SPECIFICATIONS

BINDER 'A'
ARCHITECTURAL

ELEVATOR for ST. JEAN DE BREBEUF CATHOLIC ELEMENTARY SCHOOL

200 ACADIA DRIVE, HAMILTON, ON

Hamilton-Wentworth
Catholic District School Board
Believing, Achieving, Serving

90 BULBERRY STREET
HAMILTON, ONTARIO

HAMILTON-WENTWORTH CATHOLIC DISTRICT SCHOOL BOARD

SVEDAS
ARCHITECTS INC.

3600 BILLINGS COURT, SUITE 100
BURLINGTON, ONTARIO
L7N 3N6

TENDER NUMBER

PROJECT
125804

ISSUED FOR TENDER/PERMIT MAY 28, 2026

1 General

1.1 OWNER

.1 Owner for the Project is:

The Hamilton-Wentworth Catholic District School Board
The Father Kennedy Catholic Education Centre, 90 Mulberry Street
Hamilton, Ontario
L8N 3R9

1.2 CONSULTANTS

.1 Document Responsibility: Refer to Section 00 01 10 - Table of Contents for indication of document responsibility. Abbreviations for entity responsible for document preparation are as indicated below in parentheses.

.2 The following firms comprise the Consultant team for the Project:

.1 Architect (A)

Svedas Architects Inc.
3600 Billings Court, Suite 100
Burlington, Ontario
L7N 3N6
Telephone: 905.308.7771

.2 Designated Substance Abatement (DS)

Pinchin Ltd.
151 York Boulevard, Suite 200
Hamilton, Ontario
L8R 3M2
Telephone: 905.577.6206

.3 Structural Engineer (S)

Lanhack Consultants, Inc.
1709 Upper James Street
Hamilton, Ontario
L9B 1K7
Telephone: 905.777.1454

.4 Roofing Consultant (R)

Jocelyn Roof Consultants Group Inc.
Box 10585 Station Winona
Stoney Creek, Ontario
L8E 5R1
Telephone: 905.577.0777

.5 Hardware Consultant (H)

Group 87 Architectural Hardware Inc.
3245 Harvester Road, Unit 1
Burlington, Ontario
L7N 3T7
Telephone: 905.639.4676

.6 Mechanical Engineer (M)

Filer Engineering Ltd.
1046 Botanical Drive
Burlington, Ontario
L7T 1V1
Telephone: 905.526.7411

.7 Electrical Engineer (E)

NRG Consultants Inc.
2 Cabriolet Crescent
Ancaster, Ontario
L9K 1K6
Telephone: 905.304.0294

.8 Landscape Architect (L)

Svedas Architects Inc.
3600 Billings Court, Suite 100
Burlington, Ontario
L7N 3N6
Telephone: 905.308.7771

.9 Civil Engineer (C)

S. Llewellyn & Associates Ltd.
3228 South Service Road, Suite 105, East Wing
Burlington, Ontario
L7N 3H8
Telephone: 905.631.6978

END OF DOCUMENT

Division 29 - Not Used

SITE AND INFRASTRUCTURE SUBGROUP
Division 30 - Not Used

Divisions 34 to 39 - Not Used

PROCESS EQUIPMENT SUBGROUP
Divisions 40 to 49 - Not Used

END OF TABLE OF CONTENTS

1 Bidding Requirements

1.1 BID CALL

.1 Bids will be received electronically through the designated e-procurement services provider before 2:00:00 pm local time on June [___], 2026 (hereinafter referred to as 'bid closing time') at:
https://hwcdsb.bidsandtenders.ca.

.2 The official bid closing time will be determined by e-procurement services provider's web clock.

.3 Bids cannot be submitted after the specified bid closing time.

.4 Owner reserves the right to extend the bid closing time or cancel the bid call by addendum.

.5 Bids are by invitation only from a list of prequalified Bidders. Bids received from unsolicited bidders will not be considered by Owner.

.6 Bidders must have an active bidding system vendor account and be registered as a plan taker with the designated e-procurement services provider for this bid opportunity, which will enable the Bidder to:
.1 Download Bid Documents,
.2 Receive email notifications,
.3 Download addenda, and
.4 Submit a bid electronically.

.7 To ensure receipt of latest information and updates via email regarding this Bid, or if a Bidder has obtained Bid Documents from a third party, it remains Bidder's responsibility to create a bidding system vendor account and register as a plan taker with designated e-procurement services provider for this bid opportunity.

.8 Bids will not be opened publicly with Bidders present.

.9 Bid results will be disclosed promptly to all Bidders. Such disclosure will not imply that the bids received are compliant or that a contract will be awarded to the lowest or any Bidder.

1.2 BID DOCUMENT AVAILABILITY

.1 Bid Documents are only available to registered plan takers in electronic form from designated e-procurement services provider.

.2 Bid Documents are made available only for the purpose of obtaining offers for this Project. It does not confer a license to use the Bid Documents for any other purpose.

1.3 EXAMINATION OF BID DOCUMENTS

.1 Examine Bid Documents and promptly notify Consultant of any perceived errors, omissions, conflicts or discrepancies in Bid Documents.

1.4 SITE EXAMINATION

.1 Bidders shall visit Place of the Work and familiarize themselves with conditions affecting the Work before submitting a bid.

.2 Bidders' only opportunity to visit Place of the Work will be in conjunction with the specified pre-bid site meeting and site visit.

.3 Bidders visiting Place of the Work will be required to obtain a visitor badge. Upon completion of visit, sign out and return visitor badge to Owner.

.4 Bidders visiting Place of the Work shall provide their own personal protective equipment.

.5 Bidders visiting Place of the Work will be required to be accompanied at all times by a representative of Owner.

.6 Refer to Section 00 31 00 - Available Project Information which identifies available information pertaining to the Project.

.7 In accordance with General Conditions of the Contract, Bidders will include in their bid price for non-concealed and known conditions that are either visible or can be reasonably inferred from a site examination at Place of the Work and a review of available project information before bid submission.

1.5 PRE-BID MEETING AND SITE VISIT

.1 A pre-bid meeting and site visit at Place of the Work has been scheduled for 3:30 pm local time on June [___], 2026.

.2 Attendance by prime contract Bidders is mandatory. Bidders will be required to sign an attendance sheet during the meeting. Failure of a Bidder's representative to attend and sign the attendance sheet will cause the bid to be rejected as non-compliant.

.3 Issues arising from the pre-bid meeting and site visit will be addressed as required in an addendum to the Bid Documents. No meeting minutes will be issued. Bidders may not rely upon any information given verbally or otherwise at the pre-bid meeting and site visit and that is not confirmed by addendum.

1.6 BID FORM SUPPLEMENTS

.1 Submit the following Bid Form Supplements together with the Bid Form:
.1 Bid security as specified.
.2 Consent of Surety Form.
.3 WSIB Certificate.
.4 List of Subcontractors.

.2 Owner may, after bid closing time and before contract award, require any Bidder to submit additional supplementary information about any aspect of the Bidder's bid to verify compliance with the Bid Documents.

1.7 BID SECURITY

.1 Submit with the bid a CCDC 220 form of bid bond in an amount of not less than 10 percent of the bid price.

.2 The bid bond shall name The Hamilton-Wentworth Catholic District School Board as obligee and shall be signed, sealed, and dated by both Bidder and surety.

.3 Upon request, bid bonds of unsuccessful Bidders will be returned after the successful Bidder has entered into a contract with Owner and submitted the specified contract security, or earlier at Owner's discretion.

1.8 BIDDER DEFAULT AND FORFEITURE OF BID SECURITY

.1 If a Bidder whose bid is accepted by Owner in writing, without conditions, and within the acceptance period specified in the Bid Documents, refuses or fails within 15 calendar days after the date of issuance of the written acceptance of the bid, to sign a formal agreement with Owner for the performance of the Work and to obtain and submit the specified contract performance security, Bidder will be liable to Owner for the difference in money between Bidder's bid price and the amount for which Owner legally contracts with another party to perform the Work, if the latter amount is in excess of the former, up to the maximum amount of the submitted bid security.

1.9 CONTRACT SECURITY

.1 Refer to Section 00 73 63 - Contract Performance Security.

.2 Submit with the bid and bid bond a Consent of Surety, stating that the surety company issuing the bid bond is also willing to issue contract security in accordance with the Contract Documents.

.3 Include cost of Consent of Surety in bid price.

1.10 PREQUALIFIED CONTRACTORS

.1 Owner has prequalified the following Contractors. Only named Contractors may submit a bid.

.2 Contractors
- .1 Aquicon Construction.
- .2 DeFaveri Group Contracting.
- .3 Demik Construction.
- .4 Everstrong Construction.
- .5 Fortis Group.
- .6 G.S. Wark Ltd.
- .7 Jasper Construction.
- .8 Percon Construction, Inc.
- .9 PM Contracting.
- .10 Pre-Eng Contracting.
- .11 Reid & Deleye Contractors Ltd.
- .12 Remo Contracting.
- .13 Tambro Construction Ltd.
- .14 TRP Construction General Contractors.

1.11 PREQUALIFIED SUBCONTRACTORS

.1 Owner has prequalified the following Subcontractors. Only the named Subcontractors may perform the work they are designated to perform and shall be carried in the Bidder's bid.

.2 Roofing
- .1 Atlantic Roofers Ontario Limited.
- .2 Atlas-Apex Roofing Inc.
- .3 BML Roofing Systems.
- .4 B&G Roofing.
- .5 Flynn Canada Ltd.
- .6 GRRC Roofing.
- .7 Roque Roofing and Sheet Metal Limited.
- .8 Schreiber Brothers Ltd.
- .9 Semple-Gooder Roofing Corporation.

.3 Mechanical
- .1 Anvi Services Ltd.
- .2 Besseling Mechanical Inc.
- .3 BML Multi Trades.
- .4 Brenner Mechanical Inc.
- .5 Datcor Mechanical.
- .6 Kirk Mechanical.
- .7 KP and H Mechanical Contractors Inc.
- .8 Lancaster Group.
- .9 L. J. Barton Mechanical Inc.
- .10 Mattina Mechanical Ltd.
- .11 Regional Mechanical.
- .12 Superior Boiler Works and Welding Ltd.

.4 Electrical
- .1 B-Safe Electric Ltd.
- .2 Best Electric Co.
- .3 BML Multi Trades.
- .4 Cahill Electric Limited.
- .5 CEC Services Ltd.
- .6 Clairmont Electric Inc.
- .7 Evolve Electric Inc.
- .8 Fairway Electrical Services.
- .9 Hillmer-Rossi Electric Ltd.
- .10 Kraun Electric.
- .11 L. J. Barton Mechanical Inc.
- .12 Merlo Electric Inc.
- .13 Superior Boiler Works and Welding Ltd.
- .14 T. Lloyd Electric Ltd.
- .15 Turnay Electric.

.5 Security/Video Surveillance
- .1 Hamilton Video and Sound.
- .2 Pinders Security.
- .3 Secure Solutions.

.6 Communication Cabling
- .1 3 TEC.
- .2 ACP Communication Technologies.
- .3 Telecon Inc.

1.12 TAXES

.1 Include in bid price all taxes and customs duties in effect at the time of bid closing, except for Value Added Taxes as defined in the Contract.

1.13 WORKPLACE SAFETY & INSURANCE BOARD CERTIFICATE

.1 Submit a signed certificate from the Workplace Safety & Insurance Board (WSIB), confirming that, at the date of the certificate, the Bidder maintains an account with WSIB, and is in good standing.

1.14 CONTRACT TIME

.1 The Bidder, in submitting a bid, agrees to attain Ready-for-Takeover by the date specified in Section 01 77 00 - Closeout Procedures, which will become the Contract Time under the Contract.

1.15 SUBSTITUTIONS

.1 Where the Bid Documents specify particular Products by proprietary name, Consultant will consider Bidder requests for approval of substitutions during the bid period, as long as such requests are received, in writing, at least 7 days before the bid closing time and are in accordance with the requirements specified in Section 01 25 00 - Substitution Procedures. If Consultant accepts a substitution, the substitute Product will be named in an addendum. Otherwise Bidders shall consider the request for approval of the substitution to be rejected.

1.16 LIST OF SUBCONTRACTORS

.1 Complete and submit the List of Subcontractors requested as part of the bid, indicating those Subcontractors or Suppliers whose bids have been received by the Bidder, which names the Bidder would be prepared to accept for performance of the identified portions of the Work.

.2 The purpose of this requirement is to protect the interests of subcontract bidders and the integrity of the bidding process. As long as the List of Subcontractors has been properly completed and submitted, the information will not be used in evaluating the bids to determine the lowest compliant Bidder.

.3 Indicating Subcontractors as "OWN FORCES" is not considered acceptable and may be rejected by Owner, unless the Bidder can adequately prove they have sufficiently trained personnel and experience to undertake those portions of the Work.

.4 Owner does not have any standing agreements with construction trade unions when performing work on it's properties, nor is it concerned with the union or non-union affiliation of bidders and workers. Such issues, if and when they arise among Contractor bidders and their Subcontractors, whether pre-selected or not, remain the responsibility of Bidders to resolve amongst themselves.

1.17 BID FORM SIGNING

.1 Electronic signatures for signing of requested documents are considered acceptable.

.2 Acceptable forms of electronic signature include, but are not limited to, typing of the bidder's authorized signing officer's name or inclusion of a graphic image of the bidder's authorized signing officer's signature, so long as the electronic signature is sufficient to identify the bidder's authorized signing officer.

.3 The bidder's authorized signing officer agrees that whatever form of electronic signature is used constitutes a signature for the purpose of executing requested documents.

1.18 BID SUBMISSION

.1 Bids will be received in electronic form only. Submit bid in compliance with the rules and procedures established by the designated e-procurement services provider.

.2 Verbal, telephone, fax, e-mail, text message, or hand delivered bids will not be accepted or acknowledged.

1.19 BID MODIFICATION AND WITHDRAWAL

.1 Bidders shall comply with procedures for electronic bid modification and withdrawal established by the designated e-procurement services provider.

.2 If a bid is withdrawn, a new bid may be submitted in accordance with specified bidding requirements, as long as it is received before the bid closing time.

.3 Owner assumes no responsibility or liability for modifications or withdrawals that are, for any reason, delayed, illegible, unclear as to intent, ambiguous, contrary to these instructions, or otherwise improperly received. Owner may disregard improperly received modifications or withdrawals.

1.20 BIDDING IRREGULARITIES

.1 Bidders are cautioned that the timing of Bid submission is based on when their bid is received by the e-procurement services provider, and not when their Bid is submitted by bidder. Bid transmission can be delayed in an 'internet traffic jam' due to file transfer size, transmission speed and other electronic considerations. It is recommended that bidders allow sufficient time to upload their Bid with required attachments and to resolve any issues that may arise before bid closing time.

.2 The e-procurement services provider will send a confirmation email to bidder advising their Bid was submitted successfully. In the event a confirmation email is not received, bidder is urged to contact the designated e-procurement services provider's technical support department via email at: support@bidsandtenders.ca.

.3 Bids with Bid Forms or required Bid Form Supplements that are improperly prepared, signed or submitted contrary to these Instructions to Bidders, or that contain added conditions or other irregularities of any kind, may, at Owner's discretion, be rejected as non-compliant.

.4 Owner may accept or waive a minor and inconsequential irregularity. The determination of what is, or is not, a minor and inconsequential irregularity, the determination of whether or not to accept or waive such an irregularity, and the final determination of whether the bid is compliant, will be at Owner's sole discretion.

.5 The following irregularities relate to what are considered mandatory bidding requirements. These will not be considered minor and inconsequential and will cause the bid to be rejected as non-compliant:
.1 Bid or Bid Form Supplement is received after the specified bid closing time.
.2 Required Bid Form or Bid Form Supplement is missing.
.3 Bid Form or Bid Form Supplement is not in the form provided or required.
.4 Bid security is improperly completed or executed, if such improper completion or execution may render the bid security unenforceable.
.5 Bid price is illegible, ambiguous or unclear.
.6 One or more conditions are added to or submitted with the bid, the effect of which is a material modification of the Bid Documents.
.7 Failure to indicate in the Bid Form the addendum number(s) of all addenda received.
.8 Failure to comply with any other bidding requirement expressly characterized as mandatory elsewhere in the Bid Documents.

1.21 BID ACCEPTANCE PERIOD

.1 Bids shall remain open to acceptance by Owner and shall be irrevocable until another Bidder enters into a contract with Owner for performance of the Work or until expiry of the bid acceptance period stated in the Bid Form, whichever occurs first.

.2 After bid closing and before expiry of the bid acceptance period stated in the Bid Form, Owner may request all Bidders to agree to an extension of the originally specified bid acceptance period. In such case the bid acceptance period will be extended subject to the Bidder, whose bid the Owner wishes to accept, having agreed in writing to the extension.

1.22 BID ACCEPTANCE

.1 The lowest or any bid will not necessarily be accepted and Owner may reject any and all bids.

.2 The Contract will be established if and when the successful Bidder receives from Owner a written notification accepting the bid without any conditions. If Owner's written notification accepting the bid contains, or is subject to, any conditions, the Contract will be established if and when the Bidder accepts all such conditions in writing or when the parties execute the agreement.

.3 If the lowest compliant bid exceeds Owner's budget, and Owner is unwilling or unable to award a contract at the bid price, Owner may:
.1 Negotiate, with lowest compliant Bidder only, changes to the Bid Documents and a reduced bid price acceptable to Owner, or
.2 Invite the three lowest compliant Bidders only to re-bid on modified Bid Documents under a new bid call.

1.23 INTERPRETATION AND MODIFICATION OF BID DOCUMENTS

.1 If an inquiry requires an interpretation or modification of the Bid Documents, the response to that inquiry will be issued in the form of a written addendum only, to ensure that all Bidders base their bids on the same information.

.2 Replies to inquiries or interpretations or modifications of the Bid Documents made by e-mail, verbally, or in any manner other than a written addendum, will not form part of the Bid Documents and will not be binding.

1.24 ADDENDA

.1 Addenda may be issued to modify the Bid Documents in response to inquiries or as may be considered necessary.

.2 Addenda issued during the bid period will become part of the Bid Documents.

.3 No addenda will be issued later than two Working Days before the bid closing time.

.4 Each Bidder shall ascertain before bid submission that it has received all addenda issued during the bid period. Bidders must acknowledge receipt of each addendum by checking a box for each addendum and any applicable attachments issued before they can submit their Bid.

1.25 INQUIRIES

.1 Inquiries must be submitted through the e-procurement services provider by selecting the "SUBMIT QUESTION" button.

.2 Submit inquiries as early as possible in the bid period and not less than 7 Working Days before the bid closing time. Inquiries received after this time may not receive a response.

END OF SECTION

1 General

1.1 STATUS OF AVAILABLE PROJECT INFORMATION

.1 Available Project information means information of any type and in any form that is expressly identified as available project information relevant to Place of the Work, that have been prepared by third-parties, and are intended strictly as additional information for consideration by Bidders.

.2 No available Project information forms part of the Contract Documents unless copied or transcribed into Drawings or Specifications, or is expressly listed in the agreement as a Contract Document.

1.2 USE AND RELIANCE UPON AVAILABLE PROJECT INFORMATION

.1 Available Project information is made available to Bidders to fulfill Owner's duty to disclose all relevant Project information to Bidders.

.2 Bidders shall interpret and draw their own conclusions about available Project information, including consideration of the time when it was created. Available Project information may be time sensitive. Owner and Consultant assume no responsibility for such interpretations and conclusions.

.3 Available Project information, or any part thereof, shall not be construed as contract requirements unless also reflected in Drawings or Specifications, and in case of conflict, Drawings or Specifications shall govern.

.4 Bidders, acting reasonably, may rely on available Project information in preparing their bids, subject to any qualifications stated in such available Project information and unless expressly stated otherwise.

.5 Bidders are cautioned that such documents, by their nature, cannot reveal all conditions that exist or can occur at Place of the Work.

.6 Should conditions at Place of the Work, in Consultant's opinion, be found to substantially vary from those identified in available Project information, then changes in the Work may need to be made, with appropriate adjustments being made to Contract Price and Contract Time.

.7 Direct questions pertaining to available Project information by contacting issuing organization.

1.3 GEOTECHNICAL INVESTIGATION REPORTS

.1 A copy of a detailed geotechnical investigation report with respect to Place of the Work is being made available as part of the Bid Documents; described as follows:
Titled: Geotechnical Investigation Report, [_____];
Ref. No.: [_____];
Dated: [_____];
Prepared by: [_____].

.2 Such reports record properties of soils and include recommendations for design of foundations and pavements.

1.4 DESIGNATED SUBSTANCE SURVEYS AND AUDITS

.1 A copy of a designated substance audit report with respect to Place of the Work is being made available as part of the Bid Documents; described as follows:
Titled: Asbestos Assessment, [_____], [_____], [_____], ON;
File No.: [_____];
Dated: [_____];
Prepared by: Pinchin Ltd.

