet all requirements of the UBC 17-5 corner burn.
- .9 Ends: Hot-dipped galvanized steel, full height with end caps. Gauge determined by performance requirements.
- .10 Spring Counterbalance: Sized to weight of the door, with a helically wound, oil tempered torsion spring mounted on a steel shaft; cable drum of die cast aluminum with high strength galvanized aircraft cable. Sized with a minimum 5 to 1 safety factor.
 - .1 Standard cycle spring: 10,000 cycles
- .11 Pass-Door:
 - .1 Provide with optional pass door.
- .12 Full View Aluminum Glazing Sections:
 - .1 1/2 inch (12.5 mm) Tempered Double Insulating glass.
- .2 Finish and Color:
 - .1 Two coat baked-on polyester:
 - .1 Interior color, white.
 - .2 Exterior color, white.
- .3 Windload Design: Provide to meet the Design/Performance requirements specified.
- .4 Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.
- .5 Lock:
 - .1 Interior mounted slide lock with interlock switch for automatic operator.
- .6 Weatherstripping:
 - .1 Flexible bulb-type strip at bottom section.
 - .2 Flexible Jamb seals.
 - .3 Flexible Header seal.
- .7 Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
 - .1 Size: 3 inch (76 mm).
 - .2 Type:
 - .1 Standard lift.
 - .2 Vertical lift.
 - .3 High lift.
 - .3 Horizontal track shall be reinforced with continuous angle of adequate length and gauge to minimize deflection.

- .4 Vertical track shall be graduated to provide wedge type weathertight closing with continuous angle mounting for steel or wood jambs, and shall be fully adjustable to seal door at jambs.

2.3 FABRICATION INSULATED STEEL SECTIONAL DOORS

- .1 Refer to drawings for door sizes, elevations glazing and panel locations, and track type.

2.4 OPERATOR

- .1 Motor:
 - .1 HP: RATED 3/4
 - .2 Volts: 208v
 - .3 Phase: 3
 - .4 60Hz high starting torque, continuous-duty single phase capacitor start or 3 phase motor, open drip proof, protected against overload by a built-in thermal protection with automatic reset (3 phase motors).
 - .5 current sensing device with manual reset (1 phase motors). Also available with 50Hz 220V 1 phase and 380V 3 phase motor. Motor to be separate from reduction mechanism for ease of maintenance.
- .2 Reduction:
 - .1 First step in reduction to be 5L/B V-belt drive additional steps by chain and sprockets providing mechanical braking to hold the door in any position and giving an output shaft speed of 41 rpm. Input steel shaft to be 19.05mm in diameter and supported by cast iron pillow block bearings. Output steel shaft to be 25 mm in diameter with 6 mm keyway and supported by cast iron pillow block bearings.
- .3 Drive:
 - .1 Door shaft driven by a #50 roller chain and 50B12 sprocket combination to provide door travel of 152 mm to 305 mm per second.
- .4 Clutch:
 - .1 Friction type, positioned on input shaft, adjustable from outside.
- .5 Brake:
 - .1 Electrically activated drum type solenoid brake. To be a mechanical brake.
- .6 Manual Operation:
 - .1 By a Hoist-a-matic® self-engaging chain hoist with electrical cut-off (floor level engagement device is not required to operate). An electrical interlock automatically disconnects power to the motor operator when chain hoist is engaged.
- .7 Electrical Enclosure:
 - .1 Electrical components to be in a NEMA 1 enclosure. The enclosure to be liftable and kept out of the way for easy access to mechanical components and mounting holes. Electrical enclosure cover is hinged with stable opened position. Optional Nema 4/12, Nema 4X and Nema 7/9 enclosures (enclosure not liftable).
- .8 Limit Switches:

- .1 Rotary-type limit switch with oil-impregnated steel cams, and commercial grade switches. Systems to be enclosed in electrical control box, and limit shaft to be supported in frame by self-lubricating bronze bushings. System to be provided with Accu-cam® precise and quick one-handed adjustment feature. Limit switches to remain in time when there is a manual operation or after the motor has been removed. Designed to prevent any lever breakage when limits have been exceeded during manual operation.
- .9 Corrosion Protection:
 - .1 frame and control enclosure protected by a long lasting enamel finish, polymer control box cover. All shafts to be protected by yellow chromate coating.
- .10 Control Accessories to be supplied:
 - .1 3 push-button stations, open close key switch, one button radio control, electric sensing edge, pneumatic sensing edge, through beam photo cell.
- .11 Acceptable Product:
 - .1 Operator model Opera-SH as manufactured by Manaras-Opera, part of the Canimex Group.

Part 3 Execution

3.1 GENERAL

- .1 Proceed in accordance with Section 01 10 00 General Requirements

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for Insulated Sectional Doors in accordance with manufacturer's written instructions.
 - .1 Examine locations of electrical connections.
 - .2 Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits
 - .3 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
 - .5 Start of installation indicates installer's acceptance of substrate installation conditions.

3.3 INSTALLATION

- .1 Proceed in accordance with Section 01 10 00 General Requirements
- .2 Comply with reviewed signed and sealed shop drawings, manufacturer's written recommendations and specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .3 Anchor assembly to wall construction and building framing without distortion or stress.

- .4 Securely brace door tracks suspended from structure. Secure tracks to structural members or solid backing only.
- .5 Fit and align door assembly, tracks and operating hardware.
- .6 Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.
- .7 Adjust door assembly to smooth operation and in full contact with weatherstripping.

3.4 STARTUP SERVICE

- .1 Engage a factory-authorized service representative to perform start-up service.
 - .1 Perform installation and start-up checks according to manufacturer's written instructions.
 - .2 Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.5 ADJUSTING

- .1 Adjust hardware and moving parts to function smoothly and noiseless so that doors operate easily, free of warp, twist, or distortion.
- .2 Adjust exterior doors and components to be weather-resistant.
- .3 Lubricate bearings and sliding parts as recommended by manufacturer.
- .4 Adjust seals to provide tight fit around entire perimeter.

3.6 CLEANING AND WASTE MANAGEMENT

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
 - .1 Leave Work area clean at end of each day.
- .2 Clean surfaces after installation using manufacturer's written recommended cleaning procedures.
- .3 Clean doors, frames and glass.
- .4 Remove temporary labels and visible markings.
- .5 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment

3.7 CLOSEOUT ACTIVITIES

- .1 Demonstration and Training: Proceed in accordance with Section 01 10 00 General Requirements.
- .2 Demonstrate proper operation and maintenance procedures to Owner's representative.

3.8 PROTECTION

- .1 Do not permit construction traffic through overhead door openings after adjustment and cleaning until completion of project.
- .2 Protect installed products and components from damage during construction.

- .3 Repair or replace damage to adjacent materials caused by work of this section before Substantial Completion.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 08 11 14 Metal Doors & Frames.
 - .2 Electrical:
 - .1 Drawings and Specifications; Fused electrical power supplies and interconnecting conduit required for electronic door hardware:

1.2 REFERENCES

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
 - .1 ANSI/BHMA A156.1: American National Standard for Butts and Hinges.
 - .2 ANSI/BHMA A156.2: Bored and Preassembled Locks and Latches.
 - .3 ANSI/BHMA A156.3: Exit Devices.
 - .4 ANSI/BHMA A156.4: Door Controls - Closers.
 - .5 ANSI/BHMA A156.6: Architectural Door Trim.
 - .6 ANSI/BHMA A156.8: Door Controls - Overhead Stops and Holders.
 - .7 ANSI/BHMA A156.12: Interconnected Locks and Latches.
 - .8 ANSI/BHMA A156.13: Mortise Locks and Latches Series 1000.
 - .9 ANSI/BHMA A156.14: Sliding and Folding Door Hardware.
 - .10 ANSI/BHMA A156.15: Release Devices - Closer Holder, Electromagnetic and Electromechanical.
 - .11 ANSI/BHMA A156.18: Materials and Finishes.
 - .12 ANSI/BHMA A156.21: Thresholds
 - .13 ANSI/BHMA A156.22: Standard For Gasketing.
 - .14 ANSI/BHMA A156.29: Exit Locks, Exit Alarms, Alarms for Exit Devices
 - .15 ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Steel Frames.
 - .2 Canadian Steel Door and Frame Manufacturers' Association (CSDMA)
 - .1 CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames.

1.3 SUBMITTALS

- .1 Submit the following items [in accordance with Section 01 10 00 General Requirements.
- .2 Product data: Manufacturer's data sheets on each product to be used, including:
 - .1 Product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Preparation instructions and recommendations.
 - .3 Storage and handling requirements and recommendations.

- .4 Installation and maintenance instructions.
- .3 Hardware List:
 - .1 Submit contract hardware list.
 - .2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .4 Provide keying schedule in consultation with Owner.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
- .2 Operation and Maintenance instructions, precautions regarding cleaning, product data, samples, instructions and submittals for incorporation into architectural O & M Manual.
 - .1 Include manufacturer specified hardware, including make, model, material, function, size, finish and other pertinent information installed in this project.
- .3 Manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 MAINTENANCE MATERIALS SUBMITTALS

- .1 Supply maintenance materials in accordance with Section 01 10 00 General Requirements.
- .2 Supply 2 sets of wrenches for door closers, locksets, and fire exit hardware.

1.6 QUALITY ASSURANCE

- .1 Conform to materials specified, in brand and quality, unless otherwise approved in writing by the Consultant. No claim as to their unsuitability or unavailability or this Subcontractor's unwillingness to use the same, will be considered, unless such claims are made in writing prior to the closing of Bid.
- .2 Hardware supplier shall be an established contract builders hardware firm who shall have in his employ one or more A.H.C. (Architectural Hardware Consultant) who are members in good standing of the American (Canadian) Society of Architectural Hardware Consultants and who will be responsible for the complete hardware contract.

1.7 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
- .2 Deliver, store, handle and protect materials in accordance with Section 01 10 00 General Requirement.and with manufacturer's written instructions.
- .3 Deliver hardware to the site in accordance with the construction schedule prepared by the Contractor. Inspect all hardware on site for compliance to specifications before installation, stored in the original sealed packages in a locked, secure place until required for installation. The Contractor will be responsible for receiving and storing of hardware at the site. Hardware suppliers shall tag and deliver any sealed packages to the contractor.
- .4 Supply hardware complete with required screws, bolts and fastenings necessary for proper installation, wrapped in paper and packed in the same package as hardware. Label legibly

each package indicating that portion of work for which it is intended. Deliver door hardware in unopened original boxes.

- .5 Mail one copy of hardware delivery sheets to the Owner and Consultant at time of each shipment.

1.8 WARRANTY

- .1 All Finish Hardware, except door closers shall be guaranteed by the hardware manufacturer, by written certification, for a period of one (1) year from certified date of Substantial Performance against any defects in the design, materials, finish, function and workmanship and that any defects shall be made good by the manufacturer at not additional cost to the Owner. A similar guarantee for a ten (10) year period shall be provided for door closers by the manufacturer.

Part 2 Products

2.1 MATERIALS

- .1 Hardware shall be best grade, entirely free from imperfections in manufacture and finish and shall be supplied in accordance with the hardware list specified herein.
- .2 The following list of manufactures and products are considered approved for this project.
- .3 Installed item to be equal in all respects to approved samples.
- .4 Supply all templates as required. Frame manufacturer will allow for maximum swing of doors when templating for closers. On pairs of doors RHR Leaf is to be active unless otherwise noted.
- .5 Any doors not listed shall have hardware as listed for similar locations.
- .6 Package hardware with all necessary screws and fittings, clearly labelled with door number as per Door Schedule, as to intended location. Included all necessary installation instructions.

2.2 APPROVED MANUFACTURERS

- .1 Use one manufacturer's product only for all similar items.
- .2 Butts:
 - .1 McKinney
 - .2 Hager
 - .3 Stanley
- .3 Privacy, latchsets, cylinders:
 - .1 Schlage L series
- .4 Panic sets:
 - .1 Sargent
 - .2 Von Duprin
 - .3 Complete with temporary Construction cyl, keyed as required by Contractor.

- .5 Closers:
 - .1 Norton
 - .2 Sargent
 - .3 LCN
- .6 Flush bolts:
 - .1 Rockwood
 - .2 Glynn Johnson
 - .3 Hager.
- .7 Thresholds, weatherstrips, seals, door bottoms, astragals; Fire seals must have UL labels:
 - .1 Pemko,
 - .2 Draftseal.
- .8 Coordinators:
 - .1 Rockwood
 - .2 Trimco.
- .9 Overhead stops:
 - .1 Rixson
- .10 Glynn Johnson Fastenings: Screws, bolts, expansion shields and other fastening devices required for satisfactory installation. Exposed fastening devices to match finish of hardware.

2.3 GENERAL

- .1 Supply all finish hardware, templates, screws, bolts and accessories required to complete all work indicated on drawings and/or specified herein. Use one manufacturer's products only for all similar items.
- .2 Finishes:
 - .1 Satin stainless steel (Stainless steel 300: 630; US32D)
- .3 Substitutions: Refer to Section 01 10 00 General Requirements

2.4 DOOR HARDWARE

- .1 Locks and latches: in accordance with ANSI/BHMA A156.13: Mortise Locks and Latches Series 1000.
 - .1 Grade 1, Operational and Security, UL Listed for 3-hour fire door With interchangeable core cylinders: Grade 2 Security.
 - .2 Concealed Mortise cylinder: Grade 1 Operational and Security. ANSI/ASTM F476-76 Grade 40, UL Listed.
 - .3 Supplied complete with stainless steel ANSI Standard stikes and strike boxes.
 - .4 Acceptable Manufacturer and product:
 - .1 Schlage L Series; Commercial Mortise Locks
 - .1 ANSI/BHMA A156.13 Certified Operational Grade 1
 - .2 ANSI/BHMA A156.13 Certified Security Grade 1

- .2 Sargent 8200 Series; Commercial Mortise Locks
 - .1 ANSI/BHMA A156.13 Certified Operational Grade 1
 - .2 ANSI/BHMA A156.13 Certified Security Grade 1
- .3 Schlage ND Series; ANSI/BHMA 156.2 Series 4000 Grade 1 Certified Bored Locks
- .5 Passage latch: L9010
- .6 Finishes: US26D or US32D.
- .7 Cylinders:
- .8 Or acceptable substitution.
- .2 Trims:
 - .1 Regular handle
- .3 Butts and hinges: in accordance with ANSI/BHMA A156.1
 - .1 Five knuckle concealed ball bearing hinges, grade 1, suited for heavy weight doors, full mortise, brass base metal, US32D finish.
 - .1 Acceptable manufactures and products:
 - .1 Stanley CB Series.
 - .2 Hagar BB1168 Series.
 - .3 McKinney T4A3386 & T4A3786 Series.
 - .4 Or acceptable substitution.
- .4 Panic hardware: in accordance with ANSI/BHMA A156.3
 - .1 Exit devices Von Duprin 98/99 series.
 - .2 Single door application.
 - .3 Surface mounted vertical rod device.
 - .4 Night latch cylinder assembly with pull controlled by key access.
 - .5 Exterior trim with regular handle.
 - .6 Install panic devices with through bolts, top and bottom latches to be thru-bolted.
 - .7 Supply with appropriate strikes, fittings, trim and sexbolts.
 - .8 Cylinders: same make as locksets
 - .9 Or acceptable substitution.
- .5 Astragal: in accordance with ANSI/BHMA A156.22
 - .1 Metal doors: By metal door supplier.
- .6 Door Closers and Accessories: in accordance with ANSI/BHMA A156.4
 - .1 Provide door closers that permit door to swing open to maximum opening permissible.
 - .2 Refer to plans and details.
 - .3 Doors that open onto a wall face at 90 degrees shall be limited to 90 degree operation.
 - .4 Doors equipped with overhead holders shall dead stop doors at 90degrees.
 - .5 Acceptable manufactures and products:

- .1 LCN 4040XP series
 - .1 Cylinders: 4041-3071 DEL
 - .2 Covers: 4040XP-72MC
 - .3 Complete with required arms and mounting accessories including through bolts at doors, size to suit door.
 - .1 Parallel Arm.
 - .2 Spring Cush.
 - .3 Spring Cush/Hold Open.
 - .4 Or acceptable substitution.
- .7 Coordinator: in accordance with ANSI/BHMA A156.4
 - .1 Concealed, width to suit door
 - .1 Acceptable manufactures and products:
 - .1 Ives COR Series.
 - .2 Door Control International, 600 series.
 - .3 Dorma, SR 390, surface.
 - .4 Dorma, SR 392, concealed.
 - .5 Rockwood, 2600 Series.
 - .6 Or acceptable substitution.
- .8 Overhead Door Stop and Holder Unit: in accordance with ANSI/BHMA A156.8
 - .1 Acceptable manufactures and products:
 - .1 Glynn-Johnson 90H series, surface.
 - .2 Glynn-Johnson 100H series, concealed.
 - .3 Dorma 900 Series, surface.
 - .4 Dorma 910 Series, concealed.
 - .5 Rixson 9ADJ Series, surface.
 - .6 Rixson 1ADJ Series, concealed.
 - .7 Or acceptable substitution.
- .9 Door Edge Protection:
 - .1 914 mm high, 1mm thickness, all edges beveled, stainless steel, mechanically fastened, US32D finish.
 - .1 Hager 182P
 - .1 Or acceptable substitution.
- .10 Threshold: Aluminum. in accordance with ANSI/BHMA A156.21
 - .1 Heavy Duty:
 - .1 Latching panic exit saddle threshold: Pemko 2705 AKT
 - .2 Typical threshold: 2715 AK / 2716 AK
 - .3 Modular thermally broken: 1717 AK / 1718 AK / 1719 AK
 - .1 To suit opening and match depth of door frame.
 - .4 Or acceptable substitution.

- .11 Door Sweep: in accordance with ANSI/BHMA A156.22
 - .1 Pemko 315CN or similar.
 - .1 Or acceptable substitution.
- .12 Perimeter gasketing: in accordance with ANSI/BHMA A156.22
 - .1 Pemko 29310 CS or 29310 CPK
 - .2 Pemko 369 APK, kerfed into door edge.
 - .1 Or acceptable substitution.

2.5 FASTENINGS

- .1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Exposed fastening devices to match finish of hardware.
- .4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.
- .5 Use fasteners compatible with material through which they pass.

2.6 KEYING

- .1 Consult with Owner to determine keying requirements and submit keying schedule for review. Schedule to DHI requirements including itemize door, lock/cylinder, item number, keying. Keyway to match Owners system.
 - .1 Grand master key locks to existing Owner system.
 - .2 Master key door locks
 - .3 Key locks to suit requirements of owners.
 - .4 Stamp keys "DO NOT DUPLICATE"
 - .5 Supply 2 cut keys for each lockset and cylinder.
- .2 Forward all building keys, blanks, extractor and key charts by registered delivery directly to Owner representative.
- .3 All locks to be construction keyed, supply 2 construction keys to Contractor and 1 extractor key.
- .4 Tag and identify keys to room number and door number with lock that key operates
- .5 Tags shall be 30mm diameter white cardboard with metal edges secured to keys by a loop of wire.
- .6 Provide a list of key numbers with corresponding room names.

Part 3 Execution

3.1 GENERAL

- .1 Guide: Door hardware items have been placed in sets which are intended to be a guide of design, grade, quality, function, operation, performance, exposure, and like characteristics of door hardware, and may not be complete. Provide door hardware required to make each set complete and operational.
- .2 Hardware schedule does not reflect handing, backset, method of fastening and like characteristics of door hardware and door operation.
- .3 Review door hardware sets with door types, frames, sizes and details on drawings. Verify suitability and adaptability of items specified in relation to details and surrounding conditions.