.2 Such reports identify locations and types of designated substances found to be present at Place of the Work, and may include recommendations for their safe removal and disposal.

.3 Conditions at Place of the Work identified in the report are relevant only at time of survey.

.4 The condition of some building materials may have changed.

.5 Items discovered during the execution of the Work that are not itemized within the report should be analytically tested by an accredited laboratory before further disturbance.

1.5 DOCUMENTS DESCRIBING EXISTING FACILITY

.1 Documents describing existing facility are available for viewing by bidders at Owner's office.

.2 These documents were prepared by others and neither Owner nor Consultant take responsibility for the accuracy of information nor verify they represent actual conditions at Place of the Work.

END OF SECTION

1 General

1.1 AGREEMENT

.1 CCDC 2-2020 Stipulated Price Contract, as amended below, forms the basis of Agreement between Owner and Contractor.

1.2 AMENDMENTS TO THE AGREEMENT

.1 Article A-5 - Payment

.1 Revise Subparagraph A-5.1.1 by adding the following words to the end: *"... or, where there is no Payment Certifier, jointly by the Owner and Contractor"*.

.2 Article A-6 - Receipt and Addresses for Notices in Writing

.1 Delete Paragraph A-6.5 in its entirety and replace it with the following: *"Contact information for a party may be changed by Notice in Writing to the other party setting out the new contact information in accordance with this Article."*

END OF SECTION

1 General

1.1 DEFINITIONS

.1 CCDC 2-2020 Stipulated Price Contract includes the Definitions of specific words and terms.

1.2 SUPPLEMENTARY DEFINITIONS

.1 Add a new Definition for Proper Invoice as follows: *"Proper Invoice means a proper invoice as defined in the Payment Legislation, if any, and as may be modified by written agreement between the parties to the extent permitted by such Payment Legislation."*

.2 Add a new Definition for Submittals, as follows: *"Submittals are documents or items required by the Contract Documents to be submitted by Contractor, such as Shop Drawings, samples, models, and mock-ups; indicating details or characteristics, before the portion of the Work that they represent can be incorporated into the Work."*

.3 Add a new Definition for Closeout Submittals, as follows: *"Closeout Submittals are documents or items required by the Contract Documents to be submitted by Contractor, such as manuals, as-built drawings, spare parts, extra stock materials, and special tools; required for Owner's operation and maintenance of the Project."*

END OF SECTION

1 General

1.1 GENERAL CONDITIONS

.1 CCDC 2-2020 Stipulated Price Contract is the General Conditions between Owner and Contractor.

1.2 SUPPLEMENTARY CONDITIONS

.1 Refer to Supplementary Conditions for amendments and supplements to General Conditions.

.2 Where a General Condition of the Contract or a paragraph of the General Conditions of the Contract is deleted by Supplementary Condition, the numbering of the remaining General Conditions or paragraphs shall remain unchanged, and the numbering of the deleted item will be retained, unused.

END OF SECTION

1 Supplements to General Conditions

1.1 GC 1.1 - CONTRACT DOCUMENTS

.1 Delete Paragraph 1.1.3 in its entirety and replace with the following: *"The* Contractor *shall review the* Contract Documents *for the purpose of facilitating and coordination and execution of the* Work *by the* Contractor*. The* Contractor *shall report promptly to the* Consultant *any ambiguities, design issues or other matters requiring clarification made known to the* Contractor *or that the* Contractor *may discover from such a review. Such review by the* Contractor *shall comply with the standard of care described in paragraph 3.9.1 of the* Contract*."*

.2 Delete Paragraph 1.1.4 in its entirety and replace with the following: *"Except for its obligation to review the* Contract Documents *and report the result pursuant to paragraph 1.1.3, the* Contractor *is not responsible for ambiguities, design issues or other matters requiring clarification in the* Contract Documents *and does not assume any responsibility to the* Owner *or to the* Consultant *for the accuracy of the* Contract Documents*. Without limiting the foregoing, the* Contractor *shall not be liable for any damages or costs resulting from any ambiguities, design issues or other matters requiring clarification in the* Contract Documents *which the* Contractor *could not reasonably have discovered from such review in accordance with the standard of care. If the* Contractor *does discover any ambiguities, design issues or other matters requiring clarification in the* Contract Documents*, the* Contractor *shall not proceed with the work affected until the* Contractor *has received modified or additional information from the* Consultant*. The impacts of any ambiguities, design issues or other matters requiring clarification in the* Contract Documents*, including to the* Contract Price *and* Contract Time*, shall be addressed by the parties in accordance with Part 6 - CHANGES IN THE WORK."*

.3 Revise Subparagraph 1.1.6.2 by adding the following clause to the end: *"except to the extent the* Consultant *is indemnified as a third party beneficiary as provided in subparagraphs 9.2.7.4 and 9.5.3.4 and in paragraph 13.1.7."*

1.2 GC 2.2 - ROLE OF THE CONSULTANT

.1 Add new Sentence to Paragraph 2.2.3, as follows: *"Without limiting the foregoing, the* Consultant *may appoint one or more authorized representatives in writing who may fulfill the obligations of the* Consultant *under this* Contract*."*

.2 Revise Paragraph 2.2.8 by adding the words *'written statements'* after the word 'interpretations' in both the first and second sentences; and by adding the following sentence to the end of the paragraph: *"The* Owner *and the* Contractor *shall waive any claims against the* Consultant *arising out of its making of any interpretations, written statements or findings in accordance with paragraphs 2.2.6, 2.2.7, 2.2.8 and 7.1.2, but only to the extent that any such interpretations, written statements and findings are made by the* Consultant *in an unbiased manner, and in accordance with the* Consultant's *professional standard of care at law."*

.3 Revise Paragraph 2.2.13 by adding the words *"which are submitted"* before the words 'by the *Contractor*'.

1.3 GC 2.4 - DEFECTIVE WORK

.1 Delete Paragraph 2.4.1 in its entirety and replace with the following: *"The* Contractor *shall promptly correct, in a manner acceptable to the* Owner *and the* Consultant*, defective work that has been rejected by the* Consultant *as failing to conform to the* Contract Documents*, or work that the* Contractor *discovers to be defective, whether or not the defective work had been identified by the* Consultant*, and whether or not the defective work was incorporated in the* Work *or the defect is the result of poor workmanship, use of defective* Products *or damage through carelessness or other act or omission of the* Contractor*."*

.2 Add new Paragraph 2.4.4 as follows: *"The* Contractor *shall prioritize the correction of any defective work which, in the sole discretion of the* Owner*, adversely affects the day-to-day operation of the* Owner*."*

1.4 GC 3.1 - CONTROL OF THE WORK

.1 Add new Paragraph 3.1.3 as follows: *"Prior to commencing individual procurement, fabrication and construction activities,* Contractor *shall verify at* Place of the Work *relevant measurements and levels necessary for proper and complete fabrication, assembly and installation of the Work and shall further carefully compare such field measurements and conditions with the requirements of* Contract Documents*. Where dimensions are not included or contradictions exist, or exact locations are not apparent,* Contractor *shall immediately notify* Consultant *in writing and obtain written instructions from* Consultant *before proceeding with any affected part of the* Work*."*

1.5 GC 3.2 - CONSTRUCTION BY THE OWNER AND OTHER CONTRACTORS

.1 Add new Paragraph 3.2.7 as follows: *"At commencement of the* Work*, the* Contractor *shall prepare for the review and acceptance of the* Owner *and the* Consultant*, a schedule indicating the times, within the construction schedule referred to in GC 3.4 - CONSTRUCTION SCHEDULE, that items that are specified to be* Owner *purchased and* Contractor *installed or hooked up are required at the* Place of the Work *to avoid delaying the progress of the* Work*."*

1.6 GC 3.6 - SUBCONTRACTORS AND SUPPLIERS

.1 Revise Paragraph 3.6.2 by adding the following sentence to the end of the paragraph: *"The* Contractor *shall not subsequently change* Subcontractors *without the prior written approval of the* Owner*."*

1.7 GC 3.7 - LABOUR AND PRODUCTS

.1 Revise Paragraph 3.7.1 by adding the following to the end: *"The* Contractor *represents that it has sufficient skilled employees to replace, subject to the* Owner's *approval, acting responsibly, its designated supervisor and project manager in the event of death, incapacity, removal or resignation."*

.2 Add new Paragraph 3.7.4 as follows: *"The* Owner *shall provide the* Contractor *in a timely manner with all relevant information (including storage, protection, and installation requirements) regarding* Products *to be supplied by the* Owner *or other contractors and, prior to delivery of any such* Products *to the* Place of the Work*, the* Owner *shall obtain the* Contractor's *written approval of the delivery date and proposed storage, protection and installation requirements."*

.3 Add new Paragraph 3.7.5 as follows: *"Once the* Contractor *has accepted delivery of* Products*, the* Contractor *shall be responsible for the safe storage and protection of* Products *as required to avoid dangerous conditions or contamination to the* Products *or other persons or property.* Products *shall be stored in locations and at the* Place of the Work *to the satisfaction of the* Owner *and the* Consultant *as agreed and approved by the* Contractor *pursuant to paragraph 3.7.4."*

.4 Add new Paragraph 3.7.6 as follows: *"Notwithstanding the foregoing, the* Contractor *shall not be responsible for any* Products *supplied by the* Owner *or other contractors unless:*

.1 the Contract Documents *expressly stipulate that such* Product *is to be the* Contractor's *responsibility and to be installed by the* Contractor *as part of the* Work*;*

.2 the Contractor *has or has received from the* Owner *proof of insurance coverage sufficient, at a minimum, to cover the replacement cost of such* Product*; and*

.3 the Owner *obtained the* Contractor's *approval as required by paragraph 3.7.4."*

1.8 GC 3.8 - SHOP DRAWINGS

.1 Add the words *"AND OTHER SUBMITTALS"* to the title of GC 3.8 after the words 'SHOP DRAWINGS'.

.2 Add the words *"and* Submittals*"* after the words *'Shop Drawings'* in paragraphs 3.8.1, 3.8.2, 3.8.3, subparagraph 3.8.3.2, and paragraphs 3.8.5, 3.8.6 and 3.8.7.

.3 Delete Paragraph 3.8.2 in its entirety and replace it with the following: *"Prior to the first application for payment, the* Contractor *and the* Consultant *shall jointly prepare a schedule of the dates for submission and return of* Shop Drawings *and* Submittals *in an orderly sequence."*

.4 Revise Paragraph 3.8.7 by deleting the clause 'with reasonable promptness so as to cause no delay in the performance of the Work' and replace it with the following clause: *"within 10* Working Days *or such longer period as may be reasonably required"*.

1.9 ADD NEW GC 3.9 - PERFORMANCE BY CONTRACTOR

.1 Add new Paragraph 3.9.1 as follows: *"In performing its services and obligations under the* Contract*, the* Contractor *shall exercise a standard of care, skill and diligence that would normally be provided by an experienced and prudent contractor supplying similar services for similar projects. The* Contractor *acknowledges and agrees that throughout the* Contract*, the* Contractor's *obligations, duties and responsibilities shall be interpreted in accordance with this standard. The* Contractor *shall exercise the same standard of due care and diligence in respect of any* Products*, personnel, or procedures which it may recommend to the* Owner*."*

1.10 GC 4.1 - CASH ALLOWANCES

.1 Delete Paragraph 4.1.7 in its entirety and replace with the following: *"At the commencement of the* Work*, the* Contractor *shall prepare for the review and acceptance of the* Owner *and the* Consultant*, a schedule indicating the times, within the construction schedule referred to in GC 3.4 - CONSTRUCTION SCHEDULE that items called for under cash allowances are required to be delivered to the* Place of the Work *to avoid delaying the progress of the* Work*."*

.2 Add new Paragraph 4.1.8 as follows: *"The* Owner *reserves the right to call, or to have the* Contractor *call, for competitive bids for portions of the* Work*, to be paid for from cash allowances."*

1.11 GC 5.2 - APPLICATIONS FOR PAYMENT

.1 Revise Paragraph 5.2.7 by deleting the words 'first payment' and replacing them with the words *"second payment"*.

1.12 GC 5.4 - SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK

.1 Delete Paragraph 5.4.1 in its entirety and replace it with the following: *"When the* Contractor *considers that the* Work *is substantially performed, or if permitted by the lien legislation applicable to the* Place of the Work *a designated portion thereof which the* Owner *agrees to accept separately is substantially performed, the* Contractor *shall, within five (5)* Working Days*, deliver to the* Consultant *and to the* Owner *a comprehensive list of items to be completed or corrected, together with a written application for a review by the* Consultant *to establish* Substantial Performance of the Work *or substantial performance of the designated portion of the* Work*. Failure to include an item on the list does not alter the responsibility of the* Contractor *to complete the* Contract*."*

.2 Delete Paragraph 5.4.2 in its entirety and replace it with the following: *"The* Consultant *will review the* Work *to certify or verify the validity of the application and shall promptly, and in any event, no later than 10 calendar days after receipt of the* Contractor's *application:*

.1 advise the Contractor *in writing that the* Work *or the designated portion of the* Work *is not substantially performed and give reasons why, or*

.2 state the date of Substantial Performance of the Work *or a designated portion of the* Work *in a certificate and issue a copy of that certificate to each of the* Owner *and the* Contractor*."*

.3 Delete Paragraph 5.4.3 in its entirety and replace it with the following: *"Where the holdback amount required by the applicable lien legislation has not been placed in a separate lien holdback account, the* Owner *shall, no later than 10 calendar days prior to the expiry of the holdback period stipulated in the lien legislation applicable to the* Place of the Work*, place the holdback amount in a bank account in the joint names of the* Owner *and the* Contractor*."*

.4 Delete Paragraph 5.4.4 in its entirety and replace it with the following: *"Subject to the requirements of any* Payment Legislation*, all holdback amounts prescribed by the applicable lien legislation for the* Place of the Work *shall become due and payable to the* Contractor *no later than 10* Working Days *following the expiration of the holdback period stipulated in the lien legislation applicable to the* Place of the Work*, as certified or verified by the* Consultant *when permitted by any* Payment Legislation*."*

.5 Delete Paragraph 5.4.5 in its entirety and replace it with the following: *"The* Contractor *shall submit an application for release of the lien holdback amount in accordance with the lien legislation applicable to the* Place of the Work*. Except to the extent required by any* Payment Legislation*, such application for release of the holdback shall not constitute an application for payment that is subject to* Proper Invoice *requirements."*

.6 Delete Paragraph 5.4.6 in its entirety and replace it with the following: *"Where legislation permits progressive release of the holdback for a portion of the* Work *and the* Consultant *has certified or verified that the part of the* Work *has been performed prior to* Substantial Performance of the Work*, the* Owner *hereby agrees to release, and shall release the holdback for such portion of the* Work *to the* Contractor *in accordance with such legislation."*

.7 Add new Paragraph 5.4.7 as follows: *"Notwithstanding any progressive release of the holdback, the* Contractor *shall ensure that such parts of the* Work *are protected pending the issuance of a final certificate for payment or until the* Owner *takes early occupancy in accordance with GC 12.2 - EARLY OCCUPANCY BY THE OWNER, whichever comes first, and shall be responsible for the correction of defects or work not performed regardless of whether or not such was apparent when the holdback was released."*

1.13 GC 5.5 - FINAL PAYMENT

.1 Revise Paragraph 5.5.1 by adding the following Sentence to the end of the paragraph: *"The application for final payment shall meet the requirements of* Proper Invoice*."*

.2 Revise Paragraph 5.5.3 by adding the following Sentence to the end: *"Subject to any* Payment Legislation*, when the* Consultant *finds the* Contractor's *application for final payment to be not valid, the* Contractor *shall revise and resubmit the application when the* Contractor *has addressed the reasons given by the* Consultant*."*

1.14 GC 6.3 - CHANGE DIRECTIVE

.1 Revise Subparagraph 6.3.7.18 by deleting the word 'and' from the end of the subparagraph.

.2 Revise Subparagraph 6.3.7.19 by deleting the period at the end of the subparagraph, and replacing it with *"; and"*.

.3 Add new Subparagraph 6.3.7.20 as follows: *"safety measures and requirements."*

1.15 GC 6.4 - CONCEALED OR UNKNOWN CONDITIONS

.1 Add new Paragraph 6.4.5 as follows: *"The* Contractor *confirms that, prior to bidding the* Project*, it carefully investigated the* Place of the Work *and applied to that investigation the degree of care and skill described in paragraph 3.9.1, given the amount of time provided between the issue of the bid documents and the actual closing of bids, the degree of access provided to the* Contractor *prior to the submission of its bid, and the sufficiency and completeness of the information provided by the* Owner*. The* Contractor *is not entitled to compensation or to an extension of the* Contract Time *for conditions which could reasonably have been ascertained by the* Contractor *by such review undertaken in accordance with this paragraph 6.4.5."*

1.16 GC 6.6 - CLAIMS FOR A CHANGE IN CONTRACT PRICE

.1 Revise Paragraph 6.6.5 by adding the words *"as noted in paragraph 6.6.3"* after the words 'of the claim' and add the words *"and the Consultant"* at the end of the paragraph.

1.17 GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK OR TERMINATE THE CONTRACT

.1 Add Paragraph 7.1.7 as follows: *"When a performance bond has been obtained and submitted to* Owner *by* Contractor, *the provisions of paragraph 7.1.5 shall be exercised in accordance with the conditions of such performance bond unless* Owner *chooses to forfeit it's rights under said bond."*

1.18 GC 8.2 - ADJUDICATION

.1 Revise Paragraph 8.2.1 by deleting the word 'prescribed' and replacing it with the words *"provided for"*.

1.19 GC 8.3 - NEGOTIATION, MEDIATION AND ARBITRATION

.1 Add new Paragraph 8.3.9 as follows: *"Within five (5) days of receipt of the notice of arbitration by the responding party under paragraph 8.3.6, the* Owner *and the* Contractor *shall give the* Consultant *a written notice containing:*
.1 a copy of the notice of arbitration;
.2 a copy of supplementary conditions 8.3.9 to 8.3.13 of this Contract*, and;*
.3 any claims or issues which the Contractor *or the* Owner*, as the case may be, wishes to raise in relation to the* Consultant *arising out of the issues in dispute in the arbitration."*

.2 Add new Paragraph 8.3.10 as follows: *"The* Owner *and the* Contractor *agree that the* Consultant *may elect, within ten (10) days of receipt of the notice under paragraph 8.3.9, to become a full party to the arbitration under paragraph 8.3.6 if the* Consultant*;*
.1 has a vested or contingent financial interest in the outcome of the arbitration;
.2 gives the notice of election to the Owner *and the* Contractor *before the arbitrator is appointed;*
.3 agrees to be a party to the arbitration within the meaning of the rules referred to in Paragraph 8.3.6, and;
.4 agrees to be bound by the arbitral award made in the arbitration."

.3 Add new Paragraph 8.3.11 as follows: *"Without limiting and subject to the* Owner's *and* Contractor's *rights under paragraph 8.3.12 to challenge whether the* Consultant *has satisfied the requirements of Paragraph 8.3.10, if an election is made under Paragraph 8.3.10:*
.1 the Owner *or* Contractor *may request particulars and evidence of the* Consultant's *vested or contingent financial interest in the outcome of the arbitration;*
.2 the Consultant *shall participate in the appointment of the arbitrator; and,*

.3 notwithstanding the rules referred to in paragraph 8.3.6, the time period for reaching agreement on the appointment of the arbitrator shall begin to run from the date the respondent receives a copy of the notice of arbitration."

.4 Add new Paragraph 8.3.12 as follows: *"The arbitrator in the arbitration in which the* Consultant *has elected under paragraph 8.3.10 to become a full party may:*

.1 on application of the Owner *or the* Contractor*, determine whether the* Consultant *has satisfied the requirements of paragraph 8.3.10, and;*

.2 make any procedural order considered necessary to facilitate the addition of the Consultant *as a party to the arbitration."*

.5 Add new Paragraph 8.3.13 as follows: *"The provisions of paragraph 8.3.9 shall apply (with all appropriate changes being made) to written notice to be given by the* Consultant *to any sub-consultant."*

1.20 GC 9.1 - PROTECTION OF WORK AND PROPERTY

.1 Delete Subparagraph 9.1.1.1 in its entirety and replace it with the following: *"errors in the* Contract Documents *which the* Contractor *could not have discovered applying the standard of care described in paragraph 3.9.1;".*

.2 Delete Paragraph 9.1.2 in its entirety and replace it with the following: *"Before commencing any* Work*, the* Contractor *shall determine the locations of all underground utilities and structures indicated in the* Contract Documents*, or that are discoverable by applying to an inspection of the* Place of the Work *the degree of care and skill described in Paragraph 3.9.1."*

1.21 GC 9.2 - TOXIC AND HAZARDOUS SUBSTANCES

.1 Revise Paragraph 9.2.6 by adding the following clause after the word "responsible": *"... or whether any toxic and hazardous substances or materials already at* Place of the Work *(and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the* Contractor *or anyone for whom the* Contractor *is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damage to the property of the* Owner *or others, the* Owner *shall ..."*

.2 Revise Subparagraph 9.2.7.4 by adding the words *"and the* Consultant" after the word 'Contractor'.

.3 Revise Paragraph 9.2.8 by adding the following clause after the word "responsible": *"... or that any toxic and hazardous substances or materials already at the* Place of the Work *(and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the* Contractor *or anyone for whom the* Contractor *is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damage to the property of the* Owner *or others, the* Contractor *shall ..."*

1.22 GC 9.5 - MOULD

.1 Revise Subparagraph 9.5.3.4 by adding the words *"and the* Consultant" after the word 'Contractor'.

1.23 GC 10.1 - TAXES AND DUTIES

.1 Revise Paragraphs 10.1.1 and 10.1.2 by replacing the original term "taxes and duties" with the new term *"taxes, duties and tariffs"*.

.2 Add new Paragraph 10.1.3 as follows: *"To the extent that the* Contractor *is importing* Products*, and new taxes, duties and tariffs are placed upon such* Products *after the time of the bid closing, then the following shall apply:*

.1 "The Contractor *shall notify the* Owner *of the price impact of new taxes, duties and tariffs (whether imposed directly by Canada or indirectly by another Country on the necessary supply chain imports prior to coming into Canada). Such notice shall include:*

.1 A detailed description of the new taxes, duties and tariffs, including the rates, amounts, and specific Products *affected; and*

.2 Supporting documentation demonstrating the direct impact of the new taxes, duties and tariffs on the Contract*.*

.2 "The Contractor *shall take reasonable measures to mitigate the impact of the new taxes, duties and tariffs, including but not limited to:*

.1 Identifying and proposing cost-effective substitute Products *available in Canada or other jurisdictions that comply with the* Contract Documents*. If no acceptable substitute* Products *are available, the* Contractor *shall submit a written explanation to the* Owner*, supported by evidence of the* Contractor's *efforts to source acceptable substitute* Products*.*

.2 Advancing importation of the Products *across the border prior to the enactment of the new taxes, duties and tariffs, where reasonably feasible; and*

.3 Exploring and implementing other reasonable measures to avoid or minimize related costs.

.3 "The Contractor *shall prepare and submit a New Taxes, Duties and Tariffs Proposal, that shall include:*

.1 Documentation of the direct costs or savings reasonably incurred solely due to the new taxes, duties and tariffs;

.2 A proposed adjustment to the Contract Price*, limited to such documented costs, if the* Contractor *continues with the imported* Products*;*

.3 A cost-benefit analysis comparing the use of imported Products *with proposed substitute* Products*, if available;*

.4 Any proposed adjustment to the Contract Price and Contract Time if a proposed substitute Product is approved for use by the Owner; and

.5 Any additional information reasonably requested by the Owner*.*

.4 "On receipt of the New Taxes, Duties and Tariffs Proposal, the Owner *shall promptly deliver a Notice in Writing to the* Contractor, *instructing them to:*

.1 Proceed with the imported Products *with the change to the Contract Price recorded in a* Change Order*; or*

.2 Proceed with the proposed substitute Products, *with the change to the Contract Price and Contract Time recorded in a* Change Order*; or*

.3 Submit additional information or clarification to facilitate the Owner's *decision.*

.5 "Any adjustment to the Contract Price *on account of new taxes, duties and tariffs shall be strictly limited to the actual, demonstrable, substantiated, and auditable direct costs or savings reasonably incurred by the* Contractor *due to the new taxes, duties and tariffs."*

1.24 GC 10.2 - LAWS, NOTICES, PERMITS, AND FEES

.1 Revise Paragraph 10.2.5 by deleting the word 'The' from the start of the paragraph and substituting it with the words *"Subject to paragraph 3.9.1, the"*.

1.25 GC 11.1 - INSURANCE

.1 Revise Subparagraph 11.1.1.3 by deleting the Liability Insurance for manned aircraft and watercraft, either owned or non-owned.

1.26 GC 12.1 - READY-FOR-TAKEOVER

.1 Revise Paragraph 12.1.3 by deleting the words 'written application for *Ready-for-Takeover*', and replacing them with the words *"written application for determination of* Ready-for-Takeover*"*.

1.27 GC12.2 - EARLY OCCUPANCY BY THE OWNER

.1 Revise Paragraph 12.2.4 by deleting the word 'achieve' and replacing it with the words *"have achieved"*.

1.28 GC 12.3 - WARRANTY

.1 Revise Paragraph 12.3.2 by deleting the word 'The' from the start of the paragraph and substituting it with the words *"Subject to paragraph 3.9.1, the"*.

.2 Amend Paragraph 12.3.3 by adding the following Sentence: *"The warranty period for corrected work shall re-commence upon acceptance of the correction."*

1.29 GC 13.1 - INDEMNIFICATION

.1 Revise Paragraph 13.1.3 by deleting the words 'paragraphs 13.1.1 and 13.1.2' and replacing them with the words *"paragraphs 13.1.1, 13.1.2 and 13.1.7"*.

.2 Add new Paragraph 13.1.7 as follows: *"The Contractor shall indemnify and hold harmless the* Consultant*, its agents and employees from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings by third parties that arise out of, or are attributable to the* Contractor's *performance of the* Contract*, provided such claims are:*

.1 attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property,

.2 caused by negligent acts or omissions of the Contractor *or anyone for whose negligent acts or omissions the* Contractor *is liable, and*

.3 made by Notice in Writing *within a period of 6 years from the* Ready-for-Takeover *date or within such shorter period as may be prescribed by any limitation statute or the Province or Territory of the* Place of the Work*."*

END OF SECTION

1 General

1.1 SURETY BONDS

.1 Prior to commencement of the Work, obtain and submit to Owner the required surety bonds.

.2 Surety bonds shall be issued by a duly licensed surety company authorized to transact the business of suretyship at Place of the Work.

.3 Bonds shall name The Hamilton-Wentworth Catholic District School Board as obligee and shall be signed, sealed, and dated by both Contractor and surety company.

.4 Maintain surety bonds in good standing until fulfilment of the Contract.

1.2 PERFORMANCE BOND

.1 Obtain and submit a Performance Bond for Fifty percent (50%) of Contract Price, to assure the faithful performance of the Contract, including corrections to the Work required under GC 12.3 - Warranty; on Ontario Construction Act Form 32, Performance Bond Under Section 85.1 of the Act.

1.3 LABOUR AND MATERIAL PAYMENT BOND

.1 Obtain and submit a Labour and Material Payment Bond for Fifty percent (50%) of Contract Price, to assume faithful payment of monies to parties in contract with the Contract; on Ontario Construction Act Form 31, Labour and Material Payment Bond Under Section 85.1 of the Act.

END OF SECTION

1 General

1.1 WORK OF THIS CONTRACT

.1 Work of this Contract comprises the following:

Construction of the
ST. JEAN DE BRÉBEUF C.S.S. - ELEVATOR ADDITION

located at:
200 Acadia Drive,
Hamilton, Ontario;

and is further identified as:
HWCDSB Tender # [_____], and
Project No.: 125804.

1.2 DIVISION OF WORK

.1 Division of the Work among Subcontractors and Suppliers is solely Contractor's responsibility. Consultant and Owner assume no responsibility to act as an arbiter to establish subcontract limits between Sections or Divisions of the Work.

1.3 SPECIFICATIONS LANGUAGE AND STYLE

.1 Specifications are written in imperative mood and in streamlined form. Imperative language is directed to Contractor, unless stated otherwise.

.2 Complete sentences by reading "shall", "Contractor shall", "shall be", and similar phrases by inference. Where a colon (:) is used within sentences and phrases, read the words "shall be" by inference.

.3 Fulfil and perform all indicated requirements whether stated imperatively or otherwise.

.4 When used in the context of a Product, read the word "Provide" to mean "supply and install to result in a complete installation ready for its intended use".

1.4 SPECIFICATIONS MEASUREMENTS AND DIMENSIONS

.1 Specifications are written using metric measurements and dimensions.

.2 This does not preclude the use of Products manufactured or produced to imperial measurements.

.3 It remains Contractor's responsibility to make the various parts of the Project come together properly and neatly in a complete manner, in accordance with Contract Documents.

1.5 CONTRACT DOCUMENTS FOR CONSTRUCTION PURPOSES

.1 Contract Documents were prepared by Consultant for the account of Owner. Information contained in Contract Documents reflects Consultant’s best judgement in light of the information available to them at the time of preparation. Any use which a third party makes of Contract Documents, or any reliance on or decisions to be made based on them, are the responsibility of such third parties. Consultant accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on Contract Documents.

.2 Owner will supply Contractor with a complete set of Contract Documents in electronic form before commencement of the Work. Contractor may print hard copies for construction purposes as required.

1.6 DOCUMENTS AT PLACE OF THE WORK

.1 Keep the following documents at Place of the Work, stored securely and in good order and available to Owner and Consultant in hard copy and electronic forms.
- .1 Current Contract Documents, including Drawings, Specifications, addenda, bid revisions and Notices in Writing.
- .2 Proposed changes, Change Orders, Change Directives and Supplemental Instructions.
- .3 Reviewed Shop Drawings, Product data and samples.
- .4 Field test reports and records.
- .5 Construction progress schedule.
- .6 Construction daily log.
- .7 Meeting minutes.
- .8 Manufacturer's certifications.
- .9 Current as-built drawings.
- .10 Safety Data Sheets (SDS) for controlled Products.
- .11 Manufacturer's installation and maintenance guidelines.
- .12 Consultant's field review reports and deficiency reports.
- .13 Permits and reports issued by authorities having jurisdiction.

.2 Make documents available to Consultant for review at Place of the Work.

1.7 CONTRACTOR USE OF THE PREMISES

.1 Except as otherwise specified in Section 01 14 00, Contractor has unrestricted use of designated areas of construction at Place of the Work from time of commencing construction operations at Place of the Work until Ready-for-Takeover.

.2 Upon written request to Owner, and prior to commencing construction operations at Place of the Work, Contractor may visit existing facility for the purpose of observing existing conditions and taking field measurements. Such visits may only occur on weekdays after 3:30 pm.

.3 Confine Construction Equipment, Temporary Work, storage of Products, waste materials and debris, and other construction operations to limits required by laws, ordinances, permits, and Contract Documents, whichever is most restrictive. Do not unreasonably encumber Place of the Work.

1.8 OWNER-SUPPLIED PRODUCTS

.1 Owner Responsibilities
- .1 Order and pay for Owner-supplied Products not already in Owner's possession.
- .2 Arrange and pay for delivery of Owner-supplied Products F.O.B. Place of the Work, within time frames required by Contractor's construction progress schedule. If delivered sooner than required by Contractor's latest construction progress schedule submitted to Owner, arrange and pay for delivery to a temporary storage location and subsequent delivery to Place of the Work.
- .3 Advise Contractor in writing of the value of Owner-supplied Products, prior to their delivery to Place of the Work, for Contractor's insurance purposes.
- .4 Arrange and pay for delivery to Contractor of reviewed Shop Drawings, Product data, samples, and manufacturer's instructions and certificates.
- .5 Inspect deliveries jointly with Contractor.
- .6 Submit claims for transportation damage.
- .7 Arrange for replacement of damaged, defective or missing items identified at time of delivery.
- .8 Arrange for manufacturer's field services.
- .9 Arrange for delivery of manufacturer's warranties to Contractor for inclusion in operation and maintenance manuals.

.2 Contractor Responsibilities
- .1 Designate in construction progress schedule, time frames for delivery of Owner-supplied Products to Place of the Work and for receipt of related submittals. If Place of the Work is not ready to receive delivery of Owner-supplied Products within the time frame indicated in the latest construction progress schedule submitted to Owner, arrange and pay for delivery to a temporary storage location and subsequent delivery to Place of the Work.
- .2 Review required submittals and notify Consultant of any observed discrepancies or anticipated problems.
- .3 Ensure course of construction insurance is adequate to cover Owner-supplied Products.
- .4 Receive and unload Owner-supplied Products at Place of the Work.
- .5 Inspect deliveries jointly with Owner. Record and notify Owner and Consultant of shortages and visibly damaged or defective items.
- .6 Handle Owner-supplied Products at Place of the Work, including uncrating and storage. Dispose of waste materials and debris.
- .7 Take appropriate precautions to protect Owner-supplied Products from loss or damage.
- .8 Repair or replace items damaged at Place of the Work.
- .9 Assemble, install, connect, adjust and finish Owner-supplied Products.
- .10 Arrange for inspections required by authorities having jurisdiction.
- .11 Arrange for or perform testing required by authorities having jurisdiction.
- .12 Workmanship warranty for installation.
- .13 Make Good Owner-supplied Products damaged by Contractor or Subcontractors at Place of the Work.

END OF SECTION

1 General

1.1 RESTRICTIONS ON USE OF PREMISES

.1 Limit use of premises for execution of the Work, for storage, and for access, to allow:
.1 Owner occupancy of existing facility.
.2 Work by Other Contractors in existing facility.
.3 Public usage of existing facility.

.2 Coordinate use of premises under direction of Owner.

1.2 OWNER OCCUPANCY

.1 Owner will occupy existing facility during entire construction period.

.2 Cooperate with Owner in scheduling operations to minimize disruptions and to facilitate Owner usage.

1.3 RESTRICTED HOURS OF WORK IN OCCUPIED FACILITIES

.1 When performing Work within existing facility beyond the defined areas of construction, coordinate with Owner's representative at Place of the Work to ensure operational program of existing facility is not disrupted. Conduct such coordination not less than 48 hours prior to commencing such portions of the Work.

.2 Work performed within existing facility beyond the defined areas of construction is restricted to the following times:
.1 July 1 to August 31: Mondays to Fridays, from 7:30 am to 4:00 pm.
.2 September 1 to June 30: Mondays to Fridays, from 4:00 pm to 10:30 pm.

.3 Make special arrangements with Owner to perform portions of the Work in existing facility beyond the defined areas of construction outside of these hours. Submit requests for special arrangements not less than 48 hours in advance.

.4 Submit written notice to Owner and Owner's representative at Place of the Work within 24 hours of any potential disruptions to continuing operations of existing facility.

.5 Allow for hours of work restrictions in construction schedule.

1.4 PRODUCT DELIVERY RESTRICTIONS IN OCCUPIED FACILITIES

.1 Schedule Product deliveries to Place of the Work only outside existing facility's normal operating hours.

1.5 NOISY WORK RESTRICTIONS IN OCCUPIED FACILITIES

.1 Schedule excessively noisy work to avoid disturbance to building occupants. Perform excessive noise generating work outside of existing facility's normal operating hours.

.2 Use powder actuated devices only with Consultant's written permission.

1.6 FOOD AND BEVERAGE RESTRICTIONS IN OCCUPIED FACILITIES

.1 Limit the consumption of food and beverages in occupied facilities to only those areas designated by Owner.

.2 There shall be no food or beverages allowed within existing facility beyond the defined areas of construction.

.3 Only water will be permitted to be consumed within existing facility.

.4 No sunflower seeds, peanuts, nuts, or similar foods are permitted anywhere at Place of the Work.

.5 Workers found to be in violation of this requirement will be required to leave Place of the Work and will be replaced by Contractor.

1.7 MAINTAINING LIFE SAFETY SYSTEMS IN OCCUPIED FACILITIES

.1 Maintain operational life safety systems and public access to exits in occupied areas during execution of the Work.

.2 Existing Entrances and Exits:
.1 Maintain existing entrances and exits to ensure public safety.
.2 Where existing entrances and exits are blocked or adversely affected by construction activities, construct temporary entrances and exits in accordance with authorities having jurisdiction.

.3 Determine nature and exact locations of existing fire and smoke sensors prior to commencement of the Work. Avoid direct or indirect jarring while working in adjacent areas and exercise caution to avoid triggering these devices.

.4 Be responsible for costs incurred by Owner on account of false fire alarms activated as a result of the execution of the Work without adequate precautions.

END OF SECTION

1 General

1.1 CASH ALLOWANCES FOR SUPPLY ONLY OF PRODUCTS

.1 Amount of each cash allowance includes:
.1 Cost of Products as invoiced by Supplier, including delivery and applicable taxes, but excluding Value Added Taxes.

.2 Amount of each cash allowance does not include costs of the following items, which costs shall be included in Contract Price and not in cash allowance:
.1 Unloading, handling and storage at Place of the Work.
.2 Installation and other related costs.
.3 Overheads and profits related to cash allowance.

.3 Allow the stipulated sum of $[_____] for supply of door hardware, as specified in Section 08 71 00.

1.2 CASH ALLOWANCES FOR SUPPLY AND INSTALLATION OF PRODUCTS

.1 Amount of each cash allowance includes:
.1 Costs to Provide the specified Products, including supply, installation, and related costs, excluding Value Added Taxes.
.2 Subcontractor's and sub-Subcontractor's overheads and profits related to cash allowance.

.2 Amount of each cash allowance does not include Contractor's overhead and profit, and other related costs, which shall be included in Contract Price and not in cash allowance.

.3 Allow the stipulated sum of $[_____] for supply and installation of door signage, as specified in Section 10 14 00.

1.3 CASH ALLOWANCES FOR SERVICES

.1 Amount of each cash allowance includes:
.1 Costs related to the services, excluding Value Added Taxes.
.2 Subcontractor's and sub-Subcontractor's overheads and profits related to cash allowance.

.2 Amount of each cash allowance does not include Contractor's overhead and profit, and other related costs, which shall be included in Contract Price and not in cash allowance.

.3 Allow the stipulated sum of $[_____] for inspection and testing services, as specified in Section 01 40 00.

.4 Allow the stipulated sum of $[_____] for commissioning of mechanical systems.

1.4 EXPENDITURE OF CASH ALLOWANCES

.1 Owner, through Consultant, will supply Contractor with documentation required to permit pricing of a cash allowance item.

.2 Owner, through Consultant, may request Contractor to identify potential Suppliers or Subcontractors, as applicable, and to obtain at least three competitive prices for each cash allowance item.

.3 Owner, through Consultant, may request Contractor to disclose originals of each bid, quotation, and other price related information received from potential Suppliers or Subcontractors.

.4 Owner, through Consultant, will determine by whom and for what amount each cash allowance item will be performed. Obtain Owner's prior written approval in the form of a Change Order before entering into a subcontract, amending an existing subcontract, or performing own forces work included in a cash allowance. Upon issuance of the Change Order, Contractor's responsibilities for a cash allowance item shall be the same as for other work of the Contract.

1.5 CONTINGENCY ALLOWANCE

.1 Include in Contract Price a contingency allowance in the amount of $[_____].

END OF SECTION

1 General

1.1 DEFINITION

.1 Substitution means a Product, a manufacturer, or both, not originally specified in Contract Documents by proprietary name but proposed for use by Contractor in place of a Product, a manufacturer, or both, specified by proprietary name.

1.2 SUBSTITUTION PROCEDURES

.1 Contractor may propose a Substitution wherever a Product or manufacturer is specified by proprietary name(s), unless there is accompanying language indicating that Substitutions will not be considered.

.2 Contractor may propose a Substitution wherever a Product or manufacturer is specified by proprietary name(s) and accompanied by language such as "or equal", "or approved equal", or other similar words. Do not construe such language as an invitation to unilaterally Provide a Substitution without Consultant's prior written acceptance. Do not order or install any Substitution without a Supplemental Instruction or Change Order. Unauthorized Substitutions will be removed and replaced with specified Product by Contractor.

.3 Provided a proposed Substitution submission includes all of the information specified in this Section under Submission Requirements for Proposed Substitutions, Consultant will promptly review and accept or reject the proposed Substitution.

.4 Consultant may accept a Substitution if satisfied that:
.1 The proposed substitute Product is the same type as, is capable of performing the same functions as, interfaces with adjacent work the same as, and meets or exceeds the standard of quality, performance and, if applicable, appearance, warranty and maintenance considerations, of the specified Product,
.2 The proposed substitute manufacturer has capabilities comparable to the specified manufacturer, and
.3 The Substitution provides a benefit to Owner.

.5 If Contractor fails to order a specified Product or order a Product by a specified manufacturer in adequate time to meet Contractor's construction progress schedule, Consultant will not consider that valid reason to accept a Substitution.

.6 If Consultant accepts a Substitution, and subject to Owner's agreement, the change in the Work will be documented in the form of either a Supplemental Instruction or Change Order as specified in Section 01 26 00.

.7 If a Substitution is accepted in the form of a Supplemental Instruction or Change Order, Contractor shall not revert to an originally specified Product or manufacturer without Consultant's prior written acceptance.