3.2 EXAMINATION

- .1 Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- .2 Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- .3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 HARDWARE MOUNTING

- .1 Mount hardware in accordance with the recommended locations as per standard locations for builders hardware locations (metric) as listed in Canadian Metric conversion Guide for Steel Doors and Frames prepared by the Canadian Steel Door and Frame Manufacturers association and B.C. Code for the Physically and Visually Handicapped.
- .2 Hardware positioning:
 - .1 Conform to ASAH Standards and as follows unless otherwise described under the Hardware Schedule:
 - .1 Door handle: Centres 1024 mm from floor.
 - .2 Hinges: upper edge of door to centre of top hinge 244 mm below frame. Lower edge of door to centre of bottom hinge 244 mm above floor. Centre hinge spaced equally between other two.
 - .2 Door seals shall be fitted and adjusted to make continuous contact with door or floor.
 - .3 Exterior thresholds shall be set in solid mastic. Secure thresholds with countersink chrome plated screws and metal shields.

3.4 INSTALLATION

- .1 Install hardware in accordance with reference standard and regulatory requirements.
- .2 Install hardware per manufacturer's instructions and in compliance with the following as applicable:
 - .1 NFPA 80

- .2 NFPA 105
 - .3 ICC/ANSI A117.1
 - .4 ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Steel Frames.
 - .5 ANSI/BHMA A156.115W Hardware Preparation in Wood Doors with Wood or Steel Frames.
 - .6 DHI Publication: Installation Guide for Doors and Hardware; UL10C/UBC7-2.
 - .7 Local building code.
 - .8 Reviewed shop drawings.
 - .9 Reviewed finish hardware schedule.
- .3 Do not install surface mounted items until finishes have been completed on substrates involved. Set unit level, plumb and true to line location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
 - .4 Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, machine / install each item prior to finish application and remove. Re-install each item only after finishes are completed and cured.
 - .5 Cut and fit thresholds to suit profile of door frames. Cut smooth opening for door bolts and similar items, if any. Substrate using non- corrosive countersunk screws and metal shields at 300 mm o.c.
 - .6 Install weatherstripping at all exterior doors and frames and smoke seal where indicated. Cope seals / weatherstripping at corners and use full length pieces only and full complement of matching screws and fixings. Align and adjust for ease of door operation and seal against wind, rain and sound. Ensure that door seals make continuous contact with the door and floor and that self-adhering seals are installed a minimum of two (2) weeks after door frames have been painted to allow paint to dry adequately.
 - .7 Adjust and check each operating item of hardware and each door to ensure proper operation of function of every unit. Lubricate moving parts with type of lubrication as recommended by manufacturer (graphite-type). Replace all hardware which cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.
 - .8 Correct or replace if directed all hardware that is incorrectly located, malfunctioning or improperly installed at no additional cost to the Owner.

3.5 FIELD QUALITY CONTROL

- .1 Material supplier to schedule final walk through to inspect hardware installation ten business days before final acceptance of Owner. Material supplier shall provide a written report detailing discrepancies of each opening to General Contractor within seven calendar days of walk through..

3.6 CLEANING AND WASTE MANAGEMENT

Proceed in accordance with Section 01 10 00 General Requirements.

- .1 Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no cost to Owner.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 The exterior and interior materials and finishes listed in this section complement and complete other technical sections that make reference to this section.

1.2 RELATED REQUIREMENTS

- .1 Related sections include all sections that make reference to this section and sections that are listed in the Finish Schedule.
- .2 Use this section in conjunction with the Drawings for detailed description of material locations and extent.

1.3 DEFINITIONS

- .1 **Exposed Surfaces:** Apply listed finishes to all visible surfaces viewed from normal viewing conditions except top of horizontal surfaces located 2100 mm or more above finished floor level unless visible from above.
- .2 **Semi-Exposed Surfaces:** Apply listed finishes to bottom of horizontal surfaces that are located below 1100 mm above finished floor, that are visible from offset angles, reflections or through openings in adjacent construction.
- .3 **Concealed Surfaces:** Listed finishes will not be required on surfaces that are fully enclosed or concealed from view in final construction except for identification marks or protection coating specified in other Sections of the Project Manual.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 **Substitutions:** Refer to Section 01 10 00 – General Requirements before submitting request for substitution to the Consultant
- .2 **Coordination:** Confirm with Consultant before starting finishing of any material; general finishing coordination requirements follow:
 - .1 **Walls:** Finish reveals and recesses the same as adjacent finishes, unless indicated as a contrasting colour or as an exposed metal finish.
 - .2 **Doors and Frames:** Paint metal door frames differently than walls in which they occur with doors a different colour as the frames as indicated on Drawings.
 - .3 **Painting:** Refer to Drawings for location of accent paint; paint miscellaneous metal fabrications to match adjacent finishes.

Part 2 Products

2.1 SCHEDULES

- .1 The following Schedules apply to exterior and interior finish materials listed in referenced Technical Specification Sections.
- .2 The Finish Schedule apply to exterior and interior finish materials listed in referenced Technical Specification Sections.
 - .1 Refer to Architectural drawings

.2 Refer to Architectural Finish Schedule Spreadsheet

Part 3 Execution

3.1 NOT USED

.1 Not used

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Furnish all labour, materials, equipment, accessories and services necessary for the complete supply and installation of gypsum board as indicated on the drawings, scheduled and as specified.
- .2 Section Includes:
 - .1 Interior and/or exterior gypsum board for patch work during renovation.
- .3 Related Sections:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 05 40 00 Cold Formed Channel Framing
 - .2 Section 00 06 10 00 Rough Carpentry
 - .3 Section 00 07 25 13 Air and Vapour Membranes
 - .4 Section 07 92 00 Joint Sealants
 - .5 Section 09 65 13 Resilient Base and Accessories
 - .6 Section 09 91 00 Painting
 - .7 Section 10 26 23 Protective Wall Covering
 - .8 Section 10 28 13 Washroom Accessories

1.2 REFERENCES

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM C475: Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .2 ASTM C557: Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
 - .3 ASTM C840: Standard Specification for Application and Finishing of Gypsum Board.
 - .4 ASTM C954: Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.84 mm to 2.84 mm in Thickness.
 - .5 ASTM C1002: Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - .6 ASTM C1047: Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - .7 ASTM C1278: Standard Specification for Fiber-Reinforced Gypsum Panel.
 - .8 ASTM C1280: Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.

- .9 ASTM C1396/C1396M: Standard Specification for Gypsum Wallboard.
- .10 ASTM C1629: Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.
- .2 Association of the Wall and Ceilings Industries International (AWCI)
 - .1 AWCI Levels of Gypsum Board Finish.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34: Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CAN/CGSB-71.25: Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .4 Underwriters' Laboratories of Canada (ULC).
 - .1 CAN/ULC S102: Standard Method of Test of Surface Burning Characteristics of Building Materials and Assemblies.
- .5 Association of Wall and Ceilings Contractors AWCC
 - .1 Wall and Ceiling Specifications Standards Manual.
- .2 shown on drawings and specified requires system design and shop drawing submittal.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Architect's drawings, and are acceptable for product installation in accordance with the manufacturer's instructions.

1.4 SUBMITTALS

1.5 CLOSEOUT SUBMITTALS

- .1 Submit the following items for incorporation into architectural O & M Manual.
 - .1 Product data and reviewed submittals.
 - .2 Warranty documentation.

1.6 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer Qualifications:
 - .1 Minimum two (2) years documented experience installing similar products and size projects on not less than five (5) similar installations.
 - .2 Supervised by a person having a minimum of five (5) years documented experience installing similar products and supervising similar size projects.
 - .2

1.7 DELIVER, STORAGE, HANDLING AND PROTECTION

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

1.8 FIELD CONDITIONS

- .1 Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- .2 Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- .3 Do not install panels that are wet, moisture damaged, and mold damaged.
 - .1 Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - .2 Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.
- .4 Maintain temperature 10 °C minimum, 21 °C maximum for 48 hours prior to and during application of gypsum boards and joint treatment, and for 48 hours minimum after completion of joint treatment.
- .5 Apply board and joint treatment to dry, clean, frost free surfaces.
- .6 Ventilation: ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

Part 2 Products

2.1 PERFORMANCE REQUIREMENTS

- .1 Moisture- and Mold-Resistant Assemblies: Provide and install moisture- and mold-resistant glass-mat gypsum wallboard products with moisture-resistant surfaces complying with ASTM C 1658 and ASTM C 1177 where indicated on Drawings and in all locations which might be subject to moisture exposure during construction. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- .3 Ceiling and wall materials shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 MANUFACTURER

- .1 USG Corporation
- .2 Georgia Pacific Gypsum.
- .3 CertainTeed Gypsum Canada, Inc.
- .4 National Gypsum Company.

2.3 INTERIOR GYPSUM BOARD

- .1
- .2 Fire Rated Gypsum Board: Gypsum core panel with a specially formulated core for use in fire-resistive Type X designs. Complying with ASTM C 1396/C 1396M.

- .1 Basis-of-Design Product:
 - .1 USG Corporation; USG Sheetrock Brand Firecode X Panels
 - .2 Georgia-Pacific Gypsum; ToughRock Fireguard X Gypsum Board
 - .3 CertainTeed Gypsum, Inc.; CertainTeed Type X Gypsum Board.
 - .4 Or pre-approved substitution
- .2 Thickness: 15.9 mm.
- .3 Long Edges: Tapered
- .3 Gypsum Ceiling Board: ASTM C 1396/C 1396M.
 - .1 Basis-of-Design Product:
 - .1 Georgia-Pacific Gypsum; "[DensArmor Plus High-Performance Interior Panel] [ToughRock CD Ceiling Board]."
 - .2 CertainTeed Gypsum, Inc.; CertainTeed Easi-Lite™ Interior Ceiling Board.
 - .3 Or pre-approved substitution
 - .2 Thickness: 12.7 mm.
 - .3 Long Edges: Tapered.

2.4 EXTERIOR GYPSUM BOARD

- .1 Exterior Gypsum Board: ASTM C 1396/C 1396M, with manufacturer's standard edges.
 - .1 Basis-of-Design Product:
 - .1 USG Corporation; USG Sheetrock Brand UltraLight Panels Mold Tough.
 - .2 Georgia-Pacific Gypsum; "ToughRock Soffit Board".
 - .3 CertainTeed Gypsum, Inc.; CertainTeed Exterior Soffit Board [Type X] [Type C].
 - .4 Or acceptable substitution.
 - .2 Core: 15.9 mm, Type X or as per existing.

2.5 MANUFACTURERS

- .1 Acceptable Manufacturer:
 - .1 Trim-Tex Inc.
- .2 Substitutions: Not permitted.

2.6 TRIM MEMBERS

- .1 Basis of Design: Vinyl trim for gypsum board as manufactured by Trim-Tex Inc.; including accessories, joint treatment for trim.
 - .1 Recycled Content: Furnish materials with at least 50 percent recycled content.
- .2 Performance Requirements:
 - .1 Self-Extinguishing: Shall not continue to support combustion once flame source is removed.
 - .2 Meet or exceed following ASTM Standards:
 - .1 ASTM E84-10: Achieve Class A rating for Smoke and Flame Spread.
 - .2 ASTM C 1047: Standard Specification for Accessories for Gypsum Wallboard.

- .3 ASTM D 1784: Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPCV) Compounds.
- .4 ASTM D 3678: Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Interior-Profile Extrusions.
- .5 GA-216-10: Gypsum Association
- .6 Impervious to rust, galvanic corrosion, electrolysis and resistant to most chemicals.

2.7 TRIM ACCESSORIES

- .1 Interior Trim: In accordance with ASTM C 1047.
 - .1 Material: Galvanized
 - .2 Use one manufacturer's products only for all similar items.
 - .3 Shapes:
 - .1 Corner Beads:
 - .1 Standard Corner Beads.
 - .2 Commercial Beads:
 - .1 Deflection Beads.
 - .1 For Head of Wall Details
 - .2 Wall Mounted Deflection Bead. For deflection of up to 7/16" use Wall Mounted Deflection Bead. Wall Mounted Deflection Bead is not designed for major uplift. Minor uplift can be easily caulked. Always follow installation instructions included with product.
- .2 Exterior Trim: ASTM C 1047.
 - .1 Material: Hot-dip galvanized-steel sheet, plastic, or rolled zinc.
 - .2 Shapes:
 - .1 Cornerbead.
 - .2 LC-Bead: J-shaped; exposed long flange receives joint compound.
 - .3 Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.
 - .3

2.8 DRYWALL SCREWS

- .1 Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
 - .1 Use screws complying with ASTM C 954 for fastening panels to steel members from 0.84- to 2.84-mm thick.
 - .2 For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

2.9 JOINT TREATMENT MATERIALS

- .1 General: Comply with ASTM C 475/C 475M.
- .2 Joint Tape:
 - .1 Interior Gypsum Board: Paper.

- .2 Exterior Gypsum Soffit Board: Paper.
- .3 Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
 - .1 Prefilling: At open joints[, rounded or beveled panel edges,] and damaged surface areas, use setting-type taping compound.
 - .2 Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use [setting-type taping] [drying-type, all-purpose] compound.
 - .1 Use setting-type compound for installing paper-faced metal trim accessories.
 - .3 Fill Coat: For second coat, use [setting-type, sandable topping] compound.
 - .4 Finish Coat: For third coat, use [setting-type, sandable topping] compound.
 - .5 Skim Coat: For final coat of Level 5 finish, use [setting-type, sandable topping compound] [drying-type, all-purpose compound] [high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish].
- .4 Joint Compound for Exterior Applications:
 - .1 Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
 - .2 Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.
- .5 Refer to Section

2.10 AIR VAPOUR BARRIERS

- .1 Refer to Section 07 25 13 Air and Vapour Membranes

Part 3 EXECUTION

3.1 EXAMINATION

- .1 Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- .2 Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- .3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- .1 Comply with ASTM C 840.
- .2 Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- .3 Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1.5 mm of open space between panels. Do not force into place.

- .4 Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- .5 Form control and expansion joints with space between edges of adjoining gypsum panels.
- .6 Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - .1 Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 0.7 sq. m in area.
 - .2 Fit gypsum panels around ducts, pipes, and conduits.
 - .3 Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 16.4- to 9.5-mm- wide joints to install sealant.
- .7 Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 6.4- to 12.7-mm- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- .8 Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- .9 Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

3.3 APPLYING INTERIOR GYPSUM BOARD

- .1 Install interior gypsum board in the following locations:
 - .1 Wallboard Type: As indicated on Drawings.
- .2 Single-Layer Application:
 - .1 On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - .2 On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - .1 Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - .2 At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
- .3 Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.4 INSTALLATION VINYL TRIM ACCESSORIES

- .1 Install vinyl trim members in accordance with manufacture's written installation instructions.
 - .1 Compliance: Perform Work in accordance with ASTM C 754.

- .2 Compliance: Perform Work in accordance with ASTM C 840.
- .3 Compliance: Perform Work in accordance with GA-214.
- .4 Compliance: Perform Work in accordance with GA-216.
- .5 Compliance: Perform Work in accordance with GA-600.
- .6 Compliance: As scheduled and indicated on drawings.
- .7 When manufacturer's installation instructions do not specifically cover applicable installation; comply with ASTM C 754, GA-216 and GA-600.
- .2 Secure trim members to substrate with staples and spray adhesive in accordance with trim manufacturer's written instructions.
 - .1 Install factory fabricated accessories at joints in trim members with durable:
 - .1 Straight edges.
 - .2 Straight corners.
 - .2 Apply specified mud to flanges of trim members.
- .3 Control Joints: Place control joints consistent with lines of building spaces as indicated on Drawings.
- .4 Interior Trim: Install in the following locations:
 - .1 Corner Bead: Use at outside corners; type as indicated on drawings.
 - .2 Deflection Bead: Use at head of wall or as indicated on drawings.
 - .3 J or L Bead. Use at exposed panel edges or as indicated on drawings.
 - .4 Other trims. Use as indicated on drawings.

3.5 INSTALLING TRIM ACCESSORIES

- .1 General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- .2 Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- .3 Interior Trim: Install in the following locations:
 - .1 Cornerbead: Use at outside corners.
- .4 Exterior Trim: Install in the following locations:
 - .1 Cornerbead: Use at outside corners.

3.6 FINISHING GYPSUM BOARD

- .1 General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- .2 Prefill open joints and damaged surface areas.
- .3 Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

- .4 Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - .1 Level 1: Plenums, service corridors; above ceilings.
 - .2 Level 2: Areas of water-resistant gypsum backing board under tile; exposed areas where appearance is not critical
 - .3 Level 3: Areas to receive heavy or medium textured coatings; heavy-grade wallcoverings.
 - .4 Level 4: Areas to receive flat sheen paint finish; light textured coatings; lightweight wallcoverings.
 - .1 Primer and its application to surfaces are specified in Section 09 91 00 – Painting.
 - .5 Level 5: Areas to receive gloss, semi-gloss sheen paints; critical lighting conditions] .
 - .1 Primer and its application to surfaces are specified in Section 09 91 00 - Painting.

3.7 APPLYING TEXTURE FINISHES

- .1 Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- .2 Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture[matching approved mock-up and] free of starved spots or other evidence of thin application or of application patterns.
- .3 Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written instructions.

3.8 PROTECTION

- .1 Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- .2 Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- .3 Remove and replace panels that are wet, moisture damaged, or mold damaged.
 - .1 Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - .2 Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 Furnish all labour, materials, equipment, accessories and services necessary for the complete supply and installation of resilient base and accessories as indicated on the drawings, scheduled and as specified.
- .2 Related Requirements:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 07 26 00 Joint Sealants
 - .2 Section 09 06 00 Schedule for Finishes
 - .3 Section 09 21 16 Gypsum Board Assemblies

1.2 REFERENCES

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM F 1861: Resilient Wall Base.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Consultant's drawings, and are acceptable for product installation in accordance with the manufacturer's instructions.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements for incorporation into architectural O & M Manual.
 - .1 Include manufacturer, product number, dimensions, finish, texture and colour for each product and type of this section installed in this project.
 - .2 Warranty documentation.

1.5 QUALITY ASSURANCE

- .1 Proceed in accordance with section 01 10 00 General Requirements.
- .2 Source Limitations:
 - .1 Supply product and accessories specified from one manufacturer to ensure total system compatibility and integrity.
 - .2 Installer Qualifications:
 - .1 Minimum two (2) years documented experience installing similar products and size projects.

1.6 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Proceed in accordance with Section 01 10 00 General Requirements.

- .2 Deliver, store, handle and protect materials in accordance with Section 01 10 00 General Requirements and with manufacturer's written instructions.

1.7 PROJECT CONDITIONS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20°C for 72 hours before, during and after installation.
- .2 Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 13°C or more than 35°C.
- .3 Install resilient products after other finishing operations, including painting, have been completed.

Part 2 Products

2.1 MANUFACTURERS

- .1 Acceptable manufactures:
 - .1 Tarkett
 - .1 Wall Base: Baseworks Thermoset Rubber (Type TS)

2.2 MATERIALS

- .1 Resilient Base Standard: ASTM F 1861.
 - .1 Material Requirement: Type TS (rubber, vulcanized thermoset)
 - .2 Manufacturing Method: Group I (solid, homogeneous)
 - .3 Style: Toe: Cove base, subtle radius at the bottom
- .2 Minimum Thickness: 3.2 mm.
- .3 Height: 102 mm.
- .4 Lengths: Coils in manufacturer's standard length.
- .5 Outside Corners: Preformed.
- .6 Inside Corners: Preformed.
- .7 Acoustical sealant: low VOC content, one component, water based, by specified flooring manufacturer recommendation.
- .8 Primers and Adhesives:
 - .1 Premium grades of types recommended by specified manufacturer for specific material on applicable substrate for above, on or below grade installation.
 - .2 Rubber Flooring adhesive as recommended by manufacture to meet site conditions.
- .9 Colour and Finish: Refer to section 09 06 00 - Schedule for Finishes.