1.3 SUBMISSION REQUIREMENTS FOR PROPOSED SUBSTITUTIONS

.1 Include with each proposed Substitution the following information:
.1 Identification of the substitution, including product name, and manufacturer's name, address, telephone numbers, and web site address.
.2 Reason or reasons for proposing the Substitution.
.3 A statement verifying that the Substitution will not affect the Contract Price and Contract Time or, if applicable, the amount and extent of a proposed increase or decrease in Contract Price and Contract Time on account of the Substitution.
.4 A statement verifying that the Substitution will not affect the performance and warranty of other parts of the Work.
.5 Manufacturer's Product literature for the Substitution, including material descriptions, compliance with applicable codes and reference standards, performance and test data, compatibility with contiguous materials and systems, and environmental considerations.

.6 Product samples as applicable.
.7 A summarized comparison of the physical properties and performance characteristics of the specified Product and the proposed Substitution, with any significant variations clearly highlighted. Values describing the physical properties and performance characteristics of the proposed Substitution must be expressed using the same units of measurement as for the specified Product, and have been tested using the same test methods as used for the specified Product.
.8 Availability of maintenance services and sources of replacement materials and parts for the proposed Substitution, as applicable, including associated costs and time frames.
.9 If applicable, estimated life cycle cost savings resulting from the Substitution.
.10 Details of other similar projects and applications where the Substitution has been used.
.11 Identification of any consequential changes in the Work to accommodate the Substitution and any consequential effects on the performance of the Work as a whole. A later claim for an increase to the Contract Price or Contract Time for other changes in the Work attributable to the Substitution will not be considered.

END OF SECTION

1 General

1.1 CLARIFICATIONS

.1 Request written clarifications when meaning of Contract Documents is unclear.

.2 Do not proceed with related parts of the Work until clarification is received.

.3 Failure to notify Consultant when Contract Documents are unclear or inconsistent will result in Contractor incurring responsibility for resulting deficiencies and additional costs.

.4 Clarifications issued by Consultant are deemed to supercede the relevant parts of Contract Documents, regardless whether those documents are cited in the written clarification.

1.2 REQUESTS FOR INFORMATION

.1 Contractor may, after exercising due diligence to locate the required information, request from Consultant clarification or interpretation of Contract Documents, hereinafter referred to as a request for information (RFI).

.2 Submit RFI on a form acceptable in content to Consultant, including a detailed description of Contractor's review of Contract Documents leading up to issuance of the RFI. Requests for information that fail to include a detailed review description, or whose description is insufficient in the opinion of Consultant, may not be considered and may be rejected.

.3 Maintain a log of RFI sent to and responses received from Consultant, complete with corresponding dates. Submit updated RFI log with each application for payment.

.4 Submit RFI to Consultant sufficiently in advance of affected parts of the Work so as not to cause delay in the Work. Additional costs incurred as a result of failure to submit an RFI in sufficient time will not be reimbursed by Owner.

.5 RFI will only be received from Contractor. RFI received directly from Subcontractors or Suppliers will not be considered.

.6 Submit one RFI per RFI form, numbered consecutively in a single sequence, in the order submitted.

.7 Consultant will review and respond to RFI with reasonable promptness.

.8 Consultant's response to RFI will not be considered a Change Order or a Change Directive, nor does it authorize changes in the Work, Contract Price or Contract Time.

.9 If, at any time, Contractor submits a large quantity of RFI, such that Consultant cannot process them within a reasonable period of time, then Consultant will notify Contractor of such in writing. In this event, Contractor and Consultant will jointly prepare an estimate of time necessary for processing RFI, as well as determining an order of priority among submitted RFI. Contractor will accommodate such necessary time at no increase in Contract Time or Contract Price.

.10 If the information requested in an RFI is apparent from field observations, is contained in Contract Documents or is reasonably inferable from them, Contractor shall be responsible to Owner for reasonable costs charged by Consultant for additional services required to prepare and issue such information.

.11 A request for information (RFI) will not constitute a notice of claim for a delay.

1.3 SCHEDULE OF LABOUR RATES

.1 Prior to first application for payment, submit for Consultant's review a schedule of labour rates for all Subcontracts and classifications of trades, such as journeymen, apprentices, and foremen that will be employed in the Work. Submit a breakdown of payroll burden component of labour rates.

.2 Labour rates shall reflect the salaries, wages, and benefits paid to personnel in the direct employ of Contractor, Subcontractors, and sub-Subcontractors, stated as hourly rates, that will be used when:
.1 Preparing price quotations for Change Orders, and
.2 Determining the cost of work attributable to Change Directives.

.3 Labour rates stated in the schedule of labour rates shall be consistent with rates that will actually be paid, and payroll burden costs that will actually be incurred, in the normal performance of the Work, during regular working hours. Labour rates shall not include any additional overhead and profit component.

.4 Where collective agreements apply, labour rates shall not exceed those established by collective agreement.

.5 Obtain Owner's written acceptance of the schedule of labour rates before submitting the first Change Order quotation.

.6 Accepted schedule of labour rates will be used for evaluating Change Order quotations and cost of performing work attributable to Change Directives.

.7 Contractor may request amendments to the accepted schedule of labour rates if changes in the labour rates that will actually be paid, or payroll burden cost that will actually be incurred, in the normal performance of the Work can be demonstrated. Obtain Owner's written acceptance of such changes.

1.4 SCHEDULE OF EQUIPMENT RATES

.1 Prior to first application for payment, submit for Consultant's review a schedule of equipment rates for Contractor-owned Construction Equipment.

.2 Equipment rates shall reflect the rates that will be used when:
.1 Preparing price quotations for Change Orders, and
.2 Determining the cost of work attributable to Change Directives.

.3 Equipment rates stated in the schedule of equipment rates shall be consistent with local equipment rental market rates and shall not include any additional overhead and profit component.

.4 Obtain Owner's written acceptance of the schedule of equipment rates before submitting the first Change Order quotation.

.5 Accepted schedule of equipment rates will be used for evaluating Change Order quotations and cost of performing work attributable to Change Directives.

.6 Contractor may request amendments to the accepted schedule of equipment rates if changes in the local equipment rental market rates can be demonstrated. Obtain Owner's written acceptance of such changes.

1.5 VALUATION OF CHANGES BASED ON AGREED UNIT PRICES

.1 Consultant may, at the outset of the Contract or at any other time, request Contractor to submit unit prices anticipated to be required in valuing changes in the Work.

.2 Contractor shall promptly submit requested unit prices.

.3 Unit prices are to be valid for a specified duration.

.4 Unit prices are to exclude fees for overhead and profit, and will be subject to the percentage fees specified in this Section under Fees for Overhead and Profit - Change Orders.

.5 Consultant will evaluate Contractor's quoted unit prices and, if accepted by Owner in writing, the agreed unit prices will be used to value subsequent proposed changes in the Work wherever they are applicable.

1.6 METHOD OF CONTRACT PRICE ADJUSTMENT - CHANGE ORDERS

.1 Unless otherwise agreed, the adjustment of the Contract Price on account of a proposed change in the Work will be based on a quotation for a fixed price increase or decrease to Contract Price regardless of Contractor's actual expenditures and savings.

1.7 CHANGE ORDER PROCEDURES

.1 Upon issuance by Consultant to Contractor of a proposed change in the Work, and unless otherwise requested in the proposed change or unless otherwise agreed:
- .1 Submit to Consultant a fixed price quotation for the proposed change in the Work within 5 days after receipt of the proposed change in the Work.
- .2 If requested in the proposed change, submit a detailed breakdown of the price quotation including the following to the extent applicable, with appropriate supporting documentation:
  - .1 Estimated labour costs, including hours and applicable hourly rates based on the accepted schedule of labour rates.
  - .2 Estimated Product costs, including Supplier quotations, estimated quantities and unit prices.
  - .3 Estimated Construction Equipment costs.
  - .4 Enumeration of other estimated costs included in the price quotation.
  - .5 Estimated credit amounts for labour and Products not required on account of the proposed change.
  - .6 Fees, not exceeding the specified allowable percentages for overhead and profit.
  - .7 Where applicable, Subcontractor quotations, also including a detailed breakdown of all the above items.
- .3 Include in the quotation the increase or decrease to Contract Time, if any, for the proposed change, stated in number of days.
- .4 Include in the quotation the number of days for which the quotation is valid.

.2 The quotation will be evaluated by Consultant and Owner and, if accepted by Owner, be documented in the form of a signed Change Order.

1.8 FEES FOR OVERHEAD AND PROFIT - CHANGE ORDERS

.1 Where Contractor's price quotation for a Change Order results in a net increase to the Contract Price, Contractor's entitlement to a fee for overhead and profit in the quotation shall be as follows, as applicable:
- .1 For work to be performed by Contractor's own forces, 10 percent of Contractor's price quotation before Contractor's fee is applied.
- .2 For work performed by a Subcontractor, 5 percent of Subcontractor's price quotation including Subcontractor's fee.

.2 Where a Subcontractor's price quotation for a Change Order results in a net increase to the Subcontractor's contract price, a Subcontractor's entitlement to a fee for overhead and profit in the quotation shall be as follows, as applicable:
- .1 For work to be performed by Subcontractor's own forces, 10 percent of Subcontractor's price quotation before Subcontractor's fee is applied.
- .2 For work performed by a sub-Subcontractor, 5 percent of sub-Subcontractor's price quotation including sub-Subcontractor's fee.

.3 Where Contractor's or a Subcontractor's price quotation for a Change Order results in a net decrease in price before adjustment for fees for overhead and profit, such a price quotation shall be for the net decrease without any adjustment for fees for overhead and profit.

1.9 METHOD OF CONTRACT PRICE ADJUSTMENT - CHANGE DIRECTIVES

.1 Unless Owner and Contractor reach an earlier agreement on the adjustment to the Contract Price by means of a Change Order that cancels the Change Directive, the adjustment in the Contract Price for change carried out by way of the Change Directive shall be determined as specified in the General Conditions of Contract after the change in the Work is completed.

1.10 CHANGE DIRECTIVE PROCEDURES

.1 If a Change Directive is issued for a change in the Work for which a proposed change was previously issued, but no Change Order has yet been signed, the Change Directive shall cancel the proposed change and any Contractor quotations related to that change in the Work.

.2 When proceeding with a change in the Work under a Change Directive, keep accurate records of daily time sheets for labour and Construction Equipment, and invoices for Product and Construction Equipment costs. Submit such records to Consultant dailyweekly, until the Change Order superseding the Change Directive is issued.

1.11 FEES FOR OVERHEAD AND PROFIT - CHANGE DIRECTIVES

.1 Contractor's entitlement to a fee for overhead and profit on Contractor's expenditures and savings attributable to a Change Directive shall be as follows, as applicable:
  .1 For work to be performed by Contractor's own forces, 10 percent of Contractor's net increase in costs.
  .2 For work performed by a Subcontractor, 5 percent of the sum of the Subcontractor's net increase in costs plus the Subcontractor's fee.

.2 A Subcontractor's entitlement to a fee for overhead and profit on the Subcontractor's expenditures and savings attributable to a Change Directive shall be as follows, as applicable:
  .1 For work to be performed by Subcontractor's own forces, 10 percent of Subcontractor's net increase in costs.
  .2 For work performed by a sub-Subcontractor, 5 percent of the sum of the sub-Subcontractor's net increase in costs plus the sub-Subcontractor's fee.

.3 Where a Change Directive results in net savings on account of work not required to be performed and a net decrease in the Contractor's or Subcontractor's cost, the net savings to the Contractor or Subcontractor shall be calculated without any adjustment for fees for overhead and profit.

.4 When a Change Directive is ultimately recorded as a Change Order, there shall be no additional entitlement to fees for overhead and profit beyond those specified above.

1.12 SUPPLEMENTAL INSTRUCTIONS

.1 Consultant may issue Supplemental Instructions to clarify Contract Documents, issue additional information, or make minor variations in the Work not involving adjustments in Contract Price or Contract Time.

.2 If Contractor considers a Supplemental Instruction to require an adjustment in Contract Price or Contract Time, Contractor shall promptly notify Consultant and Owner in writing and shall not proceed with any work related to the Supplemental Instruction pending receipt of a Change Order, a Change Directive, or, in accordance with the dispute resolution provisions of General Conditions of the Contract, a Notice in Writing of a dispute and instructions to proceed.

END OF SECTION

1 General

1.1 SCHEDULE OF VALUES

.1 Prior to first application for payment, submit for Consultant's review an initial schedule of values.

.2 Modify initial schedule of values if and as requested by Consultant.

.3 Obtain Consultant's written acceptance of initial schedule of values prior to first application for payment.

.4 Together with first and all subsequent applications for payment, submit updated versions of the schedule of values, indicating the values, to the date of application for payment, of work performed and Products delivered to Place of the Work.

.5 Prepare schedule of values in an electronic spreadsheet format based on the format and content described in CCDC 24-2022, A Guide to Model Forms and Support Documents.

1.2 CASH FLOW PROJECTION

.1 Prior to first application for payment, submit for Consultant's review a forecast of approximate monthly progress payments for each month of Contract Time.

.2 Submit revised cash flow forecasts when required due to significant changes in rate of progress of the Work, or significant changes in Contract Price, or when requested by either Owner or Consultant.

1.3 WORKERS' COMPENSATION CLEARANCE

.1 Submit proof of workers' compensation clearance with each application for payment.

1.4 PAYMENT FOR PRODUCTS STORED OFF SITE

.1 Owner may, due to extraordinary circumstances and at Owner's sole discretion, make payments for Products delivered to and stored at a location other than Place of the Work, subject to:
   .1 A request submitted by Contractor in writing, with appropriate justification, and
   .2 Whatever conditions Owner or Consultant may establish for such payments, as required to protect Owner's interests.

END OF SECTION

1 General

1.1 COORDINATION

.1 Coordinate the Work to ensure the Project proceeds safely and expeditiously.

.2 Ensure adequate communication among involved parties.

.3 Allocate mobilization areas at Place of the Work; for field offices and sheds, for access, traffic and parking facilities.

.4 Coordinate use of Place of the Work and facilities through procedures for submittals, reports and records, schedules, coordination of Drawings, recommendations, and resolution of ambiguities and conflicts.

.5 Submit information required for preparation of coordination and interference drawings. Review and approve revised drawings for submission to Consultant.

1.2 OTHER CONTRACTORS

.1 Cooperate with Other Contractors employed by Owner and, if necessary, coordinate with their work.

.2 Submit necessary information to Owner to assist in required scheduling of Other Contractors.

1.3 GENERAL REQUIREMENTS FOR MEETINGS

.1 Schedule and administer meetings in consultation with Consultant, throughout progress of the Work.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting 5 Working Days in advance of meeting date to Consultant and Owner.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record meeting minutes, including significant decisions and identifying action items and action dates by attendees or the parties they represent.

.7 Submit draft copy of minutes to Consultant within two Working Days after meeting.

.8 Consultant will review minutes and will submit comments for any necessary revisions or additions within three Working Days.

.9 Update minutes to reflect Consultant's comments.

.10 Reproduce and distribute copies of meeting minutes within 5 days after meeting and transmit to meeting participants, affected parties not in attendance, Consultant and Owner.

.11 Representatives of parties attending meetings shall be qualified and authorized to act on behalf of the party each represents.

.12 Schedule meetings on a day that is determined to be convenient by both Contractor and Consultant.

1.4 CONSTRUCTION START-UP MEETING

.1 Promptly after Contract award, Contractor shall establish the time and location of a construction start-up meeting to review and discuss administrative procedures and responsibilities.

.2 Senior representatives of Owner, Consultant, subconsultants, Contractor, including Contractor's project manager and site superintendent, and major Subcontractors shall be in attendance.

.3 Agenda will include the following:
- .1 Appointment of official representatives of Owner, Contractor, Subcontractors, Consultant, and subconsultants.
- .2 Project communications.
- .3 Contract Documents for construction purposes.
- .4 Documents at Place of the Work.
- .5 Contractor's use of premises.
- .6 Owner-supplied Products.
- .7 Work restrictions.
- .8 Contract modification procedures.
- .9 Payment procedures.
- .10 Construction progress meetings.
- .11 Construction progress schedule, including long lead time items.
- .12 Submittals schedule and procedures.
- .13 Special procedures.
- .14 Quality requirements, including testing and inspection procedures.
- .15 Contractor's mobilization.
- .16 Temporary utilities.
- .17 Existing utility services.
- .18 Construction facilities.
- .19 Temporary barriers and enclosures.
- .20 Temporary controls.
- .21 Field engineering and layout of work.
- .22 Site safety.
- .23 Site security.
- .24 Cleaning and waste management,
- .25 Closeout procedures and submittals.
- .26 Procedures for publishing Certificate of Substantial Performance of the Work, including identification of publisher, and procedures for notifying Subcontractors and Suppliers of publication.
- .27 Commissioning.
- .28 Other items.

1.5 PREINSTALLATION MEETINGS

.1 During course of the Work, schedule preinstallation meetings as required by Contract Documents.

.2 Wherever possible, schedule preinstallation meetings on same date as regularly scheduled progress meetings.

.3 Contractor, affected Subcontractors and Suppliers, Consultant, manufacturer's representatives, field inspectors and supervisors, and any other specified parties are to be in attendance.

.4 Agenda will include the following:
- .1 Review of existing conditions and affected parts of the Work, and any testing thereof.
- .2 Review of installation procedures and requirements.
- .3 Review of environmental and field condition requirements.
- .4 Schedule of the applicable parts of the Work.
- .5 Schedule of submission for samples and other items requiring Consultant's selection.
- .6 Requirements for Temporary Work.
- .7 Requirements for notification for reviews. Allow a minimum of 48 hours notice for Consultant to review the affected parts of the Work.

.8 Requirements for inspections and tests as applicable. Schedule and undertake inspections and tests.
.9 Delivery schedule for Products.
.10 Special requirements and procedures necessary to comply with regulatory requirements and authorities having jurisdiction.

1.6 CONSTRUCTION PROGRESS MEETINGS

.1 Schedule regular bi-weekly construction progress meetings for duration of the Work.

.2 Contractor, major Subcontractors currently involved in the Work, Consultant, and Owner are to be in attendance.

.3 Agenda will include the following:
.1 Review and approval of minutes from previous meeting.
.2 Work progress since previous meeting.
.3 Field observations, including any problems, difficulties, or concerns.
.4 Construction progress schedule.
.5 Submittals schedule.
.6 Proposed changes in the Work.
.7 Requests for information.
.8 Site safety issues.
.9 Maintenance of construction quality standards.
.10 Other business.

1.7 PROGRESS DRAW MEETINGS

.1 Schedule regular monthly progress draw meetings for duration of the Work.

.2 Contractor, Owner, and Consultant are to be in attendance.

.3 Submit to Consultant a copy of the application for payment not less than two Working Days before the scheduled progress draw meeting.

.4 Consultant may require changes to the application for payment prior to progress draw meeting occurring.

END OF SECTION

1 General

1.1 CONSTRUCTION SCHEDULE

.1 Format and Content:
- .1 Prepare construction schedule in the form of a critical path method (CPM) Gantt chart using appropriate scheduling software.
- .2 Incorporate a work breakdown structure identifying key activities, work packages, and major milestones, including long delivery Products, inspection and testing activities, preparation and review of mock-ups, Owner decisions for cash allowances, shutdown or closure activities, delivery of Owner-supplied Products, demonstration and training activities, and similar items, at a sufficient level of detail to effectively manage construction progress.
- .3 Indicate milestone dates for Ready-for-Takeover and Substantial Performance of the Work.

.2 Submission:
- .1 Submit initial schedule to Owner and Consultant within 10 Working Days after Contract award.
- .2 Submit schedule as portable document format (.pdf) files.
- .3 Consultant will review format and content of initial schedule and request necessary changes, if any, within 10 Working Days after receipt.
- .4 If changes are required, resubmit finalized initial schedule within 5 Working Days after return of reviewed copy.
- .5 Submit updated progress schedule monthly to Owner and Consultant, indicating actual and projected start and finish dates with report date line and progress, activity relationships, critical path, float, and baseline comparison to current progress.

1.2 SUBMITTALS SCHEDULE

.1 Format and Content:
- .1 Prepare submittals schedule identifying required Shop Drawings, Product data, and sample submissions, including samples required for testing, and including those for Owner-supplied Products.
- .2 Prepare schedule in electronic format.
- .3 Incorporate separate line items for each required submittal, organized by Specification sections numbers and titles, and further broken down by individual Products and systems required.
- .4 For each required submittal, show planned earliest date for initial submission, earliest date for return of reviewed submittal by Consultant, and latest date for return of reviewed submittal without causing delay.
- .5 Allow time in schedule for resubmission of submittals, should resubmission be necessary.