2.3 PRODUCT PERFORMANCE

- .1 Construction:

- .1 Proprietary thermoplastic rubber formulation designed specifically to meet the performance and dimensional requirements of ASTM F-1861 Standard Specification for Resilient Wall Base, Type TP, and Group 1.
- .2 Flexibility:
 - .1 Will not crack, break, or show any signs of fatigue when bent around a 1/4" (6.4 mm) diameter cylinder.
- .3 Chemical resistance (ASTM F 925):
 - .1 Passes – 5% acetic acid, 70% isopropyl alcohol, mineral oil, 5% sodium hydroxide solution, 5% hydrochloric acid solution, 5% sulfuric acid solution, 5% household ammonia solution, and 5.25% household bleach solution
- .4 Resistance to light (ASTM F 1515):
 - .1 $\Delta E < 8$

2.4 ACCESSORIES

- .1 Adhesives:
 - .1 Tarkett 960 Cove Base Adhesive (Porous surfaces).
 - .2 Tarkett 946 Premium Contact Adhesive (Non-porous surfaces).

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product installation instructions, and data sheets.

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for resilient base installation in accordance with manufacturer's written instructions.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
 - .3 Start of resilient base installation indicates installer's acceptance of substrate installation conditions.

3.3 RESILIENT BASE INSTALLATION

- .1 Comply with reviewed shop drawings, manufacturer's written recommendations and specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .2 Apply acoustical caulking bead between floor slab and base of all walls receiving rubber base.
- .3 Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

- .4 Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- .5 Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- .6 Do not stretch resilient base during installation.
- .7 On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- .8 Preformed Corners: Install preformed corners before installing straight pieces.

3.4 RESILIENT ACCESSORY INSTALLATION

- .1 Comply with reviewed shop drawings, manufacturer's written recommendations and specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .2 Tightly adhere to substrates throughout length of each piece.
- .3 Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece.

3.5 CLEANING AND WASTE MANAGEMENT

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
 - .1 Leave Work area clean at end of each day.
- .2 Clean surfaces after installation using manufacturer's written recommended cleaning procedures.
 - .1 Remove adhesive and other blemishes from exposed surfaces.
 - .2 Sweep and vacuum surfaces thoroughly.
 - .3 Damp-mop surfaces to remove marks and soil.
- .3 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment

3.6 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair or replace damage to adjacent materials caused by work of this section before Substantial Completion.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 Section Includes: All labor, materials, tools and other equipment, services and supervision required to complete all exterior and interior painting and decorating work as indicated on Finish Schedules and to the full extent of the drawings and specifications.
- .2 Work under this contract also include:
 - .1 Surface preparation of substrates as required for acceptance of painting, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas to the limits defined under MPI preparation requirements.
 - .2 Surface preparation and prime painting surfaces for wall coverings prior to installation in accordance with MPI and wall covering manufacturer's requirements.
 - .3 Specific pre-treatments noted herein or specified in the MPI Architectural Painting Specification Manual.
 - .4 Priming (except where pre-primed with an approved primer under other Sections of work) and painting of structural steel, miscellaneous metal, ornamental metal, and primed steel equipment.
 - .5 Priming and back-priming of wood materials as noted herein or specified in the MPI Architectural Painting Specification Manual.
 - .6
 - .7 Re-painting of existing surfaces and finishes when adjacent to new painting work where applicable including surface preparation, prime and finish coats in accordance with MPI Repainting requirements.
 - .8 Provision of safe and adequate ventilation as required over and above temporary ventilation supplied by others, where toxic and/or volatile / flammable materials are being used.
- .3 Refer to drawings and schedules (e.g., Finish Schedule) for type, location and extent of finishes required, and include all touch-ups and field painting necessary to complete work shown, scheduled or specified.
- .4 This Section along with the drawings forms part of the Contract documents and is to be read, interpreted and coordinated with all other parts, including.

1.2 RELATED SECTIONS

- .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 04 05 13 Masonry Mortaring and Grouting
 - .2 Section 07 46 46 Fibre-Cement Siding
 - .3 Section 08 11 00 Metal Doors and Frames
 - .4 Section 08 36 13 Overhead Sectional Door
 - .5 Section 09 06 00 Schedule for Finishes

.6 Section 09 21 16 Gypsum Board Assemblies

1.3 REFERENCES

- .1 Proceed in accordance with the current edition of the following:
 - .1 Architectural Painting Specification Manual by the Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List. (hereafter referred to as the MPI Painting Manual) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
 - .2 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).
 - .3 National Fire Code of Canada.

1.4 QUALITY ASSURANCE

- .1 Contractor having a minimum of five (5) years proven satisfactory experience and show proof before commencement of work that he will maintain a qualified crew of painters throughout the duration of the work.
- .2 Conform all materials, preparation and workmanship to requirements of the latest edition of the Architectural Painting Specification Manual by the Master Painters Institute (MPI) (hereafter referred to as the MPI Painting Manual) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
- .3

1.5 REGULATORY REQUIREMENTS

- .1 Conform to the latest edition of Industrial Health and Safety Regulations issued by applicable authorities having jurisdiction in regard to site safety (ladders, scaffolding, ventilation, etc.).
- .2 Conform to requirements of local authorities having jurisdiction in regard to the storage, mixing, application and disposal of all paint and related waste materials. Refer to Waste Management and Disposal.

1.6 SUBMITTALS

- .1 Provide submittals in accordance with Section –01 10 00 General Requirements.
- .2 Submit consent of surety with Bid Submission as proof of ability to supply a 100% two (2) year Maintenance Bond, if an MPI Accredited Quality Assurance Association’s guarantee option is not used.
- .3 If requested, submit a list of all painting materials to the Consultant for review prior to ordering materials.
- .4 Submit two sets of Material Safety Data Sheets (MSDS) prior to commencement of work for review and for posting at job site as required.
- .5 If requested, submit work schedule for various stages of work when painting occupied areas for the Consultant’s review and Owner’s approval.

- .6 At project completion provide an itemized list complete with manufacturer, paint type and colour coding for all colours used for Owner's later use in maintenance.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Deliver all painting materials in sealed, original labeled containers bearing manufacturer's name, brand name, type of paint or coating and colour designation, standard compliance, materials content as well as mixing and/or reducing and application requirements.
- .2 Store all paint materials in original labeled containers in a secure (lockable), dry, heated and well ventilated single designated area meeting the minimum requirements of both paint manufacturer and authorities having jurisdiction and at a minimum ambient temperature of 7° C. Store only material used on this project on site.
- .3 Where toxic and/or volatile / explosive / flammable materials are being used, provide adequate fireproof storage lockers and take all necessary precautions and post adequate warnings (e.g. no smoking) as required.
- .4 Take all necessary precautionary and safety measures to prevent fire hazards and spontaneous combustion and to protect the environment from hazard spills. Store materials that constitute a fire hazard (paints, solvents, drop clothes, etc.) in suitable closed and rated containers and removed from the site on a daily basis.
- .5 Comply with requirements of authorities having jurisdiction, in regard to the use, handling, storage and disposal of hazardous materials.

1.8 SCHEDULING

- .1 Schedule painting operations to prevent disruption of and by other trades.
- .2 Schedule painting operations in occupied facilities to prevent disruption of occupants in and about the building. Carry out painting in accordance with Owner's operating requirements. Schedule work such that painted surfaces will have dried before occupants are affected. Obtain written authorization from Consultant / Owner for changes in work schedule.

1.9 PROJECT AND SITE REQUIREMENTS

- .1 UNLESS specifically pre-approved by the specifying body, Paint Inspection Agency and the applied product manufacturer, perform no painting or decorating work when the ambient air and substrate temperatures are below 10° C for both interior and exterior work.
- .2 Perform no exterior painting work unless environmental conditions are within MPI and paint manufacturer's requirements or until adequate weather protection is provided. Where required, place suitable weatherproof covering and sufficient heating facilities to maintain minimum ambient air and substrate temperatures for 24 hours before, during and after paint application.
- .3 Perform no interior painting or decorating work unless adequate continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above minimum requirements for 24 hours before, during and after paint application. Provide supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.

- .4 Perform no painting or decorating work when the relative humidity is above 85% or when the dew point is less than 3° C variance between the air / surface temperature.
- .5 Perform no painting or decorating work when the maximum moisture content of the substrate exceeds:
 - .1 15% for wood.
 - .2 12 % for plaster and gypsum board.
- .6 Conduct all moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple cover patch test.
- .7 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .8 Concrete and masonry surfaces must be installed at least 28 days prior to painting and decorating work and must be visually dry on both sides.
- .9 Apply paint only to dry, clean, properly cured and adequately prepared surfaces in areas where dust is no longer generated by construction activities such that airborne particles will not affect the quality of finished surfaces
- .10 Perform no painting or decorating work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted or decorated. General Contractor to provide adequate lighting facilities.

1.10 WASTE MANGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 10 00 General Requirements.
- .2 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground strictly adhered the following procedures:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case clean equipment by using free draining water.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
 - .6 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.
- .3 Set aside and protect surplus and uncontaminated finish materials not required by the Owner and deliver or arrange collection for verifiable re-use or re-manufacturing.

1.11 WARRANTY

- .1 Warranty period: 2 years commencing on Date of Substantial Performance of Work.

Part 2 Products

2.1 MATERIALS

- .1 Only materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, etc.) listed in the latest edition of the MPI Approved Product List (APL) are acceptable for use on this project. All such material from a single manufacturer for each system used.
- .2 Other materials such as linseed oil, shellac, thinners, solvents, etc. to be the highest quality product of an MPI listed manufacturer and to be compatible with paint materials being used as required.
- .3 All materials used, to be lead and mercury free and have low VOC content where possible.
- .4 All paint materials must have good flowing and brushing properties and must dry or cure free of blemishes, sags, air entrapment, etc. Refer to 3.7, Field Quality Control / Standard of Acceptance requirements.