.2 Submission:
- .1 Submit initial schedule to Owner and Consultant within 15 Working Days after Contract award.
- .2 Submit schedule as portable document format (.pdf) files.
- .3 Consultant will review format and content of initial schedule and request necessary changes, if any, within 5 Working Days after receipt.
- .4 If changes are required, resubmit finalized initial schedule within 5 Working Days after return of reviewed copy.
- .5 Submit updated submittals schedule monthly to Owner and Consultant.

1.3 SCHEDULE MANAGEMENT

.1 A schedule submitted as specified and accepted by Consultant will become the baseline schedule and shall be used as the baseline for updates.

.2 At regular progress meeting, review and discuss current construction progress and submittals schedules with Consultant and Owner, including activities that are behind schedule and planned measures to regain schedule slippage in key areas on or near the critical path.

.3 Activities considered behind schedule are those with start or completion dates later than the dates shown on the baseline schedule.

1.4 CONSTRUCTION DAILY LOG

.1 Maintain a construction log, recording on a daily basis the following information:
- .1 Number of workers actively working at Place of the Work, organized on a Subcontract basis.
- .2 Subcontractors present at Place of the Work.
- .3 Identify the parts of the Work being worked on.
- .4 Identify the working hours being kept at Place of the Work.
- .5 Activities with intermittent progress.
- .6 Time lost with an explanation as to cause.
- .7 Difficulties encountered, such as construction activity delays, labour inefficiencies, labour shortages, etc.
- .8 Product deliveries.
- .9 Equipment mobilization and de-mobilization.
- .10 Demolition conditions.
- .11 Start and finish dates for each part of the Work.

1.5 RECORDING ACTUAL SITE CONDITIONS ON AS-BUILT DRAWINGS

.1 Keep one hard-copy set of Drawings at Place of the Work for the purpose of creating as-built drawings. Record information and maintain as-built drawings in clean, dry, and legible condition.

.2 Clearly label each drawing as "AS-BUILT DRAWING". Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.3 Record actual construction including:
- .1 Measured depths of elements of foundation in relation to finish first floor datum.
- .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
- .3 Measured locations of pipes, ducts, conduits, outlets, fixtures, access panels, and appurtenances, referenced to visible and accessible features of construction.
- .4 Field changes of dimension and detail.
- .5 Changes made by Change Orders and Supplemental Instructions.
- .6 References to Shop Drawings, where Shop Drawings show more detail.

.4 Do not use as-built drawings for construction purposes.

1.6 PROGRESS PHOTOGRAPHS

.1 Arrange for periodic digital photography to document and record the progress of the Work.

.2 Photographs will be properly exposed and in focus, with unobstructed views.

.3 Identify each photograph by Project name and date taken.

.4 Format photographs as .jpg, .bmp, or .tif format files in high definition resolution.

.5 Submit progress photographs monthly as part of the current application for payment.

.6 Submit additional photographs showing special conditions when requested by Consultant.

.7 Do not use progress photographs, or any other Project photographs for promotional purposes without Owner's written consent.

END OF SECTION

1 General

1.1 ADMINISTRATIVE

.1 Submit specified submittals to Consultant for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in the Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time or for Product substitutions or other deviations from Drawings and Specifications.

.2 Where required by authorities having jurisdiction, submit submittals to authorities having jurisdiction for review and approval.

.3 Do not proceed with Work affected by a submittal until review is complete.

.4 Present Shop Drawings, Product data and samples in SI (metric) units. Where items or information is not produced in SI (metric) units, converted values are acceptable.

.5 Review submittals, verifying field measurements where applicable, and affix Contractor's review stamp prior to submission to Consultant. Contractor's review stamp represents that necessary requirements have been determined and verified, and that the submittal has been checked and coordinated with requirements of the Work and Contract Documents.

.6 Verify field measurements and affected adjacent work is coordinated.

.7 Submittals not meeting specified requirements will be returned with comments.

.8 Reproduction of construction Drawings to serve as background for Shop Drawings is not permitted.

.9 Digital files are to be electronically created from original files. Scanned images will be rejected.

.10 Do not propose Substitutions or deviations from Contract Documents via Shop Drawing, Product data, and sample submittals.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 Indicate Products, methods of construction, and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the Work.

.2 Where Products attach or connect to other Products, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross-references to Drawings, Specifications, and other already reviewed Shop Drawings.

.3 Accompany submittals with a transmittal form containing the following information:
- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification of each submittal item and quantity.
- .5 Other pertinent data.

.4 Shop Drawing submittals will include:
- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.

.4 Contractor's stamp, date, and signature of Contractor's authorized representative responsible for Shop Drawing review, indicating that each Shop Drawing has been reviewed for compliance with Contract Documents and, where applicable, that field measurements have been verified.

.5 Details of appropriate portions of the 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 Relationships to other parts of the Work.

.5 Product data submittals for controlled Products must include safety data sheets (SDS).

.6 Submit electronic copy of Shop Drawings, as portable document format (.pdf) files, where specified in Product Specifications.

.7 Submit electronic copy of Product data sheets or brochures, as portable document format (.pdf) files, where specified in Product Specifications.

.8 Where a submittal includes information not applicable to the Work, clearly identify applicable information and strike out non-applicable information.

.9 Supplement standard information to include details applicable to Project.

.10 Allow 10 Working Days for Consultant's review of each submittal and incorporate submittals schedule specified in Section 01 32 00. Allow additional 5 Working Days where subconsultant or commissioning agent review is required.

.11 If upon Consultant's review no errors or omissions are discovered, or if only minor corrections are required as indicated, submittal will be returned and fabrication or installation of work may proceed.

.12 If upon Consultant's review significant errors or omissions are discovered, a copy noted as such will be returned for correction and resubmission. Do not commence fabrication or installation.

.13 Consultant's notations on submittals are intended to ensure compliance with Contract Documents and are not intended to constitute a change in the Work requiring change to Contract Price or Contract Time. If Contractor considers any Consultant's notation to be a change in the Work, promptly notify Consultant in writing before proceeding with the Work.

.14 Resubmit corrected submittals through same procedure indicated above, before any fabrication or installation of the Work proceeds. When resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.

1.3 ENGINEERED SUBMITTALS

.1 Submittals required to be sealed by professional engineer are to be prepared, sealed, signed and dated under direct control and supervision of a qualified professional engineer licensed to practice at Place of the Work.

.2 Upon written request from Consultant, submit proof of Submittal engineer's professional liability insurance with a minimum limit of liability of $5,000,000 per claim. Identify insurer, policy number and policy term on duly signed certificate of insurance.

.3 Design includes life safety, sizing of supports, anchors, framing, connections, spans and as additionally required to meet or exceed requirements of applicable codes, standards, regulations, authorities having jurisdiction, and design requirements of Contract Documents.

.4 Engineered Submittals are to include design calculations, complete with references to codes and standards used in such calculations, supporting the proposed design represented in the Submittal. Prepare calculations in a clear and comprehensive manner so that they can be properly reviewed.

.5 Submittal engineer shall undertake periodic field review, including review of associated mock-ups when applicable. Such reviews will include review during fabrication at the point of manufacture, and during installation at Place of the Work. Prepare and submit a field review report for each review undertaken.

.6 Conduct field reviews at intervals appropriate to the progress of the parts of the Work relevant to the engineered Submittal. Report on progress and quality of the affected parts of the Work. Determine if installation is in general conformity with Contract Documents and in strict conformance with the accepted engineered Submittal.

.7 Upon completion of the parts of the Work affected by an engineered submittal, submittal engineer shall prepare and submit a Letter of General Conformity to Contractor, Consultant and authorities having jurisdiction. Certify that the parts of the Work affected by the engineered Submittal have been designed, fabricated and installed in accordance with Contract Documents and applicable regulatory requirements.

.8 Include costs of Submittal engineer's services in Contract Price.

1.4 SAMPLES

.1 Submit samples for Consultant's review as requested in Contract Documents.

.2 Label samples as to origin, Project name, and intended use.

.3 Deliver samples prepaid to Consultant's business address.

.4 Notify Consultant in writing of any deviations in samples from requirements of Contract Documents.

.5 Where a required colour, pattern, or texture has not been specified, submit full range of available Products meeting other specified requirements.

.6 Consultant selection from samples is not intended to change Contract Price or Contract Time. If a selection would affect Contract Price or Contract Time, notify Consultant in writing prior to proceeding with the Work.

.7 Resubmit samples as required by Consultant to comply with Contract Documents.

.8 Reviewed and accepted samples will establish the standard against which installed Work will be reviewed.

1.5 INTERFERENCE DRAWINGS

.1 Prepare interference drawings, identifying and resolving potential conflicts among various parts of the Work, including sprinkler systems, HVAC ductwork, plumbing and drainage lines, lighting, and electrical systems.

.2 Submit interference drawings electronically as portable document format (.pdf) files to Consultant prior to commencement of the Work.

.3 Coordinate and review interference drawings with affected Subcontractors prior to commencement of their portions of the Work.

1.6 CERTIFICATES AND CERTIFICATION SUBMITTALS

.1 Submit written statements, as requested in Contract Documents, certifying installed Products meet specified criteria.

.2 Include signature of person responsible for preparing certification.

1.7 TEST AND EVALUATION REPORTS

.1 Submit manufacturers' test and evaluation reports electronically as portable document format (.pdf) files for requirements requested in Product Specifications, and as Consultant may reasonably request.

.2 Ensure results are expressed in SI (metric) units of measurement. Test and evaluation reports recording results only in imperial units of measurement may be rejected.

.3 Clearly indicate compliance with specified performance criteria, tested in accordance with specified test methods, and conducted by an independent testing agency.

.4 Test results achieved through the use of alternative test methods will be rejected.

END OF SECTION

1 General

1.1 PROPER CONDUCT OF WORKERS

.1 Ensure workers conduct themselves in a proper and civilized manner at all times.

.2 Workers using improper language, cat calls, lewd comments, or improper behaviour will be required to leave Place of the Work, and will be replaced by Contractor.

.3 Workers are required to be properly attired at all times.

.4 Workers wearing clothing exhibiting hateful or offensive images or language will be required to replace or cover such clothing. Workers refusing to do so will be required to leave Place of the Work, and will be replaced by Contractor.

.5 Smoking or vaping of any substance is not permitted at Place of the Work.

.6 Consumption of alcohol and use of controlled substances is not permitted at Place of the Work.

1.2 SPECIAL PROCEDURES FOR INFECTION CONTROL

.1 Conform to latest edition of CCA COVID-19 - Standardized Protocols for All Canadian Construction Sites.

1.3 LABOUR CONDITIONS

.1 Ensure rates of wages, working hours, and working conditions at Place of the Work are in accordance with regulatory requirements and authorities having jurisdiction.

1.4 EMERGENCY CONTACT INFORMATION

.1 Submit emergency contact information for site superintendent to authority having jurisdiction; for their use 24 hours a day, 7 days a week, 52 weeks a year.

.2 Immediately notify authority having jurisdiction when emergency contact information changes.

1.5 FIRST AID PERSONNEL

.1 A minimum of one person trained in basic first aid must be present at Place of the Work at all times during performance of the Work.

.2 This person may perform other duties, but must be immediately available to render first aid when needed.

1.6 SPECIAL PROCEDURES FOR CONTRACTORS WORKING IN AN EXISTING FACILITY

.1 Comply with Owner's procedures and requirements for construction personnel working in existing facilities.

.2 Conform to latest edition of "Guidelines For Maintaining Fire Safety During Construction in Existing Buildings", as issued by Office of the Fire Marshal.

.3 Coordinate requirements with local fire department. Discuss fire safety planning issues and alternative measures.

1.7 SPILL RESPONSE

.1 Prepare and initiate a spill response procedure in accordance with appropriate authorities having jurisdiction before commencing the Work.

.2 Supply and maintain spill kit at Place of the Work.

1.8 SPECIAL PROCEDURES FOR WORKING IN CONFINED SPACES

.1 Perform work in confined spaces in accordance with applicable regulatory requirements.

.2 Work in confined spaces must be supervised and performed by licenced confined space and hazardous materials personnel.

1.9 SPECIAL PROCEDURES FOR WORKING WITH DESIGNATED SUBSTANCES

.1 Prepare and initiate a health and safety plan in accordance with authorities having jurisdiction prior to commencing construction operations involving excavating, removing, transporting, handling or disposing of potentially contaminated materials.

.2 Keep an up-to-date copy of health and safety plan at Place of the Work.

.3 Adhere to health and safety plan for duration of removal and disposal of contaminated material from Place of the Work.

.4 Provide and maintain a safe working environment for on-site personnel and minimize the impact of construction activities on general public and surrounding environment.

.5 Verify workers and visitors to Place of the Work have and are adequately trained in the use of appropriate personal protective equipment.

.6 Should any unforeseen, or site-peculiar safety related factor, hazard, or condition become evident during performance of the Work, immediately notify authority having jurisdiction and Consultant, and take prudent temporary action to establish and maintain safe working conditions until suitable permanent action can be implemented. Safeguard workers, the public and the surrounding area from contamination.

.7 Perform routine air monitoring at Place of the Work, testing for organic vapours, explosive conditions and oxygen deficient conditions. Evacuate affected areas immediately and implement corrective measures if unsatisfactory conditions are discovered.

.8 Guidelines by Authorities Having Jurisdiction: Conform to the following guideline documents issued by Province of Ontario:
.1 Silica on Construction Projects.
.2 Lead on Construction Projects.

.9 Mercury Precautions: Ensure workers handling, removing and disposing of mercury-containing materials have been properly trained by a competent and qualified person.

.10 In the event of injury to on-site personnel, contact designated hospital and describe injury prior to or during transport of injured personnel. Transport injured personnel to designated medical facility along a predefined route.

.11 Take appropriate measures to minimize contact of construction vehicles and Construction Equipment with potentially contaminated materials. Decontaminate construction vehicles, Construction Equipment and workers that have come into contact with contaminated materials prior to their leaving Place of the Work.

END OF SECTION

1 General

1.1 REFERENCE STANDARDS

.1 Reference Standards means consensus standards, trade association standards, guides, and other publications expressly referenced in Contract Documents.

.2 Where an edition or version date is not specified, referenced standards shall be deemed to be the latest edition or revision issued by publisher at time of bid closing. However, if a particular edition or revision date of a specified standard is referenced in an applicable code or other regulatory requirement, the regulatory referenced edition or version shall apply.

.3 Reference standards establish minimum standards. If Contract Documents call for requirements that differ from a referenced standard, the more stringent requirements shall govern.

.4 If compliance with two or more reference standards is specified, and the standards establish different or conflicting requirements, comply with the most stringent requirement. Refer uncertainties to Consultant for clarification.

.5 Specifications refer to standards writing, testing, and certification organizations by their acronyms or initialisms, as follows:

.1	AA	The Aluminum Association;
.2	AABC	Associated Air Balance Council;
.3	AAMA	American Architectural Manufacturers Association;
.4	ACI	American Concrete Institute;
.5	AISC	American Iron and Steel Construction;
.6	AMCA	Air Movement and Air Control Association;
.7	ANSI	American National Standards Institute;
.8	ARI	Air Conditioning and Refrigeration Institute;
.9	ASCC	American Society of Concrete Contractors;
.10	ASME	American Society of Mechanical Engineers;
.11	ASTM	American Society for Testing and Materials;
.12	ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc.;
.13	AWMAC	Architectural Woodwork Manufacturers' Association of Canada;
.14	AWPA	American Wire Producers Association;
.15	BHMA	Builders Hardware Manufacturers Association;
.16	BIA	Brick Industry Association;
.17	CaGBC	Canadian Green Building Council;
.18	CCMPA	Canadian Concrete Masonry Producers Association;
.19	CFCA	Concrete Floor Contractors Association of Canada;
.20	CGA	Canadian Gas Association;
.21	CGSB	Canadian General Standards Board;
.22	CHPVA	Canadian Hardwood Plywood and Veneer Association;
.23	CISC	Canadian Institute of Steel Construction;
.24	CISCA	Ceiling & Interior Systems Construction Association;
.25	CKCA	Canadian Kitchen Cabinet Association;
.26	CLFMI	Chain Link Fence Manufacturers' Institute;
.27	CPC	Concrete Polishing Council;
.28	CPCI	Canadian Precast Concrete Institute;
.29	CPCQA	Canadian Precast Concrete Quality Assurance;
.30	CPSC	Consumer Product Safety Commission;
.31	CRCA	Canadian Roofing Contractors' Association;
.32	CRI	Carpet and Rug Institute;
.33	CSA	Canadian Standards Association;
.34	CSC	Construction Specifications Canada;
.35	CSDMA	Canadian Steel Door Manufacturers' Association;

.36 CSSBI Canadian Sheet Steel Building Institute;
.37 CUFCA Canadian Urethane Foam Contractors Association Inc.;
.38 CWB Canadian Welding Bureau;
.39 CWC Canadian Wood Council;
.40 CWTA Canadian Wood Truss Association;
.41 DASMA Door & Access Systems Manufacturers' Association, International;
.42 DHI Door and Hardware Institute;
.43 DIN Deutsches Institut für Normung E.V.;
.44 GA Gypsum Association;
.45 GANA Glass Association of North America;
.46 HPVA Hardwood Plywood and Veneer Association;
.47 ICEA Insulated Cable Engineers Association;
.48 ICRI International Concrete Repair Institute;
.49 IEEE Institute of Electrical and Electronics Engineers;
.50 IGMA Insulating Glass Manufacturers Association;
.51 ISCA Interior Systems Contractors Association of Ontario;
.52 IWFA International Window Film Association;
.53 LEED Leadership in Energy and Environmental Design;
.54 MPI Master Painters' Institute;
.55 MSS Manufacturers Standardization Society of the Valve and Fittings Industry;
.56 NAAMM National Association of Architectural Metal Manufacturers;
.57 NCMA National Concrete Masonry Association;
.58 NEMA National Electrical Manufacturers Association;
.59 NFPA National Fire Protection Association;
.60 NFRC National Fenestration Rating Council Incorporated;
.61 NHLA National Hardwood Lumber Association;
.62 NLGA National Lumber Grades Authority;
.63 OIRCA Ontario Industrial Roofing Contractors' Association;
.64 OMCA Ontario Masonry Contractors' Association;
.65 OPSD Ontario Provincial Standard Drawings;
.66 OPSS Ontario Provincial Standard Specifications;
.67 OWTFA Ontario Wood Truss Fabricators Association;
.68 PCI Precast Concrete Institute;
.69 PEI Porcelain Enamel Institute;
.70 RSIC Reinforcing Steel Institute of Canada;
.71 SEFA Scientific Equipment & Furniture Association;
.72 SMACNA Sheet Metal and Air Conditioning Contractors' National Association;
.73 SSPC The Society for Protective Coatings;
.74 SWI Sealant and Waterproofer's Institute;
.75 TPIC Truss Plate Institute of Canada;
.76 TSSA Technical Standards and Safety Authority;
.77 TTMAC Terrazzo, Tile and Marble Association of Canada;
.78 ULC Underwriters' Laboratories of Canada;
.79 ULI Underwriters' Laboratories Incorporated;
.80 WDMA Window and Door Manufacturers' Association; and
.81 WHI Warnock-Hersey International.

1.2 QUALITY ASSURANCE

.1 Quality of work shall be the best quality, executed by workers experienced and skilled in the respective duties for which they are employed.

.2 Immediately notify Consultant if required work is such as to make it impractical to produce required results.

.3 Decisions as to the quality or fitness of work in cases of dispute rest solely with Consultant, whose decision is final.

1.3 INDEPENDENT INSPECTION AND TESTING AGENCIES

.1 Except as otherwise specified, Owner will appoint independent inspection and testing agencies to be retained and paid by Contractor to inspect, test, or perform other quality control reviews of parts of the Work.

.2 Retain and pay for inspection and testing that is for Contractor's own quality control, or is required by regulatory agencies.

.3 Contract Price includes a stipulated price cash allowance for payment of independent inspection and testing services to be retained and paid for by Contractor. Cash allowance excludes any inspection and testing that is for Contractor's own quality control or is required by regulatory requirements. Refer to Section 01 21 00.

.4 Employment of inspection and testing agencies by Contractor or Owner does not relieve Contractor from responsibility to perform the Work in accordance with Contract Documents.

.5 Allow and arrange for inspection and testing agencies to have access to the Work, including access to off-site manufacturing and fabrication plants.

.6 For inspection and testing required by Contract Documents or by authorities having jurisdiction, notify Consultant and inspection and testing agencies in a timely manner in advance of required inspection and testing.

.7 Submit test samples required for testing in accordance with submittals schedule specified in Section 01 32 00.

.8 Supply labour, Construction Equipment and temporary facilities needed to obtain and handle test samples at Place of the Work.

.9 If defects are revealed during inspection and testing, the appointed agency will request additional inspection and testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no additional cost to Owner. Pay costs for retesting and reinspection.

1.4 INSPECTION AND TESTING AGENCY REPORTS

.1 For inspection and testing required by Contract Documents or by regulatory requirements, and performed by Contractor retained inspection and testing agencies, promptly submit copies of reports to Consultant, Owner and authority having jurisdiction. Submit reports electronically as portable document format (.pdf) files.

.2 For inspection and testing performed by Owner-retained inspection and testing agencies, copies of inspection and testing agency reports will be promptly forwarded to Contractor.

.3 In all cases, promptly forward inspection and testing agency reports to affected Subcontractors.

1.5 MANUFACTURER FIELD REVIEW

.1 When required by Contract Documents, arrange for a qualified manufacturer's representative to review relevant parts of the Work and verify those portions of the Work are being executed in accordance with manufacturer's written recommendations and installation guidelines.

.2 Manufacturer field review services are intended to ensure specified Products are being used and are being installed on substrates that have been prepared in accordance with manufacturer's written recommendations.

.3 Unless specified otherwise, manufacturer's representative will undertake a minimum of one field review, with additional reviews being conducted as deemed necessary by manufacturer.

.4 Within two Working Days of a field review, manufacturer will submit a field review report recording manufacturer representative's observations and recommendations.

.5 Distribute copies of manufacturer's field review reports to affected Subcontractors, Consultant and authorities having jurisdiction.

1.6 MOCK-UPS

.1 Prepare mock-ups of Work as specified in Contract Documents with reasonable promptness and in an orderly sequence, so as not to cause delay in the Work.

.2 If a mock-up location is not indicated in Drawings or Specifications, locate where directed by Consultant.

.3 Include all necessary Products and labour required to fully construct mock-ups.

.4 Modify mock-up as required until Consultant acceptance is obtained.

.5 Accepted mock-ups establish an acceptable standard for the Work.

.6 Protect mock-ups from damage until the Work they represent is complete.

.7 Unless specified otherwise, accepted mock-ups forming part of the Work may remain as part of the Work.

.8 Remove mock-ups only when the Work they represent is complete or when otherwise directed by Consultant.

1.7 MILL TESTS

.1 Submit mill tests certificates as may be requested.

1.8 EQUIPMENT AND SYSTEMS

.1 Submit adjustment and balancing reports for facility services and building equipment systems.

.2 Refer to facility services Specifications for definitive requirements.

END OF SECTION

1 General

1.1 EXISTING FACILITY WATER, HEATING, VENTILATION, POWER, AND LIGHTING

.1 Existing facility water, heating, ventilation, power, and lighting may be relied upon and used during construction, at no cost to Contractor.

END OF SECTION

1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Provide temporary construction facilities as necessary for performance of the Work and in compliance with applicable regulatory requirements.

.2 Maintain temporary construction facilities in good condition for duration of the Work.

.3 Remove temporary construction facilities from Place of the Work when no longer required.

1.2 CONSTRUCTION PARKING

.1 Limited parking will be permitted at Place of the Work at locations indicated on Drawings, as long as it does not disrupt continuing operations of existing facility.

1.3 VEHICULAR ACCESS

.1 Provide and maintain adequate access to Place of the Work, ensuring continuous access by emergency vehicles.

.2 Existing private roadways at Place of the Work may be used for access to Place of the Work. Contractor assumes responsibility for any damage caused by construction traffic, and agrees to prevent or promptly clean up mud tracking or material spillage.

.3 Clean municipal roadways located immediately adjacent to Place of the Work, regardless of cause, as follows:
.1 At least once per week on Friday afternoons, just before end of Working Day,
.2 After Construction Equipment or construction vehicles have left Place of the Work, resulting in soil or debris being deposited on roadway surfaces,
.3 As directed by authorities having jurisdiction, and
.4 As directed by Consultant.

.4 Municipal Road Closures: Conform to requirements of authorities having jurisdiction.

1.4 FIELD OFFICES

.1 Provide a temperature controlled and ventilated Contractor's field office, with suitable lighting, sufficiently sized and furnished to accommodate Project meetings and Contract Document layout.

.2 Consultant's Field Office: Provide minimum 10 square metres of temporary office space for Consultant, either separately or within Contractor's field office.

.3 Provide field office with at least one operable window and a lockable door.

.4 Provide field office with temperature control, ventilation, and suitable power and lighting.

.5 Equip field office with table and chairs to accommodate at least 8 meeting attendees, one 3-drawer filing cabinet, and one Drawing rack.

.6 Provide appropriate emergency and first aid equipment as required by authorities having jurisdiction. Mount equipment in a prominent and easily accessible location, complete with easily identifiable labels.

.7 Provide public access wi-fi internet service for use by Contractor and Consultant.

.8 Provide a printer/photocopier/scanner for use by Contractor and Consultant.

.9 Clean field office weekly.

.10 Due to space restrictions at Place of the Work, Subcontractors may not be able to have their own offices at Place of the Work.

1.5 STORAGE FACILITIES

.1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of Products and Construction Equipment.

.2 Do not store Products or Construction Equipment in field office or in existing facility.

.3 Whereas the Project is a renovation to an existing facility, space for storage of Products and equipment at Place of the Work will be limited, and may require Contractor to make alternate arrangements for storage of Products and equipment off-site. Pay additional storage, delivery, and transportation costs.

1.6 SANITARY FACILITIES

.1 Provide a sufficient quantity of temporary sanitary facilities, separate for male and female workers, in accordance with authorities having jurisdiction.

.2 Keep sanitary facilities clean and fully stocked with necessary supplies.

.3 Permanent sanitary facilities may not be used during construction.

.4 Except where connected to municipal sewer system, periodically remove wastes from Place of the Work.

1.7 FIRE PROTECTION

.1 Provide and maintain temporary fire protection systems and equipment during construction.

1.8 HOISTS AND CRANES

.1 Provide, operate, and maintain hoists and cranes required for moving of construction personnel, Products, and Construction Equipment.

.2 Make financial arrangements with Subcontractors for use thereof.

.3 Hoists and cranes shall be operated by a qualified operator.

1.9 ELEVATORS

.1 New permanent elevator may be used by construction personnel and for transporting Products, at Contractor's option. If used during construction:
  .1 Provide protective coverings for finish surfaces of cars and entrances.
  .2 Just prior to Ready-for-Takeover, perform required maintenance to ensure elevators are in as near as new condition as possible.
  .3 Ensure elevator manufacturer's warranty does not commence until the date of Ready-for-Takeover or, if manufacturer's warranty does commence earlier when elevators are put into use, arrange for necessary extension of manufacturer's warranty or equivalent coverage under Contractor's warranty.

1.10 PROJECT IDENTIFICATION SIGNS

.1 Provide one Project identification sign complete with graphics and text.

.2 Project identification sign shall be 2 440 x 2 440 mm in size, of solid and weatherproof construction, with graphics produced by a professional sign company.

.3 Indicate on Project identification sign the following information:
- .1 Name of Project,
- .2 Name and logo of Owner,
- .3 Name and logo of Consultant, and
- .4 Name and logo of Contractor.

.4 Relevant graphics and text will be supplied to Contractor by Owner and Consultant promptly after Contract award.

.5 Submit Shop Drawings for Project identification sign graphics and text.

.6 Erect Project identification sign within three weeks of Contract award, in location directed by Consultant.

.7 Erect Project identification signs plumb and level, with bottom of sign set minimum 1 220 mm above finished grade.

.8 No other signs or advertisements, other than safety, warning, or directional signs, are permitted without Consultant's prior written approval.

.9 Maintain Project identification sign in clean condition.

.10 Remove and dispose of Project identification sign when directed by Consultant.

END OF SECTION

1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Provide temporary barriers and enclosures necessary to protect the public and building occupants, and to secure Place of the Work during performance of the Work.

.2 Comply with applicable regulatory requirements.

.3 Maintain temporary barriers and enclosures in good condition for duration of the Work.

.4 Remove temporary barriers and enclosures from Place of the Work when no longer required.

1.2 FENCING

.1 Erect temporary security and safety site fencing of type and height determined by Contractor, subject to applicable regulatory requirements.

.2 Provide lockable access gates as required to facilitate construction access.

1.3 WEATHER ENCLOSURES

.1 Provide weather tight enclosures to unfinished door and window openings, top of shafts, and other openings in floors and roofs.

.2 Provide weather enclosures to protect floor areas where walls are not finished and to enclose work areas that require temporary heating.

.3 Design weather enclosures to withstand wind pressure and snow loading requirements.

1.4 DUST TIGHT SCREENS AND PARTITIONS

.1 Provide dust tight insulated wood stud and plywood partitions to localize interior building areas from dust and noise generating activities.

.2 Erect, maintain, and relocate screens and partitions as required to facilitate construction operations and Owner's operational requirements.

1.5 FIRE ROUTES

.1 Maintain fire access routes, including overhead clearances, for use by emergency response vehicles.

1.6 SECURITY AT PLACE OF THE WORK

.1 Become familiar with Place of the Work and surrounding neighbourhood.

.2 Provide adequate security measures to prevent vandalism, theft, arson, and trespassing by unauthorized persons at Place of the Work.

.3 Maintain security measures for 24 hours a day, 7 days a week, 52 weeks of the year, including times when construction may be shut down due to strikes or lockouts.

.4 Remove security measures upon Ready-for-Takeover.

1.7 PROTECTION OF BUILDING FINISHES

.1 Provide necessary temporary barriers and enclosures to protect existing finished surfaces, and completed or partially-completed finished surfaces from damage during performance of the Work.

END OF SECTION

1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Provide temporary controls necessary for performance of the Work, and in compliance with applicable regulatory requirements.

.2 Maintain temporary controls in good condition for duration of the Work.

.3 Remove temporary controls and Construction Equipment used to provide temporary controls from Place of the Work when no longer required.

1.2 PLANT PROTECTION

.1 Protect trees and other plant material designated to remain at Place of the Work and on adjacent properties where indicated on Drawings.

.2 Protect trees and shrubs susceptible to damage during construction to OPSS.MUNI 801.

.3 For trees designated to remain, protect roots inside dripline from disturbance or damage during excavation and grading. Avoid traffic, dumping, and storage of materials over root zones.

.4 Minimize stripping of topsoil near trees and other plant material designated to remain at Place of the Work.

.5 Provide lockable access gates as required to facilitate construction access.

1.3 DUST AND PARTICULATE CONTROL

.1 Implement and maintain dust and particulate control measures in accordance with applicable regulatory requirements.

.2 Execute Work by methods that minimize dust from construction operations and spreading of dust at Place of the Work or to adjacent properties.

.3 Provide temporary dust tight enclosures to prevent extraneous materials resulting from sandblasting or similar operations from contaminating air beyond immediate work area. Refer to Section 01 56 00.

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

.5 Use appropriate covers on trucks hauling fine, dusty, or loose materials.

1.4 DEWATERING

.1 Provide temporary drainage and pumping as necessary to dewater excavations, trenches, foundations, and other parts of the Work. Maintain such areas free of water arising from groundwater or surface runoff, as required to keep them stable, dry, and protected from damage due to flooding.

.2 Maintain standby equipment necessary to ensure continuous operation of dewatering system.

.3 Do not pump water containing suspended materials or other harmful substances into waterways, sewers, or surface draining systems. Treat or dispose of such water in accordance with applicable regulatory requirements.

1.5 DRAINAGE AT PLACE OF THE WORK

.1 Maintain grades to ensure proper drainage at Place of the Work.

.2 Prevent surface water runoff from leaving Place of the Work.

.3 Prevent precipitation from infiltrating or from directly running off stockpiled waste materials. Cover stockpiled waste materials with an impermeable liner during periods of work stoppage, including at end of each Working Day.

.4 Control surface drainage from cuts and fills, from borrow and waste disposal areas, from stockpiles, staging areas, and other work areas as required to prevent erosion and sedimentation.

.5 Control surface drainage by ensuring gutters are kept open and water is not directed across or over pavements or sidewalks, except through pipes or properly constructed troughs. Ensure runoff from unfinished areas is intercepted and diverted to suitable outlets.

.6 Periodically inspect and clean catch basins and storm lines at Place of the Work to ensure their continuous operation during performance of the Work and upon Ready-for-Takeover.

1.6 EROSION AND SEDIMENT CONTROL

.1 Minimize amount of bare soil exposed at one time. Stabilize disturbed soils as quickly as practical to minimize erosion. Remove accumulated sediment resulting from construction activity from adjoining surfaces, drainage systems, and watercourses. Make Good damage caused by soil erosion and sedimentation.

.2 Provide and maintain appropriate temporary measures such as silt fences, straw bales, ditches, geotextiles, drains, berms, terracing, riprap, temporary drainage piping, sedimentation basins, vegetative cover, dikes, and other measures that may be required to prevent erosion and migration of silt, mud, sediment, and other debris.

.3 Do not disturb existing embankments or embankment protection.

.4 Periodically inspect erosion and sediment control measures to detect evidence of erosion and sedimentation. Promptly take corrective measures when necessary.

.5 If soil and debris from Place of the Work accumulate in ditches or other low areas, remove accumulation and restore area to original condition.

1.7 POLLUTION CONTROL

.1 Take measures to prevent contamination of soil, water, and atmosphere through uncontrolled discharge of noxious or toxic substances and other pollutants, potentially causing environmental damage.

.2 Be prepared, by maintaining appropriate materials, equipment, and trained personnel at Place of the Work, to intercept, clean up, and dispose of spills or releases that may occur. Promptly report spills and releases that may occur to:
.1 Authority having jurisdiction.
.2 Person causing or having control of pollution source, if known.
.3 Owner and Consultant.

.3 Contact manufacturer of pollutant, if known and applicable, to obtain WHMIS safety data sheets (SDS), and ascertain hazards involved and precautions and measures required in cleanup or mitigating actions.

.4 Take immediate action to contain and mitigate harmful effects of the spill or release.

END OF SECTION

1 General

1.1 DEFINITIONS

.1 Not In Contract (NIC) means an item that requires coordination for its later installation and which is neither supplied nor installed as part of the Work.

.2 Owner-supplied Product means a Product that will be supplied by Owner to Contractor for installation as part of the Work. Refer to Section 01 11 00.

1.2 COMMON PRODUCT REQUIREMENTS

.1 Provide Products that are not damaged or defective, and suitable for purpose intended, subject to specified requirements. If requested by Consultant, furnish evidence as to type, source, and quality of Products Provided in the Work.

.2 Products referred to in the singular implies supply and installation of as many Products as necessary to complete the Work.

.3 Unless specified otherwise, maintain uniformity of manufacture for like items throughout.

.4 Unless specified otherwise, Consultant may select colours from a manufacturer's complete range of available colours, textures, and patterns, including those considered to be premium.

.5 Permanent manufacturer's markings, labels, trademarks, and nameplates on Products are not acceptable in prominent locations, except where required by regulatory requirements or for operating instructions, or when located in facility service rooms.

1.3 PRODUCT OPTIONS

.1 Subject to Section 01 25 00:
  .1 Wherever a Product or manufacturer is specified by a single proprietary name, Provide the named Product only.
  .2 Wherever more than one Product or manufacturer is specified by proprietary name for a single application, Provide any one of the named Products.

.2 Wherever a Product is specified by reference to a standard only, Provide any Product that meets or exceeds the specified standard. If requested by Consultant, submit information verifying that the proposed Product meets or exceeds the specified standard.

.3 Wherever a Product is specified by descriptive or performance requirements, and includes a named example preceded by the abbreviation "eg." (meaning "for example"), Provide the named Product or a similar Product manufactured by one of the named manufacturers that meets or exceeds the specified descriptive and performance characteristics. If requested by Consultant, submit information verifying that a proposed Product meets or exceeds the specified requirements.

.4 Wherever a Product is specified by descriptive or performance requirements only, Provide any Product that meets or exceeds specified requirements. If requested by Consultant, submit information verifying that proposed Product meets or exceeds specified requirements.

1.4 PRODUCT AVAILABILITY AND DELIVERY TIMES

.1 Promptly upon Contract award and periodically during construction, review and confirm Product availability and delivery times. Order Products in sufficient time to meet the construction progress schedule and the Contract Time.

.2 If a specified Product is no longer available, promptly notify Consultant. Consultant will take action as required.

.3 If delivery delays are foreseeable, for any reason, promptly notify Consultant.
.1 If a delivery delay is beyond Contractor's control, Consultant will give direction how to proceed.
.2 If a delivery delay is caused by something that was or is within Contractor's control, Contractor shall propose actions to maintain the construction progress schedule for Consultant's review and acceptance.

1.5 STORAGE, HANDLING, AND PROTECTION

.1 Store, handle, and protect Products during transportation to Place of the Work and before, during, and after installation in a manner to prevent damage, adulteration, deterioration, and soiling.

.2 Comply with manufacturer's instructions for storage, handling and protection.

.3 Store packaged or bundle Products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in the Work.

.4 Comply with the requirements of the workplace hazardous materials information system (WHMIS) regarding use, handling, storage, and disposal of hazardous materials, including requirements for labelling, and for submission of safety data sheets (SDS).

.5 Store Products subject to damage from weather in weatherproof enclosures.

.6 Store sheet Products on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store Products within occupied facility only when approved in writing by Owner.

.8 Move Products stored within the Work should they become a hindrance to the Work, or to the delivery of other Products.

.9 Remove flammable rubbish and packing materials from Place of the Work on a daily basis.

.10 Remove and replace damaged Products.

END OF SECTION

1 General

1.1 SURVEYOR QUALIFICATIONS

.1 Engage a registered land surveyor, licensed to practice at Place of the Work.

1.2 SUBMITTALS

.1 Submit name and address of registered land surveyor performing survey work.

.2 Submit to Consultant surveys of the Work prepared and issued by registered land surveyor upon completion of the following stages of the Work:
.1 Building footings and foundations.
.2 Rough grading.
.3 Utility services and pavements.
.4 Finish grading and landscaping.

.3 Submit a certificate, signed by registered land surveyor and acceptable in content and form to authority having jurisdiction, certifying inverts, elevations, grades, and locations of completed Work are in conformance with Contract Documents.

1.3 SURVEY REFERENCE POINTS

.1 Locate and confirm permanent reference points prior to commencing work at Place of the Work.

.2 Preserve and protect permanent reference points at Place of the Work during performance of the Work.

.3 Do not change or relocate reference points without prior written notice to Consultant.

.4 Report to Consultant when a reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations. Require registered land surveyor to replace reference points in accordance with original land survey.

1.4 SURVEY REQUIREMENTS

.1 Establish sufficient benchmarks at Place of the Work, referenced to established benchmarks by survey control points.

.2 Confirm that existing survey reference points are in accordance with Owner's survey and property limits.

.3 Establish initial lines and levels for Project layout.

.4 Maintain a complete, accurate log of control and survey work as it progresses. Record locations with horizontal and vertical data in Project as-built record drawings.

1.5 EXISTING UTILITIES AND STRUCTURES

.1 Before commencing excavation, drilling or other earthwork, establish or confirm location and extent of existing underground utilities and structures in work area.

.2 Promptly notify Consultant if underground utilities, structures, or their locations differ from those indicated in Contract Documents or in available project information. Consultant will give appropriate direction.

.3 Record locations of maintained, re-routed and abandoned utility lines.

1.6 VERIFICATION OF EXISTING CONDITIONS

.1 Where work specified in any Section is dependent on the work of another Section or Sections having been properly completed, verify that work is complete and in a condition suitable to receive subsequent work. Commencement of work of a Section that is dependent on the work of another Section or Sections having been properly completed means acceptance of those existing conditions.

.2 Verify ambient conditions are suitable before commencing the work of any Section and will remain suitable for as long as required for proper setting, curing, or drying of Products used.

.3 Ensure substrate surfaces are clean, dimensionally stable, cured and free of contaminants.

.4 Notify Consultant in writing of unacceptable conditions.

END OF SECTION

1 General

1.1 DEFINITIONS

.1 Make Good means to restore new or existing work after being damaged, cut, patched or rejected by Consultant. Use materials identical to original materials, with visible surfaces matching the appearance of original surfaces in all details, and with no apparent junctions between new and original surfaces.

1.2 COLD WEATHER REQUIREMENTS

.1 Perform the Work continually and avoid weather delays.

.2 Provide temporary heating and cold weather working measures during cold weather periods and winter months. Refer to Sections 01 51 00 and 01 56 00.

.3 Construction delays, whether the responsibility of Contractor or otherwise, which result in unanticipated or extended winter work will not be considered justification for claims for additional payments.

.4 Uniformly distribute heat to avoid hot or cool areas or excessive drying.

1.3 MANUFACTURER'S INSTRUCTIONS

.1 Install, erect, or apply Products in strict accordance with manufacturer's instructions.

.2 Specifications requiring the installation, erection or application of Products to conform to a consensus standard does not replace or supercede the requirement to also conform to manufacturer's instructions.

.3 Where a manufacturer's instructions and the requirements of a specified consensus standard are contradictory, manufacturer's instructions will govern.