2.2 MANUFACTURES

- .1 Pre-approved manufacturers:
 - .1 Interior and Exterior:
 - .1 Sherwin Williams
 - .2 Benjamin Moore
 - .3 Cloverdale Paint

2.3 EQUIPMENT

- .1 Painting and Decorating Equipment: to best trade standards for type of product and application.
- .2 Spray Painting Equipment: of ample capacity, suited to the type and consistency of paint or coating being applied and kept clean and in good working order at all times.

2.4 MIXING AND TINTING

- .1 Unless otherwise specified herein or pre-approved, all paint be ready-mixed and pre-tinted. Re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Where thinner is used, don't exceed addition to paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.
- .4 If required, thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.

2.5 FINISH AND COLOURS

- .1 Unless otherwise specified herein, all painting work in accordance with MPI Premium Grade finish requirements.

- .2 Colours and finishes:
 - .1 In accordance with finish plans and section 09 06 00 Schedule for Finishes.
- .3 Colours to be as selected by the Consultant from a manufacturer’s full range of colours.
- .4 Paint walls only where it is specified in the drawing within the area of scope, including the universal washroom, welding shop, and all patchwork in both the interior and exterior of the building.
- .5 Paint new exit doors, new overhead sectional doors, and new door/overhead door frames with the same colour as specified in the Finish Schedule.

2.6 GLOSS AND SHEEN RATING

- .1 Define paint gloss as the sheen rating of applied paint, in accordance with the following MPI values:

Gloss Level	Description	Units @ 60 degrees	Units @ 85 degrees
G1	Matte or Flat finish	0 to 5	10 max.
G2	Velvet finish	0 to 10	10 to 35
G3	Eggshell finish	10 to 25	10 to 35
G4	Satin finish	20 to 35	35 min.
G5	Semi-Gloss finish	35 to 70	
G6	Gloss finish	70 to 85	
G7	High-Gloss finish	> 85	

- .2 Gloss level ratings of painted surfaces to be as specified herein and as noted on Finish Schedule.

Part 3 Execution

3.1 CONDITION OF SURFACE

- .1 Prior to commencement of work of this section, thoroughly examine (and test as required) all conditions and surfaces scheduled to be painted and report in writing to the Contractor and Consultant any conditions or surfaces that will adversely affect work of this section.
- .2 Commence no painting work until all such adverse conditions and defects have been corrected and surfaces and conditions are acceptable to the Painting Subcontractor.
- .3 Commencement of work not to imply acceptance of surfaces except as qualified herein. Such surfaces as concrete, masonry, structural steel and miscellaneous metal, wood, gypsum board and plaster, is not the responsibility of the Painting Subcontractor.
- .4 The Painting Subcontractor is not responsible for the condition of the substrate or for correcting defects and deficiencies in the substrate which may adversely affect the painting work except for minimal work normally performed by the Painting Subcontractor and as indicated herein. It is the responsibility of the Painting Subcontractor to see that surfaces are properly prepared before any paint or coating is applied.

3.2 PREPERATION OF SURFACES

- .1 Prepare all surfaces in accordance with MPI requirements. Refer to the MPI Painting Manual in regard to specific requirements
- .2 Sand, clean, dry, etch, neutralize and/or test all surfaces under adequate illumination, ventilation and temperature requirements.
- .3 Remove and securely store all miscellaneous hardware and surface fittings / fastenings (e.g. electrical plates, mechanical louvers, door and window hardware (e.g. hinges, knobs, locks, trim, frame stops), removable rating / hazard / instruction labels, washroom accessories, light fixture trim, etc. from wall and ceiling surfaces, doors and frames, prior to painting. Carefully clean and replace all such items upon completion of painting work in each area. Do not use solvent or reactive cleaning agents on items that will mar or remove finishes (e.g. lacquer finishes). Remove doors before painting to paint bottom and top edges and then re-hung.
- .4 Protect all adjacent interior surfaces and areas, including rating and instruction labels on doors, frames, equipment, piping, etc., from painting operations and damage with drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide such protection.
- .5 Substrate defects to be made good and sanded by others ready for painting particularly after the first coat of paint. Start of finish painting of defective surfaces (e.g. gypsum board) to indicate acceptance of substrate and any costs of making good defects to be borne by the painter including re-painting of entire defective surface (no touch-up painting).
- .6 Confirm preparation and primer used with fabricator of steel items. Refer to Quality Assurance.

3.3 APPLICATION

- .1 Do not paint unless substrates are acceptable and/or until all environmental conditions (heating, ventilation, lighting and completion of other subtrade work) are acceptable for applications of products.
- .2 Apply paint or stain in accordance with MPI Painting Manual Premium Grade finish requirements.
- .3 Apply paint and decorating material in a workmanlike manner using skilled and trade qualified applicators as noted under Quality Assurance.
- .4 Apply paint and coatings within an appropriate time frame after cleaning when environmental conditions encourage flash-rusting, rusting, contamination or the manufacturer's paint specifications require earlier applications.
- .5 Painting coats specified are intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer's recommendations.
- .6 Tint each coat of paint progressively lighter to enable confirmation of number of coats.
- .7 Unless otherwise approved by the painting inspection agency, apply a minimum of four coats of paint where deep or bright colours are used to achieve satisfactory results.
- .8 Sand and dust between each coat to provide an anchor for next coat and to remove defects visible from a distance up to 1000 mm.

- .9 Do not apply finishes on surfaces that are not sufficiently dry. Unless manufacturer's directions state otherwise, each coat to be sufficiently dry and hard before a following coat is applied.
- .10 Prime coat of stain or varnish finishes may be reduced in accordance with manufacturer's directions.
- .11 Continue paint finish through behind all wall-mounted items (e.g. chalk and tack boards).

3.4 EXTERIOR PAINT AND COATING SYSTEMS

Paint exterior surfaces in accordance with the following MPI Painting Manual requirements:

- .1 Concrete Masonry Units: (smooth and split face block and brick).
 - .1 EXT 4.2A Latex [gloss level: match existing adjacent surface] finish (over latex block filler).
- .2 Galvanized Metal: (not chromate passivated)
For high contact / high traffic areas (doors, frames, railings, misc. steel, pipes, etc.)
For low contact / low traffic areas (overhead decking, ducts, gutters, flashing, etc.)
 - .1 EXT 5.3K Water based light industrial coating (over epoxy).

3.5 INTERIOR PAINT AND COATING SYSTEMS

Paint interior surfaces in accordance with the following MPI Painting Manual requirements:

- .1 Concrete Masonry Units: (smooth and split face block and brick)
 - .1 INT 4.2A Latex [gloss level: match existing adjacent surface] finish.
- .2 Plaster and Gypsum Board: (gypsum wallboard, drywall, "sheet rock type material", etc., and textured finishes)
 - .1 INT 9.2B High performance architectural latex [G4] finish.

3.6 FIELD QUALITY AND STANDARD OF ACCEPTANCE

- .1 Inspect all surfaces, preparation and paint applications.
- .2 Consider painted exterior and interior surfaces to lack uniformity and soundness if any of the following defects are apparent to the Painting Inspection Agency inspector:
 - .1 Brush / roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.
 - .2 Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
 - .3 Damage due to touching before paint is sufficiently dry or any other contributory cause.
 - .4 Damage due to application on moist surfaces or caused by inadequate protection from the weather.
 - .5 Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).

- .3 Consider painted surfaces unacceptable if any of the following are evident under natural lighting source for exterior surfaces and final lighting source (including daylight) for interior surfaces:
 - .1 Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm.
 - .2 Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm.
 - .3 Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.
 - .4 When the final coat on any surface exhibits a lack of uniformity of colour, sheen, texture, and hiding across full surface area.

3.7 PROTECTION

- .1 Protect all exterior surfaces and areas, including landscaping, walks, drives, all adjacent building surfaces (including glass, aluminum surfaces, etc.) and equipment and any labels and signage from painting operations and damage by drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide such protection.
- .2 Protect all interior surfaces and areas, including glass, aluminum surfaces, etc. and equipment and any labels and signage from painting operations and damage by drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide such protection.
- .3 Erect barriers or screens and post signs to warn of or limit or direct traffic away or around work area as required.

3.8 CLEANING

- .1 Remove all paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
- .2 Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.
- .3 Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.
- .4 Clean equipment and dispose of wash water / solvents as well as all other cleaning and protective materials (e.g. rags, drop cloths, masking papers, etc.), paints, thinners, paint removers / strippers in accordance with the safety requirements of authorities having jurisdiction.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Furnish all labour, materials, equipment, accessories and services necessary for the complete supply and installation of Protective Wall Covering as indicated on the drawings, scheduled and as specified.
- .2 Related Sections:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 06 10 00 Rough Carpentry
 - .2 Section 07 92 00 Joint Sealants
 - .3 Section 09 21 16 Gypsum Board Assemblies
 - .4 Section 09 65 13 Resilient Base and Accessories
 - .5 Section 10 28 13 Washroom Accessories

1.2 REFERENCES

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials. CLASS A
 - .2 ASTM D790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - .3 ASTM D4226: Standard Test Methods for Impact Resistance of Rigid Poly (Vinyl Chloride) (PVC) Building Products.
 - .4 ASTM D5420: Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact).
 - .2 National Electrical Manufacturers Association (NEMA)
 - .1 ANSI/NEMA LD-3: High-Pressure Decorative Laminates (HPDL).
 - .2 NEMA 3.13: Wear Resistance
 - .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102: Surface Burning Characteristics

1.3 ADMINISTRATIVE REQUIREMENTS

- .1
- .2 Verify actual dimensions/openings by field measurements before fabrication and record on shop drawings. Coordinate with fabrication and construction schedule to avoid construction delays.
- .3 Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Architect's drawings, and are acceptable for product installation in accordance with the manufacturer's instructions.