.4 Notify Consultant in writing of conflicts between Contract Documents and manufacturer's instructions where, in Contractor's opinion, conformance with Contract Documents instead of manufacturer's instructions may be detrimental to the Work or may jeopardize manufacturer's warranty.

.5 Do not rely on labels or enclosures supplied with Products. Obtain written instructions directly from manufacturers.

.6 Allow manufacturer's representatives to have access to the Work at all times. Render assistance and facilities for such access so that manufacturer's representatives may properly perform their responsibilities. Refer to Section 01 40 00.

1.4 CONCEALMENT

.1 Conceal pipes, ducts, and wiring in floors, walls and ceilings in finished areas:
  .1 After review by Consultant and authority having jurisdiction.
  .2 Where locations differ from those shown on Drawings, after recording actual locations on as-built record drawings.

.2 Provide incidental furring or other enclosure as required.

.3 Notify Consultant in writing of interferences before installation.

1.5 FASTENINGS - GENERAL

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials.

.2 Provide fasteners to full required complement. Products with missing fasteners will be rejected by Consultant.

.3 Prevent electrolytic action and corrosion between dissimilar metals and materials by using suitable non-metallic strips, washers, sleeves, or other permanent separators to avoid direct contact.

.4 Use non-corrosive fasteners and anchors for securing exterior work.

.5 Space fasteners within individual load limit or shear capacity, and ensure fasteners provide positive permanent anchorage.

.6 Keep exposed fastenings to a minimum, space evenly and install neatly.

.7 Do not use fastenings or fastening methods that may cause spalling or cracking of material to which anchorage is made.

.8 Fasteners stressed in withdrawal will be rejected.

.9 Powder-actuated fasteners are to be a system suitable for the specific application, corrosion-resistant, and capable of sustaining without failure a load equal to 10 times the design load when tested to ASTM E1190.

.10 Do not use powder-actuated fasteners stressed in withdrawal for finished work.

.11 Do not use powder-actuated fasteners within 100 mm of concrete or masonry edges.

.12 Do not use powder-actuated fasteners in post-tensioned concrete.

1.6 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Bolts shall not project more than one diameter beyond nuts.

1.7 FIRE RATED ASSEMBLIES

.1 When penetrating fire rated wall, ceiling, or floor assemblies, completely seal voids with firestopping materials, smoke seals, or both, in full thickness of the construction element as required to maintain the integrity of the fire rated assembly.

1.8 TEMPLATES, BUILT-INS AND DIMENSIONS

.1 Take field measurements and confirm dimensions necessary for the proper execution of the Work.

.2 Assume responsibility for accuracy and completeness of dimensions.

.3 Provide forms, templates, anchors, inserts and accessories to be fixed to or inserted as part of the Work.

.4 Prepare and submit setting drawings, templates and other information necessary for the placement and installation of Products, holes, sleeves, inserts, anchors, accessories, fastenings, connections and access panels.

.5 Supply items in sufficient time, complete with templates and other necessary information, to accommodate installation without causing delay to the Work. Failure to do so will not result in an increase in Contract Price and Contract Time.

.6 Verify that the Work, as it proceeds, is executed in accordance with dimensions and positions indicated, which maintain levels and clearances to adjacent work, as set out in Contract Documents.

.7 Verify details and field measurements at Place of the Work prior to fabricating Products of special design to ensure fit.

1.9 INTERFERENCES

.1 Prior to commencement of the Work, coordinate placement of Products to ensure components are properly accommodated within designed spaces. Prepare and submit interference drawings as specified in Section 01 33 00.

.2 Be responsible for additional work and costs necessitated by failure to coordinate the parts of the Work.

.3 Provide adequate access and clearances around Products as required by authorities having jurisdiction, and as required for maintenance purposes by manufacturers.

.4 Notify Consultant if Contract Documents are in conflict with access and clearance requirements.

1.10 LOCATION OF FIXTURES, OUTLETS AND DEVICES

.1 Consider location of fixtures, outlets, and devices indicated on Drawings as approximate.

.2 Locate fixtures, outlets, and devices for minimum interference, maximum usable space, and as required to meet safety, access, maintenance, acoustic, and regulatory, including barrier free, requirements.

.3 Promptly notify Consultant in writing of conflicting installation requirements for fixtures, outlets and devices. If requested, indicate proposed locations and obtain approval for actual locations.

1.11 REMEDIAL WORK AND MAKING GOOD

.1 Notify Consultant of, and perform remedial work required to Make Good defective or unacceptable work.

.2 Ensure properly qualified workers perform remedial work.

.3 Coordinate adjacent affected work as required.

.4 Make Good defective and damaged parts of the Work.

.5 Make Good damage to property located adjacent to Place of the Work.

.6 Make Good damage to existing surfaces designated to remain as part of the Work.

.7 Make Good existing conditions as noted on Drawings.

.8 Prioritize the correction of defective work which, in the sole discretion of Owner, adversely affects Owner's day to day operations.

.9 Make Good damage to the Work resulting from lack of adequate heating protection.

.10 Make Good damage to utility services in accordance with authority having jurisdiction.

END OF SECTION

1 General

1.1 REQUESTS FOR CUTTING, PATCHING AND REMEDIAL WORK

.1 Submit written request in advance of cutting, coring, or alteration which affects or is likely to affect:
.1 Structural integrity of any element of the Work.
.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 Other Contractor.
.6 Warranty of Products affected.

.2 Include in request:
.1 Identification of Project.
.2 Location and description of affected work, including drawings or sketches as required.
.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 Other Contractors.
.7 Written permission of affected Other Contractors.
.8 Date and time work will be executed.

1.2 PRODUCTS

.1 Unless specified otherwise, when replacing existing or previously installed Products in the course of cutting and patching work, use replacement Products of same character and quality as those being replaced.

.2 If an existing or previously installed Product must be replaced with a different Product, submit request for substitution as specified in Section 01 25 00.

1.3 PREPARATION

.1 Inspect existing conditions as specified in Section 01 71 00.

.2 Provide supports to assure structural integrity of surroundings.

.3 Provide devices and methods to protect other portions of the Work from damage.

.4 Provide protection from elements for areas that may be exposed by uncovering work.

1.4 EXISTING UTILITIES

.1 Where the Work involves breaking into or connecting to existing facility services, give authority having jurisdiction, Owner, and Consultant 48 hours notice for necessary interruption of facility services.

.2 Maintain excavations free of water.

.3 Keep duration of interruptions to a minimum.

.4 Carry out interruptions after regular operating hours of existing facility, preferably on weekends, unless Owner's prior written approval is obtained.

.5 Protect and maintain existing active services.

.6 Record locations of services, including depth, on as-built drawings.

.7 Construct or erect temporary barriers as specified in Section 01 56 00, as required to protect pedestrian and vehicular traffic.

1.5 CUTTING, PATCHING AND REMEDIAL WORK

.1 Coordinate and perform the Work to ensure cutting and patching work is kept to a minimum.

.2 Perform cutting, fitting, patching, and remedial work including excavation and fill, to make the affected parts of the Work come together properly and complete the Work.

.3 Provide openings in non-structural elements of the Work for penetrations of mechanical and electrical work.

.4 Perform cutting by methods to avoid damage to other work.

.5 Provide proper surfaces to receive patching, remedial work, and finishing.

.6 Perform cutting, patching, and remedial work using competent and qualified specialists familiar with the Products affected, in a manner that neither damages nor endangers the Work.

.7 Do not use pneumatic or impact tools without Consultant's prior written approval.

.8 Ensure cutting, patching, and remedial work does not jeopardize manufacturers' warranties.

.9 Refinish surfaces to match adjacent finishes. For continuous surfaces refinish to nearest intersection. For an assembly, refinish entire unit.

.10 Fit work to pipes, sleeves, ducts, conduit and other penetrations through surfaces with suitable allowance for deflection, expansion, contraction, acoustic isolation and firestopping.

.11 Maintain fire ratings of fire rated assemblies where cutting, patching or remedial work is performed. Completely seal voids or penetrations of assembly with firestopping and smoke seal materials to full depth or with suitably rated devices.

END OF SECTION

1 General

1.1 REGULATORY REQUIREMENTS

.1 Comply with applicable regulatory requirements when disposing of waste materials.

.2 Obtain permits from authorities having jurisdiction and pay disposal fees where required for disposal of waste materials and recyclables.

1.2 GENERAL CLEANING REQUIREMENTS

.1 Provide adequate ventilation during use of volatile or noxious substances. Do not rely on building ventilation systems for this purpose.

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

.3 Prevent cross-contamination during cleaning process.

.4 Notify Consultant of the need for cleaning caused by Owner or Other Contractors.

.5 Assign cleaning duties to special dedicated crew with own foreman and of sufficient size and skill to prevent accumulation of waste, debris, and dirt at Place of the Work.

1.3 PROGRESSIVE CLEANING AND WASTE MANAGEMENT

.1 Maintain the Work in tidy and safe condition, free from accumulation of waste materials and construction debris.

.2 Provide appropriate, clearly marked, containers for collection of waste materials and recyclables. Locate containers where they will not hinder the progress of the Work and Owner's continuing operations.

.3 Owner's existing waste containers at Place of the Work may not be used during construction.

.4 Owner's custodial equipment and supplies may not be used during construction.

.5 Remove waste materials and recyclables from work areas, separate, and deposit in designated containers at end of each Working Day. Collect packaging materials for recycling or reuse.

.6 Remove waste materials and recyclables from Place of the Work at regular intervals.

.7 Clean interior building areas prior to start of finish work and maintain free of dust and other contaminants during finishing operations.

.8 Schedule cleaning operations so that resulting dust, debris, and other contaminants will not fall on wet, newly finished surfaces, nor contaminate building systems.

1.4 FINAL CLEANING

.1 Before final cleaning, arrange a meeting at Place of the Work to determine the acceptable standard of cleaning. Ensure Owner, Consultant, Contractor, and cleaning Subcontractor are in attendance.

.2 Remove from Place of the Work surplus Products, waste materials, recyclables, Temporary Work, and Construction Equipment not required to perform any remaining work.

.3 Provide professional cleaning by a recognized, established cleaning company.

.4 Lock or otherwise restrict access to each room or area after completing final cleaning in that area.

.5 Re-clean as necessary areas that have been accessed by Contractor's workers prior to Ready-for-Takeover.

.6 Remove stains, spots, marks and dirt from finished surfaces, mechanical and electrical fixtures, furniture, fitments, walls, and floors.

.7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and all other finished surfaces, including mechanical and electrical fixtures. Replace broken, scratched, or otherwise damaged glass.

.8 Remove dust from lighting reflectors, lenses, lamps, bulbs, and other lighting surfaces.

.9 Vacuum clean and dust exposed wall, floor, and ceiling surfaces, above suspended ceiling tiles, and behind grilles, louvres, and screens.

.10 Clean mechanical, electrical, and other equipment. Replace filters for mechanical equipment if equipment has been used during construction.

.11 Remove waste materials and debris from crawlspaces and other accessible concealed spaces.

.12 Remove stains, spots, marks, and dirt from exterior facades.

.13 Clean exterior and interior window glass and frames.

.14 Clean and sweep roofs, and clear roof drains.

.15 Wax, seal, shampoo, or prepare floor finishes, as recommended by manufacturer.

.16 Power wash exterior paved surfaces.

.17 Use leaf blower to clean landscaped surfaces.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Dispose of waste materials and recyclables at appropriate municipal landfills and recycling facilities in accordance with applicable regulatory requirements.

.2 Do not burn or bury waste materials at Place of the Work.

.3 Do not dispose of volatile and other liquid waste such as mineral spirits, oil, paints and other coating materials, paint thinners, cleaners, and similar materials together with dry waste materials or on the ground, in waterways, or in storm or sanitary sewers. Collect such waste materials in appropriate covered containers, promptly remove from Place of the Work, and dispose of at recycling facilities or as otherwise permitted by applicable regulatory requirements.

.4 Cover or wet down dry waste materials to prevent blowing dust and debris.

1.6 HAZARDOUS WASTE DISPOSAL

.1 If and when required, remove and dispose of hazardous or contaminated waste materials in accordance with applicable regulatory requirements.

.2 Hazardous or contaminated waste materials must be transported by a licensed waste hauling company.

.3 Submit a copy of hauling company's Certificate of Approval to authority having jurisdiction prior to transporting any hazardous or contaminated waste materials.

.4 Stockpile suspected hazardous or contaminated waste material temporarily in neat and secure stockpiles overlying a double layer of 0.20 mm thick high density polyethylene.

.5 Isolate stockpiles from remainder of Place of the Work and cover with a single layer of 0.20 mm thick polyethylene to prevent entry, wind disturbance or collection of surface water.

.6 Do not transport potentially hazardous or contaminated waste materials until such materials have been properly identified by appropriate authority having jurisdiction.

END OF SECTION

1 General

1.1 PROTECTION OF EXISTING PROPERTY

.1 Protect Owner's existing property and property adjacent to Place of the Work from damage.

.2 Make Good damage to Owner's existing property resulting from performance of the Work.

.3 Do not undertake to Make Good damage to any property located adjacent to Place of the Work, or acknowledge that such damage was caused or occasioned by Contractor, without first consulting with Owner and receiving written instructions as to the course of action to be followed.

.1 Under such circumstances, where there is danger to life or property, Contractor may take such emergency action as he deems necessary to remove the danger.

.2 Contractor shall indemnify and hold harmless Owner and Consultant, including their agents and employees from and against claims, demands, losses, costs, damages, actions, suits, or proceedings by third parties that arise out of, or are attributable to, such emergency action.

1.2 PROTECTION OF COMPLETED WORK AND WORK IN PROGRESS

.1 Adequately protect parts of the Work completed and in progress from any kind of damage.

.2 Do not load or permit to be loaded any part of the Work with a weight or force that will endanger the safety or integrity of the Work.

.3 Refer to technical specification Sections for Product-specific requirements regarding protection of installed Products.

.4 Unless specified otherwise, maintain protection until Ready-for-Takeover. Remove protection and protective coverings upon expiry of specified duration.

.5 Promptly Make Good parts of the Work damaged as a result of inadequate protection.

END OF SECTION

1 General

1.1 READY-FOR-TAKEOVER

.1 Prerequisites to attaining Ready-for-Takeover of the Work are described in the General Conditions of the Contract.

.2 Ready-for-Takeover is required on or before [_____], 202[___].

1.2 INSPECTION AND REVIEW BEFORE READY-FOR-TAKEOVER

.1 Contractor's Inspection: Before applying for Consultant's review to establish Ready-for-Takeover of the Work:
.1 Ensure specified prerequisites for Ready-for-Takeover of the Work are completed.
.2 Conduct an inspection of the Work to identify defective, deficient, or incomplete work.
.3 Prepare a comprehensive and detailed list of items to be completed or corrected.
.4 Submit an anticipated schedule and costs for items to be completed or corrected.

.2 Consultant's Review: Upon receipt of Contractor's application for review, together with Contractor's list of items to be completed or corrected, Consultant will review the Work. Consultant will advise Contractor whether or not the Work is Ready-for-Takeover and will prepare and give Contractor a list of items, if any, to be added to Contractor's list of items to be completed or corrected. Submit to Consultant a revised list of items to be completed or corrected.

.3 Maintain the list of items to be completed or corrected and promptly correct or complete defective, deficient and incomplete work. Contractor's inspection and Consultant's review procedures specified above shall be repeated until the Work is Ready-for-Takeover and no items remain on Contractor's list of items to be completed or corrected.

.4 When Consultant determines the Work is Ready-for-Takeover, Consultant will notify Contractor and Owner in writing to that affect.

1.3 PREREQUISITES TO FINAL PAYMENT

.1 After Ready-for-Takeover of the Work and before submitting an application for final payment in accordance with General Conditions of the Contract:
.1 Correct or complete all remaining defective, deficient, and incomplete work.
.2 Remove from Place of the Work surplus Products, Construction Equipment, and Temporary Work.
.3 Perform final cleaning and waste removal necessitated by Contractor's work performed after Ready-for-Takeover, as specified in Section 01 74 00.

1.4 SUBSTANTIAL PERFORMANCE OF THE WORK

.1 Prerequisites to, and procedures for, attaining Substantial Performance of the Work shall be:
.1 Independent of those for attaining Ready-for-Takeover of the Work.
.2 In accordance with lien legislation applicable at Place of the Work.

1.5 TAKE-OVER PROCEDURES

.1 Conform to OAA-OGCA Document 100-2025, Recommended Procedures Concerning Substantial Performance, Ready-for-Takeover, and Completion of Construction Projects.

END OF SECTION

1 General

1.1 OPERATION AND MAINTENANCE MANUAL

.1 Prepare a comprehensive operation and maintenance manual, in the language of the Contract, using personnel qualified and experienced for this task.

.2 Submit an initial draft of operation and maintenance manual for Consultant's review. If required by Consultant's review comments, revise manual contents and resubmit for Consultant's review. If required, repeat this process until Consultant accepts draft manual in writing.

.3 Submit final version of operation and maintenance manual to Owner in both hard copy and electronic formats. Submit three hard copies.

1.2 OPERATION AND MAINTENANCE MANUAL FORMAT

.1 Organize data in the form of an instructional manual.

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

.3 Hard Copy Requirements:
.1 Binders: Vinyl, hard covered, three D-rings, loose leaf, 215 x 280 mm size, with spine and face pockets.
.2 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine and front cover.
.3 Cover: Identify each binder with typed or printed title "Operation and Maintenance Manual", name of Project, and subject matter of contents.
.4 Include tabbed fly leaf for each separate Product or system, with typed description of Product and major component parts of equipment.
.5 Text: Manufacturer's printed data, or typewritten data.
.6 Drawings: With reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.4 Electronic Copy Requirements:
.1 Prepare electronic copy of operation and maintenance manual as a portable document format (.pdf) file.
.2 When multiple files are used, correlate data into related consistent groupings. Identify contents of each file in file name.
.3 Submit electronic copy of operation and maintenance manual on electronic media type acceptable to Owner.
.4 Include electronic bookmarks for each separate Product and system, with description of Product and major component parts of equipment.
.5 Include electronic copy of Shop Drawings in manual as portable document format (.pdf) files.

1.3 OPERATION AND MAINTENANCE MANUAL - GENERAL CONTENT

.1 Table of Contents for each volume.

.2 Introductory information, including:
.1 Date of manual submission.
.2 Complete contact information for Consultant, subconsultants, other consultants, and Contractor, with names of responsible parties identified for each.
.3 Schedule of Products and systems indexed to content of volume.

.3 For each Product or system, include complete contact information for Subcontractors, Suppliers and manufacturers, including local sources for supplies and replacement parts.

.4 Product Data: Mark each sheet to clearly identify specific Products, options, and component parts, and data applicable to installation. Delete or strike out inapplicable information. Supplement with additional information as required.

.5 Reviewed Shop Drawings.

.6 Permits, certificates, letters of assurance, and other relevant documents issued by, or required by, authorities having jurisdiction.

.7 Warranties.

.8 Operating and maintenance procedures, incorporating manufacturer's operating and maintenance instructions, in a logical sequence.

.9 Training materials as specified in Section 01 79 00.

1.4 OPERATION AND MAINTENANCE MANUAL - EQUIPMENT AND SYSTEMS CONTENT

.1 Each Item of Equipment and System: Include description of unit or system and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel Board Circuit Directories: Include electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

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

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

.6 Include servicing and lubrication schedule, and list of lubricants required.

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

.8 Include sequence of operation by controls manufacturer.

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

.10 Include Contractor's coordination drawings, with installed colour coded piping diagrams.

.11 Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

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

.13 Include testing and balancing reports.

.14 Include additional content as specified in Product Specifications.

1.5 OPERATION AND MAINTENANCE MANUAL - PRODUCTS AND FINISHES

.1 Include Product data, with catalogue number, options selected, size, composition, and colour and texture designations. Include information for re-ordering custom manufactured Products.

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

.3 Include an outline of requirements for routine and special inspections and for regular maintenance to ensure that on-going performance of building envelope will meet the initial building envelope criteria.

.4 Include additional content as specified in Product Specifications.

1.6 OPERATION AND MAINTENANCE MANUAL - WARRANTIES CONTENT

.1 Separate each warranty with index tab sheets keyed to Table of Contents listing.

.2 List each warrantor with complete contact information.

.3 Verify documents are in proper form and contain full information. Ensure warranties are for correct duration and are in Owner's name.

1.7 CONTRACTOR'S AS-BUILT DRAWINGS

.1 Submit final as-built drawings to Consultant, in form specified in Section 01 32 00.

1.8 SPARE PARTS, EXTRA STOCK MATERIALS, AND SPECIAL TOOLS

.1 Supply spare parts, extra stock materials, and special tools in quantities specified in Product Specifications.

.2 Ensure spare parts and extra stock materials are new, not damaged or defective, and of same quality, manufacturer, and batch or production run as installed Products.