1.4 SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
- .2 Warranty documentation:
 - .1 Submit manufacturer's standard warranty.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements for incorporation into architectural O & M Manual.
 - .1 Include manufacturer, product number, dimensions, finish, texture and colour for each product and type of this section installed in this project.
 - .2 Warranty documentation.

1.6 QUALITY ASSURANCE

- .1 Proceed in accordance with section 01 10 00 General Requirements.
- .2 Supply product and accessories specified from one manufacturer to ensure total system compatibility and integrity.
- .3 Qualifications:
 - .1 Manufacturer Qualifications:
 - .1 Minimum five (5) years documented experience manufacturing similar products and size projects.
 - .2 Installer Qualifications:
 - .1 Minimum three (3) years documented experience installing similar products and size projects.

1.7 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Deliver, store, handle and protect materials in accordance with Section 01 10 00 General Requirements and with manufacturer's written instructions.

1.8 WARRANTY

- .1 Provide Manufacturer's standard warranty.

Part 2 Products

2.1 WALL COVERING (INPRO)

- .1 Wall Covering:
 - .1 Manufacturer: InPro Corporation.
 - .2 Product: IPC Door and Wall Protection Systems.
 - .3 Material: Vinyl; Palladium® Rigid Vinyl Sheet, manufactured from chemical and stain resistant polyvinyl chloride with the addition of impact modifiers. No plasticizers added.
 - .4 Thickness: minimum 1.0mm

- .5 Colour and Texture: To be determined by Architect from manufacturers standard colours, refer to Finish Schedule
- .6 Trims: Vinyl
 - .1 Top Cap
 - .2 Vertical Divider
 - .3 Inside Corner
 - .4 Outside Corner
- .7 Caulk: Colour matched
- .8 Substitutions: Not permitted.

2.2 FABRICATION

- .1 Fabricate components with tight joints, corners and seams.
- .2 Pre-drill holes for attachment.
- .3 Form end trim closure by capping and finishing smooth.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for protective wall covering installation in accordance with manufacturer's written instructions.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
 - .3 Start of protective wall covering installation indicates installer's acceptance of substrate installation conditions.

3.3 INSTALLATION – GENERAL

- .1 Proceed in accordance with Section 01 10 00 General Requirements
- .2 Comply with reviewed shop drawings, manufacturer's written recommendations and specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .3 Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only, unless noted otherwise.
- .4 Complete all finishing, including painting before beginning installation of wall protection systems.
- .5 Substrate surface to be dry and free from dirt, grease and loose paint.

- .6 Install units on solid backing and erect with materials and components straight, tight and in alignment.
- .7 Ensure temperature at installation is between 18°C and 24°C and below 80% relative humidity. Maintain installation temperature for minimum 48 hours after installation to ensure adhesive cure.
- .8 At completion, clean surfaces in accordance with manufacturer's instructions.

3.4 CLEANING AND WASTE MANAGEMENT

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
 - .1 Leave Work area clean at end of each day.
- .2 Clean surfaces after installation using manufacturer's written recommended cleaning procedures.
- .3 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment

3.5 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair or replace damage to adjacent materials caused by work of this section before Substantial Completion.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Furnish all labour, materials, equipment, accessories and services necessary for the complete supply and installation of washroom accessories as indicated on the drawings, scheduled and as specified.
- .2 Related Sections:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 06 10 00 Rough Carpentry
 - .2 Section 07 92 00 Joint Sealants
 - .3 Section 09 21 16 Gypsum Board Assemblies
 - .4 Section 10 26 23 Protective Wall Covering

1.2 REFERENCES

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 American National Standards Institute (ANSI)
 - .1 ANSI/ICC A117.1: Standard for Accessible and Usable Buildings and Facilities.
 - .2 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A167: Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A653/A653M: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.
 - .3 ASTM A666: Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 - .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-12.5-M86: Mirrors, Silvered.
 - .4 Canadian Standard Association (CSA Group)
 - .1 CAN/CSA B651: Accessible Design for Built Environment.
 - .2 CAN/CSA-G164: Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate accessory locations with other affected work to prevent interference with clearances required for access by disabled persons, proper installation within substrate, blocking requirements, adjustment, operation, cleaning, and servicing of accessories including following:
 - .2 Installation of grab bars to metal toilet partitions, provide templates and detail to partition manufacturer for shop fabrication of steel reinforcing plates. Instruct whether shop or field, drill and tap technique will be used.

- .3 Delivery of inserts and anchoring devices set into concrete and masonry as required to prevent delay to work of this Section.
- .2 Product Substitutions: Toilet accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by specific Basis-of-Design Materials listed in this section Please inform Consultant for any proposed modifications before implementing the changes.
- .3 Pre-Installation Meeting:
 - .1 Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Consultant's drawings, and are acceptable for product installation in accordance with the manufacturer's instructions.

1.4 SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
- .2 Product data: Manufacturer's data sheets on each product to be used, including:
 - .1 Product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Preparation instructions and recommendations.
 - .3 Storage and handling requirements and recommendations.
 - .4 Installation and maintenance instructions.
 - .5 Manufactures Construction details, material descriptions profiles, fastening and mounting methods, and specified options.
- .3 Information Submittals: Provide following submittals during course of work of this Section:
 - .1 Submit setting drawings for cut outs required in other work; include templates, substrate preparation instructions, and directions for preparing cut outs and installing anchoring devices.
 - .2 Submit product schedule indicating types, quantities, sizes, and installation locations by room of each accessory required; use designations indicated in Washroom and Custodial Accessory Schedule below and room designations indicated on Drawings in product schedule.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements for incorporation into architectural O & M Manual.
 - .1 Product data and reviewed submittals.
 - .2 Operation and Maintenance data.
 - .3 Include manufacturer, product number, dimensions, finish, texture and colour for each product and type of this section installed in this project.
 - .4 Warranty documentation.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- .1 Tools:

- .1 Provide special tools required for assembly, disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 10 00 General Requirements.
- .2 Deliver special tools to Owner.

1.7 QUALITY ASSURANCE

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
- .2 Regulatory Requirements: Install toilet accessories in accordance with CAN/CSA B651 at accessible washroom locations.
- .3 Qualifications: Provide proof of qualifications when requested by Consultant:
 - .1 Manufacturer: Obtain products from single manufacturer for each type of accessory unit and for units exposed to view in same area.

1.8 DELIVER, STORAGE, HANDLING AND PROTECTION

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

1.9 WARRANTY

- .1 Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.

Part 2 Products

2.1 MANUFACTURERS

- .1 Basis-of-Design Products: Products named in this Section were used as basis-of-design for project; manufacturers listed as additional acceptable materials and that offer similar products may be incorporated into work of this Section provided they meet performance requirements established by named products.
- .2 Additional Acceptable Manufacturers: Subject to compliance with performance requirements specified in this Section; as established by the Basis-of-Design Products, use any of the listed manufacturers' products in accordance with |Specifier Selection Required|; following manufacturer's do not require submission of a request for substitutions provided required shop drawing and product data submissions are submitted before starting any work of Section:
 - .1 Bobrick Washroom Equipment of Canada Ltd.
- .3 Substitutions: Consultant may consider additional manufacturers having similar products to Acceptable Products Manufacturers listed above during the construction period, provided they meet the performance requirements established by the named products and provided they submit requests for substitution in accordance with |Specifier Selection Required| before starting any work of this Section:
 - .1 Do not use substitute materials to establish Bid Price.

- .2 Substitutions that appear as a part of the project without review and acceptance by the Consultant will be rejected and replaced with one of the specified materials.

2.2 PERFORMANCE REQUIREMENTS

- .1 Fastener and Mounting Requirements: Install grab bars to withstand minimum 1.3 kN downward shear force when tested in accordance with ASTM F446; provide fasteners and mountings of types suitable for substrates, and as required for permanent and durable installation.
- .2 Labels: Provide unobtrusive stamped manufacturer logo on exposed surfaces; with printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number mounted to non-exposed faces.
- .3 Surface Mounted Units: Provide units having tight seams and joints, and with exposed edges rolled; doors and access panels having continuous stainless steel hinges; and concealed anchorage where possible.
- .4 Recessed Mounted Units: Provide units having welded construction, without mitred corners; doors and access panels having full length, stainless steel hinges and anchorage fully concealed when unit is closed.
- .5 Framed Glass Mirror Units: Provide frames for glass mirror units designed to protect glass edges from damage, and as follows:
 - .1 Mirror Backing: Backing and support system that permits rigid, tamper resistant glass installation and prevents moisture accumulation consisting of minimum nominal 0.8 mm galvanized steel sheet same size as full mirror size with non-absorptive filler material; corrugated cardboard is not an acceptable filler material.
 - .2 Mirror Unit Hangers: Provide rigid, tamper and theft resistant, heavy duty wall hanging device consisting of one-piece galvanized steel and spring action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

2.3 MATERIALS

- .1 Stainless Steel: Type 304, stretcher levelled stainless steel sheet in accordance with ASTM A666; minimum nominal thickness as established by product type and manufacturers standard.
- .2 Sheet Steel: Steel: Cold rolled, commercial quality , stretcher levelled steel sheet in accordance with ASTM A366; minimum nominal thickness as established by product type and manufacturers standard; surface preparation and metal pretreatment as required for applied finish.
- .3 Galvanized Steel Sheet: Minimum Z180 coating designation, cold rolled commercial quality , stretcher levelled galvanized steel sheet in accordance with ASTM A653/A653M; minimum nominal thickness as established by product type and manufacturers standard.
- .4 Fasteners: Manufacturer's standard for installation; through bolts for mounting to toilet partitions; expansion anchors of type designed to accept anticipated loads and as follows:
 - .1 Galvanized Steel Mounting Devices: In accordance with ASTM A153/A153M, hot dip galvanized after fabrication.

- .2 Screws, Bolts, and other Devices: Same material as accessory unit, tamper and theft resistant when exposed, and galvanized steel when concealed.
- .5 Keys: Provide universal keys for internal access to accessories for servicing and re-supplying. Provide minimum of six (6) keys to Owner's representative.

2.4 FINISHES

- .1 Chrome and nickel plating: to ASTM B456, satin finish.
- .2 Baked enamel: condition metal by applying one coat of metal conditioner to CGSB 31-GP-107Ma, apply one coat Type 2 primer to CAN/CGSB-1.81 and bake. Apply two coats Type 2 enamel to CAN/CGSB-1.88 and bake to hard, durable finish. Sand between final coats. Colour selected from standard range by Architect.
- .3 Manufacturer's or brand names on face of units not acceptable.

2.5 FIXTURES:

- .1 Refer to Mechanical Drawings and Specifications

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for washroom accessories installation in accordance with manufacturer's written instructions.
 - .1 Wall thickness and construction will accept recessed accessories.
 - .2 Solid blocking for support and anchoring of washroom accessories is installed where required.
 - .3 Frames and anchors provided are correctly and securely installed ready to accept accessory scheduled for specific location.
 - .4 Wall finish Painting and Wall Protection installation are complete and dry in area of installation before accessories are installed.
 - .5 Remove existing accessories and keep it aside to be re-installed in new construction.
 - .6 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .7 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
 - .8 Start of washroom accessories installation indicates installer's acceptance of substrate installation conditions.

3.2 INSTALLATION

- .1 Install accessories in accordance with manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer; install toilet accessory units level, plumb, and firmly anchored in locations and at heights indicated.

- .2 Conform to mounting heights indicated on Fixture Mounting Schedule as indicated on Drawings and meeting accessibility requirements listed in CAN/CSA B651; confirm locations prior to site installation.
- .3 Install and secure accessories rigidly in place as follows:
- .4 Secure mirrors to walls using concealed, tamper resistant hangers, toggle bolts, or screws; set mirrors level, plumb, and square at locations indicated.
- .5 Install and secure fixtures rigidly in place and as follows:
 - .1 Stud Walls: Install steel back plate to stud prior to gypsum board finish; provide threaded studs or plugs in back plates
 - .2 Existing Stud Walls: Install items using toggle bolts drilled into wall cavity.
- .6 Install grab bars on built-in anchors provided according to manufacturers written recommendations.
- .7 Use tamper proof screws/bolts for fasteners.
- .8 Fill units with necessary supplies shortly before final acceptance of building.

3.3 ADJUSTING

- .1 Adjust accessories components and systems for correct function and operation in accordance with manufacturer's written instructions.
- .2 Lubricate moving parts to operate smoothly and fit accurately.

3.4 CLEANING AND WASTE MANAGEMENT

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
 - .1 Leave Work area clean at end of each day.
- .2 Remove temporary labels and protective coatings.
- .3 Clean and polish exposed surfaces in accordance with manufacturer's written recommendations.

3.5 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair or replace damage to adjacent materials caused by work of this section before Substantial Completion.

3.6 SCHEDULE

- .1 Locate accessories where indicated.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Furnish all labour, materials, equipment, accessories and services necessary for the complete supply and installation of galvanized steel chainlink fence as indicated on the drawings, scheduled, and as specified.
- .2 Related Sections:
 - .1 Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - .1 Section 01 10 00 General Requirements

1.2 REFERENCES

- .1 Reference Standards; Proceed in accordance with the current edition of the following:
 - .1 ASTM B117: Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - .2 ASTM D822: Tests on Paint and Related Coatings Using Filtered Open-Flame Carbon-Arc Exposure Apparatus.
 - .3 ASTM D2794: Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
 - .4 ASTM D3363: Test Method for Film Hardness by Pencil Test.

1.3 SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements.
- .2 Submit the following items:
- .3 Product data: including construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, maintenance instructions and finishes specified.
- .4 Product data: Manufacturer's data sheets on each product to be used, including:
 - .1 Product characteristics, performance criteria, physical size, finish and limitations.
- .5 Shop drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in British Columbia, Canada.
 - .1 Submit Schedule S-B; Assurance of professional design and commitment for field review.
 - .2 Submit Schedule S-C; Assurance of professional field review and compliance.
 - .3 Indicate components and installation methods to conform to specified seismic design and construction requirements of Contract Documents.
 - .2 Construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, maintenance instructions and finishes specified.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit the following items in accordance with Section 01 10 00 General Requirements for incorporation into architectural O & M Manual.
 - .1 Warranty documentation.

1.5 QUALITY ASSURANCE

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
- .2 Qualifications:
 - .1 Manufacturer and Installer Qualifications:
 - .1 Minimum five (5) years documented experience manufacturing and/or installing similar products and size projects.

1.6 DELIVER, STORAGE, HANDLING AND PROTECTION

- .1 Deliver, store, handle and protect materials in accordance with Section 01 10 00 General Requirements and with manufacturer's written instructions.
- .2 Storage, Handling and Protection Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, free from dampness, and well-ventilated area.
 - .2 Store, protect and prevent product from damage.
 - .3 Replace defective or damaged materials with new.
- .3 Packaging Waste Management:
 - .1 Proceed in accordance with Section 01 10 00 General Requirements.
 - .2 Separate waste materials for recycling.

1.7 WARRANTY

- .1 Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.

Part 2 Products

2.1 MATERIALS

- .1 Heavy Industrial Galvanized Steel Chain Link Fence System - Internally Secured: System includes fence posts, framework, and mounting accessories.
 - .1 Steel: need to be updated to steel components
 - .1 Tubular Pickets, Rails and Posts: Shall conform to ASTM B221.
 - .2 Extrusions for Posts and Rails (Outer Channel): 6005-T5.
 - .3 Extrusions for Pickets and Rail (Inner Slide Channels): 6063-T5.
 - .2 Panels: Capable of supporting a 270 kg (600 pound) load applied at midspan without permanent deformation

- .3 Rails:
 - .1 Double-walled U channel; outside cross-section dimensions of (1-3/4 inch) (44.5 mm) square; interior guide channel shall form lower limit of raceway for retaining rod.
 - .2 Panel Length: Per drawings.
 - .3 Panel Height: 2438mm (8 foot) typical.
 - .4 Rail Strength: Effective Wall Thickness: top wall of outer channel of the rail shall be 2.54 mm (0.100 inch) thick; side walls shall be 3.05 mm (0.120 inch) thick.
 - .5 Enclosed Retaining Rod: Retaining rods shall be 3.2 mm (0.125 inch) diameter galvanized steel. Variable pitch connection system for, high angle racking and elimination of external fasteners.
 - .6 PVC Grommets: Provide grommets to seal all line post-to-rail intersections.
 - .7 Galvanized mesh in between line posts to be 51mm (2")
- .4 Chain Link mesh to be made of galvanized 11-gauge wire.
- .5 Fasteners: All fasteners shall be 302 stainless steel; match finish of fence.
 - .1 Security Fastener: one-way tamperproof security bolts with inverted t-nuts.
 - .2 Bracket to Post Connections: Self-drilling hex-head screws.
- .6 Racking/Biasability (Ability of Panels to Follow Grades): Minimum of 25 percent slope.
- .7 Posts:
 - .1 Size: 2-1/2 inches diameter with perimeter wall thickness of 0.080 inch (2.03 mm) and interior reinforcing web thickness of 0.080 inch (2.03 mm) for top and base rails.
 - .2 Size: 3 inches diameter with perimeter wall thickness of 0.120 inch w/ std. post cap.
 - .3 Size: 4 inches diameter with perimeter wall thickness of 0.250 inch w/ std. post cap.

2.2 ACCESSORIES

- .1 Fasteners: Stainless steel bolts of type, size, and spacing as recommended by fence manufacturer for specific condition.
- .2 End caps: Provide aluminum caps for exposed open extruded aluminum sections and for attachment of components to posts.
- .3 Provide anti-intruder bolts consisting of cup head bolt and nut with clamping hexagon such that tightening shears hexagon and render bolt impossible to release.

2.3 FINISHES

- .1 Product, Colour and Finish: to be selected by consultant from manufacturer's standard full product line.
- .2 Coating Performance Requirements: Coating meets or exceeds the following: update to steel

- .1 Adhesion (ASTM D 3359, Method B): Adhesion over 90 percent of test area (tape and knife test).
- .2 Corrosion Resistance (ASTM B 117, ASTM D 1654): Coated galvanized steel shall be capable of salt spray resistance for 1,000 hours without loss of adhesion on parts scribed per ASTM D1654 and tested in accordance with ASTM Test Method B117. Failure is considered to have occurred when there is either 1/8 inch (3.18 mm) coating loss from the scribed mark or an accumulation of medium #8 blisters.
- .3 Impact Resistance (ASTM D 2794): 60 inch pounds, minimum (impact using 0.625 inch ball).
- .4 Weathering Resistance (ASTM D 822, D 2244, D 523 - 60 Degree Method): 1,000 hours, minimum (failure mode is 60 percent loss of gloss or color variance of more than 3 delta-E color units.)

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate are acceptable for installation in accordance with manufacturer's written instructions.

3.3 INSTALLATION

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
- .2 Comply and install with reviewed signed and sealed shop drawings, manufacturer's written recommendations and specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .3 Install fence posts plumb and level.
- .4 Apply paint on the welded galvanized steel. Refer to Section 09 91 00 Painting.
- .5 Do not install bent, bowed, or otherwise damaged components. Remove damaged components from site and replace.
- .6 Gates:
 - .1 Install gates and adjust hardware for smooth operation.
 - .2 After installation, test gate and operator. Open and close a minimum of five times. Correct deficiencies and adjust.
- .7 Touch-up damaged finish with paint supplied by manufacturer and matching original coating.

3.4 CLEANING AND WASTE MANAGEMENT

- .1 Proceed in accordance with Section 01 10 00 General Requirements.
 - .1 Leave Work area clean at end of each day.

- .2 Clean surfaces after installation using manufacturer's written recommended cleaning procedures.
- .3 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment
- .4 Waste Management: Separate waste materials for reuse and recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair or replace damage to adjacent materials caused by work of this section before Substantial Completion.

END OF SECTION