.3 Include tags for special tools identifying their function and associated Product.

.4 Deliver to, and store items at, location directed by Owner at Place of the Work. Store in original packaging with manufacturer's labels intact and in a manner to prevent damage or deterioration.

.5 Catalogue items and submit to Consultant an inventory listing organized by specification Section numbers. Include Consultant reviewed inventory listing in operation and maintenance manual.

END OF SECTION

1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Demonstrate and train Owner's personnel on operation and maintenance of equipment, building envelope and systems prior to scheduled date of Ready-for-Takeover.

.2 Owner will prepare a list of personnel to receive training, and will coordinate their attendance at agreed upon times.

.3 Coordinate and schedule demonstration and training given by Subcontractors and Suppliers.

1.2 SUBMITTALS

.1 Submit proposed dates, times, durations, and locations for demonstration and training of each item of equipment and each system for which demonstration and training is required. Allow sufficient time for training and demonstration for each item of equipment or system, or time as may be specified in Product Specifications.

.2 Consultant and Owner will review submittal and advise Contractor of any necessary revisions.

.3 Submit reports within 5 Working Days after completion of demonstration and training:
.1 Identifying time and date of each demonstration and training session.
.2 Summarizing the demonstration and training performed.
.3 Including a list of attendees.

.4 Submit video recordings of demonstration and training sessions together with reports.

1.3 PREREQUISITES TO DEMONSTRATION AND TRAINING

.1 Ensure testing, adjusting and balancing has been performed in accordance with Contract Documents.

.2 Ensure equipment and systems are fully operational.

.3 Ensure a copy of the completed operation and maintenance manual is available for use in demonstration and training.

.4 Ensure conditions for demonstration and training comply with requirements specified in Product Specifications.

1.4 DEMONSTRATION AND TRAINING

.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment and system.

.2 Review operation and maintenance manual in detail to explain all aspects of operation and maintenance.

.3 Prepare and insert additional data in operation and maintenance manual if required.

END OF SECTION

1 General

1.1 COMMISSIONING AGENCY

.1 Contractor shall retain and pay for a commissioning agency to undertake commissioning services for the Project.

1.2 CONTRACTOR RESPONSIBILITIES

.1 Contractor shall:
- .1 Prepare each system ready for commissioning. Verify systems installation is complete and in operation.
- .2 Coordinate commissioning with and assist commissioning agency.
- .3 Perform and document verification, performance testing, adjusting, and balancing operations.
- .4 Cooperate with commissioning agency and provide access to equipment and systems.
- .5 Supply personnel and operate systems at designated times, and under conditions required for proper commissioning.
- .6 Make instruments available to commissioning agency to facilitate spot checks during commissioning.
- .7 Participate in commissioning meetings.
- .8 Complete commissioning forms as requested by commissioning agency.
- .9 Correct deficiencies identified in commissioning process.
- .10 Incorporate commissioning data into operation and maintenance manual.
- .11 Ensure commissioning agency participates in demonstration and training as specified in Section 01 79 00.

1.3 COMMISSIONING AGENCY RESPONSIBILITIES

.1 The commissioning agency will:
- .1 Prepare a commissioning plan, including a list of systems to be commissioned, forms, checklists, and responsibilities of commissioning team members.
- .2 Implement the commissioning plan and lead the commissioning team through start-up, verification, performance testing, training, and document preparation.
- .3 Convene, chair, prepare and distribute minutes of commissioning meetings.
- .4 Supervise commissioning activities and witness inspections and tests.
- .5 Make periodic visits to Place of the Work for the purpose of selective checking of accuracy of commissioning form submissions, witness testing, and review of mock-ups.
- .6 Review content of operation and maintenance manual.
- .7 Supply instruments necessary for commissioning.

1.4 CONSULTANT RESPONSIBILITIES

.1 Consultant will:
- .1 Participate in commissioning meetings.
- .2 Coordinate commissioning agency's involvement in Shop Drawing review process.
- .3 Review verification and performance test results and direct Contractor to correct defects or deficiencies in the Work.
- .4 Initiate Change Orders or Change Directives identified as necessary by commissioning process.
- .5 Review final commissioning report.

1.5 OWNER RESPONSIBILITIES

.1 Owner will:
- .1 Assign operation and maintenance personnel to participate in meetings, and witnessing of demonstration and training.
- .2 Designate a person to acknowledge receipt of reports.

1.6 SCHEDULE OF EQUIPMENT AND SYSTEMS TO BE COMMISSIONED

.1 Commission the following equipment and systems:
- .1 Elevator.
- .2 Integrated systems testing of fire protection and life safety systems.
- .3 Fire suppression system.
- .4 Heating, ventilating, and air conditioning system.
- .5 Building communication systems.
- .6 Fire detection system.
- .7 Building automation system.

END OF SECTION

1 General

1.1 REFERENCES

.1 CSA Z783-12 (R2021): Deconstruction of Buildings and Their Related Parts.

1.2 SEQUENCING

.1 Schedule deconstruction activities to minimize disruption to existing facility operations.

.2 Verify deconstruction schedule with Consultant prior to commencement of the Work.

.3 Protect existing facility occupants from dust and from any danger arising from deconstruction operations. Refer to Section 01 56 00.

1.3 SPECIAL PROCEDURE SUBMITTALS

.1 Submit three copies of each photograph taken of existing conditions to Consultant.

1.4 QUALIFICATIONS

.1 Demolition Supervisor: An individual experienced in building deconstruction, capable of ensuring deconstruction is carried out safely, expeditiously, and without unnecessary damage to materials and surfaces that are designated to remain.

1.5 FIELD CONDITIONS

.1 Inspect and photograph existing adjacent surfaces and assemblies.

.2 Record conditions and stability in a manner suitable for evaluation of possible damage caused by deconstruction operations.

.3 Approximate locations of existing facility services may be indicated on Drawings. Owner and Consultant assume no responsibility for accuracy of such information.

2 Products

2.1 REGULATORY REQUIREMENTS

.1 Permits and Fees: Include tipping charges and other related fees necessary for completion of deconstruction operations.

.2 Utilities: Obtain approval from authorities having jurisdiction prior to commencing deconstruction operations.

.3 Hazardous Waste: Conform to authorities having jurisdiction.

2.2 EQUIPMENT

.1 Deconstruction: Appropriate equipment for type of deconstruction being contemplated.

.2 Do not use heavy equipment for making openings in existing walls or in confined spaces where damage to other parts of the Work or adjacent property may result.

3 Execution

3.1 EXAMINATION

.1 Refer to Section 01 71 00.

.2 Verify locations and construction of structures to be demolished.

.3 Verify construction and details of other existing and adjacent property.

.4 Verify location of utility and facility services.

.5 Undertake x-ray investigations of existing building elements designated for selective demolition to determine locations of concealed components, utility services, and facility services.

3.2 PREPARATION

.1 Erect shoring, bracing, and other temporary structures to prevent collapse, settlement, and movement of property. Refer to Section 01 56 00.

.2 Provide and maintain dust protection screen as specified in Section 01 56 00.

.3 Provide and maintain weather enclosures as specified in Section 01 56 00.

.4 Barricade access by unauthorized persons to areas in which deconstruction is in-progress.

.5 Post danger signs in conspicuous locations to warn persons that deconstruction is in-progress.

.6 Erect protection to ensure safe access that must be maintained to existing areas still occupied by public.

.7 Protect adjacent property from damage caused by deconstruction operations.

.8 Remove flammable and contaminated materials, and refuse from area before deconstruction operations commence.

.9 Arrange for disconnection, capping, and plugging of facility services that may be affected by deconstruction operations.

3.3 DECONSTRUCTION

.1 Perform deconstruction work in an expeditious and safe manner.

.2 Conform to CSA Z783.

.3 Confine deconstruction operations to only those areas required.

.4 Prevent and contain spread of dust.

.5 Do not drop debris more than one storey unless in an enclosed chute. Lower large components carefully, under control and fully supported at all times.

.6 Withdraw or flatten protruding nails as deconstruction operations proceed.

3.4 SALVAGE

.1 Carefully remove materials scheduled for salvage to CSA Z783.

.2 Clean and prepare salvaged items for use by others.

.3 Store salvaged materials in secure locations, protected from damage.

.4 Items not scheduled for salvage become property of Contractor.

3.5 CLEANING

.1 Leave Place of the Work in a clean and orderly condition, ready for use by others.

.2 Remove debris as specified in Section 01 74 00 and in accordance with authorities having jurisdiction.

.3 Remove protections, barricades and other temporary constructions on completion of deconstruction operations.

.4 Make Good property and materials damaged during deconstruction operations.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 20 00 - Concrete Reinforcing.

.2 Section 05 12 00 - Structural Steel Framing.

.3 Section 05 50 00 - Metal Fabrications.

.4 Section 07 21 19.13 - Foamed-in-Place Urethane Insulation.

.5 Section 07 26 00 - Vapour Retarders.

.6 Section 07 27 00 - Air Barriers.

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

.8 Section 07 92 00 - Joint Sealants.

.9 Section 08 12 13 - Hollow Metal Frames.

1.2 REFERENCES

.1 ASTM A123/A123M-24: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM A153/A153M-23: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.3 ASTM A240/A240M-22b: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

.4 ASTM A580/A580M-23: Standard Specification for Stainless Steel Wire.

.5 ASTM A641/A641M-19(2025): Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

.6 ASTM A951/A951M-22: Standard Specification for Steel Wire for Masonry Joint Reinforcement.

.7 ASTM A1011/A1011M-18a: Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability and Ultra-High Strength.

.8 ASTM C207-24: Standard Specification for Hydrated Lime for Masonry Purposes.

.9 ASTM C331/C331M-23: Standard Specification for Lightweight Aggregates for Concrete Masonry Units.

.10 ASTM C979/C979M-24: Standard Specification for Pigments for Integrally Colored Concrete.

.11 BIA Technical Note on Brick Construction 18A: Accommodating Expansion of Brickwork.

.12 CSA A82:14 (R2023): Fired Masonry Brick Made from Clay or Shale.

.13 CSA A165 SERIES-14 (R2019): CSA Standards on Concrete Masonry Units.

.14 CAN/CSA-A179:14 (R2024): Mortar and Grout for Unit Masonry.

.15 CSA A370:14 (R2023): Connectors for Masonry.

.16 CAN/CSA-A371-14 (R2019): Masonry Construction for Buildings.

.17 CSA A3001:23: Cementitious Materials for Use in Concrete.

.18 CSA A3002:23: Masonry and Mortar Cement.

.19 CSA G30.18:21: Carbon Steel Bars for Concrete Reinforcement.

.20 CSA S304:24: Design of Masonry Structures.

.21 NCMA TEK 3-2A-2005: Grouting Concrete Masonry Walls.

.22 NCMA TEK 10-2C-2010: Control Joints for Concrete Masonry Walls - Empirical Method.

1.3 QUALIFICATIONS

.1 Manufacturers of Concrete Masonry Units: A firm specializing in manufacturing concrete masonry units, having minimum 5 years documented experience, and a member of CCMPA.

.2 Manufacturers of Clay Masonry Units: A firm specializing in manufacturing clay masonry units, having minimum 5 years documented experience.

.3 Installers: A firm specializing in installing commercial masonry, having minimum 5 years documented experience, and a member of OMCA.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Deliver mortar and grout materials in original unbroken and undamaged packages, with manufacturer's name and Product brand name distinctly marked.

.3 Store mortar and grout materials in a shed until ready for use.

.4 Store or pile sand on a plank platform, and protect from dirt and rubbish.

.5 Store mortar materials and sand in a manner to prevent deterioration or contamination by foreign materials.

.6 Deliver masonry units in an approved protective film.

.7 Store masonry units off ground with care to avoid damage. Damaged units will not be acceptable for face work.

1.5 AMBIENT CONDITIONS

.1 Environmental Requirements: To CAN/CSA-A371.

.2 Do not use anti-freeze, liquid salts, or other substances to lower freezing point of mortar or grout.

1.6 EXISTING CONDITIONS

.1 Existing conditions at Place of the Work may require adjustment to counteract variations resulting from inaccuracies in previous construction.

.2 The restricted availability of imperial-sized Products may also require adjustments be made.

.3 Make necessary adjustments to ensure proper fit and coursing of masonry.

2 Products

2.1 MORTAR AND GROUT MATERIALS

.1 Portland Cement: To CSA A3001, Type GU; Grey colour.

.2 Masonry Cement: To CSA A3002, Type N.

.3 Hydrated Lime: To ASTM C207, Type S-Special.

.4 Mortar Aggregate: To CAN/CSA-A179, standard masonry type; clean, dry, protected against dampness, freezing, and foreign matter.

.5 Grout Coarse Aggregate: To CAN/CSA-A179, maximum 10 mm OD; 27 percent by volume.

.6 Grout Fine Aggregate: To CAN/CSA-A179, clean well graded sharp sand; 54 percent by volume.

.7 Water: Potable, clean, and free of deleterious amounts of acids, alkalies, or organic materials.

.8 Plasticizer: Water reducing type, reducing porosity and absorption to increase bond strength.

.9 Pigment: To ASTM C979/C979M; liquid manufactured or natural oxide pigment, colours as selected by Consultant.

2.2 MASONRY MATERIALS

.1 Concrete Masonry Unit (CMU): To CSA A165.1, using N aggregate; 190 mm face height, 390 mm face length, bed depths as indicated on Drawings; types as follows:
.1 Hollow: H/15/A/M.
.2 Solid (75 percent): S/15/A/M.
.3 Solid (100 percent): S_c/15/A/M.

.2 Lightweight Concrete Masonry Unit (CMU-LWT): To CSA A165.1, using $L_2$20S slag aggregate to ASTM C331; 190 mm face height, 390 mm face length, bed depths as indicated on Drawings; types as follows:
.1 Hollow: H/15/C/M.
.2 Solid (75 percent): S/15/C/M.
.3 Solid (100 percent): S_c/15/C/M.

.3 Clay Brick: To CSA A82, Type S, Grade EG; burned clay brick, [___] mm face height, [___] mm face length, [___] mm bed depth; special shapes as required; [_____] by [_____].

2.3 REINFORCEMENT AND ANCHORAGES

.1 Single Wythe Joint Reinforcement - Exterior Walls: To CSA A370; Ladder-type, Extra Heavy Duty, fabricated from steel wire to ASTM A951/A951M; hot dipped galvanized; eg. BL-10 by Blok-Lok.

.2 Single Wythe Joint Reinforcement - Interior Walls: To CSA A370; Ladder-type, Extra Heavy Duty, fabricated from steel wire to ASTM A951/A951M; mill galvanized; eg. BL-10 by Blok-Lok.

.3 Wall Tie (CMU Back-up): Adjustable, dual component, shear connector system; as follows:
.1 Block Plate: 1.52 mm thick stainless steel plate; length to suit air space and CMU width dimension, less 6 mm; complete with a series of eight 5.8 mm OD holes punched along leading edge to receive V-Tie.
.2 V-Tie: 4.76 mm OD stainless steel wire; [complete with seismic clip;] length to provide placement of tie legs at centerline of veneer.
.3 Manufacturer and Product Name: Fero Thermal Tie - Block Shear Masonry Connector by Fero Corporation.

.4 [Seismic Clip: 14 x 25 mm size C-shaped clip with 11 mm inside width and 5 mm opening, fabricated from 1.37 mm thick stainless steel; eg. Lateral Tie-Clip by Fero Corporation.]

.5 Steel Reinforcing Bars: To CSA G30.18, Grade 400R; new billet steel deformed bars; sizes as indicated on Drawings.

.6 Rigid Strap Anchors: 6.0 mm thick, 38 mm wide steel plate with 50 mm long Z-shaped bends; hot dipped galvanized; lengths to suit application; eg. BLT-11Z by Blok-Lok.

.7 Anchors: To CSA A370; purpose made for substrate; stainless steel for exterior walls, mill galvanized for interior walls.

2.4 MASONRY ACCESSORIES

.1 Flexible Membrane Flashing: 1.0 mm thick self-adhering SBS rubberized asphalt membrane with cross-laminated HDPE top surface, sheet width to suit application; eg. Blueskin TWF by Henry (a Carlisle Company).

.2 Flashing Tape: 75 mm wide, self-adhesive sealing tape; eg. X-Seal Tape by Blok-Lok.

.3 Metal Drip Edge Flashing: Prefinished sheet steel, as specified in Section 07 62 00.

.4 Joint Filler: Closed cell polyurethane or polyethylene oversized by 50 percent; self-expanding.

.5 Building Paper: No. 15 asphalt saturated felt.

.6 Mortar Dropping Control Device: Purpose made open weave nylon and polyester mesh, top hat profile, complete with insect barrier.

.7 Cavity Vents: Open weave polyester mesh, to suit mortar joint size; colour as selected by Consultant.

.8 Cavity Wall Filler: Compressible closed cell foam.

.9 Cavity Wall Insulation: Foamed-in-place urethane insulation, Type INS-FIP-1 as specified in Section 07 21 19.13.

2.5 MORTAR MIXES

.1 Mortar for Use with Loadbearing Concrete Unit Masonry: To CAN/CSA-A179, Type S using Proportion specification method; Portland cement-masonry cement-sand mix.

.2 Mortar for Use with Non-Loadbearing Concrete Unit Masonry: To CAN/CSA-A179, Type N using Proportion specification method; masonry cement-sand mix.

.3 Mortar for Use with Non-Loadbearing Masonry Veneers: To CAN/CSA-A179, Type N using Proportion specification method; Portland cement-hydrated lime-sand mix, complete with integral colour as selected by Consultant.

2.6 MORTAR MIXING

.1 Thoroughly mix materials in proper measured quantities needed for immediate use, to CAN/CSA-A179.

.2 Coloured Mortar: Pigment dosage as selected by Consultant, but not to exceed 10 percent of cement content by mass, as defined in ASTM C979/C979M.

.3 Provide uniformity of mix and colouration.

.4 Take representative samples for testing consistency of strength and colour to CAN/CSA-A179.

.5 Use mortar within 1-1/2 hours after mixing at temperature of 25 degrees C or higher, or 2-1/2 hours after mixing at temperatures less than 25 degrees C.

.6 Discard mortars exceeding time limits specified above.

2.7 GROUT MIXES

.1 Grout for Use in Spaces 50 mm or Wider: To CAN/CSA-A179, Coarse Grout using Property Specification method; Portland cement-sand-coarse aggregate mix.

.2 Grout for Use in Spaces Narrower than 50 mm: To CAN/CSA-A179, Fine Grout using Property Specification method; Portland cement-sand mix.

.3 Match grout's 28 day compressive strength to compressive strength of concrete masonry unit being filled.

2.8 GROUT MIXING

.1 Thoroughly mix materials in proper measured quantities needed for immediate use, to CAN/CSA-A179.

.2 Use grout within 1-1/2 hours after mixing.

.3 Discard grout exceeding time limit specified above.

2.9 FINISHES

.1 Hot Dipped Galvanized Coating: To ASTM A123/A123M and ASTM A153/A153M, Class B2; minimum 458 g/m^2 zinc coating on all surfaces, except as specified below:
.1 Strap Anchors: To ASTM A123/A123M, Coating Grade 75; minimum 503 g/m^2 zinc coating on all surfaces.

.2 Mill Galvanized Coating: To ASTM A641/A641M, Regular; minimum 30 g/m^2 zinc coating on all surfaces.

3 Execution

3.1 PREPARATION

.1 Supply metal anchors to appropriate trades for placement. Direct correct placement.

.2 Verify anchorages embedded in concrete or attached to structural steel members are properly placed. Embed anchorages in every second joint.

.3 Apply bonding agent to existing concrete surfaces.

.4 Plug clean-out holes with masonry units to prevent leakage of grout materials. Brace masonry for wet grout pressure.

3.2 COORDINATION WITH OTHERS

.1 Securely install frames, louvres, sleeves, chases, reglets, and equipment supplied by other Sections.

.2 Anchor frames with backs of jambs solidly packed with mortar. Where mortar additives have been used to prevent freezing, coat metal frames with bitumen paint before installation.

.3 Provide openings wherever required, including those required by facility services Subcontractors. Locating openings is the responsibility of component installer.

.4 Accurately locate chases and openings, and neatly finish to required sizes.

.5 No pipe, conduit chases, or enclosures shall be covered until advised that such portions of the Work have been inspected and tested.

.6 Coordinate placement of steel and concrete anchors with appropriate Subcontractor.

3.3 COURSING

.1 Place masonry to lines and levels indicated.

.2 Maintain masonry courses to uniform width.

.3 Lay concrete masonry units in half-running bond.

.4 Lay clay brick in bond pattern to match existing adjacent brick veneer.

.5 Maintain 10 mm thick mortar joints in both directions.

.6 When thumbprint hard, tool mortar joints to a smooth, tightly compressed, concave profile.

3.4 PLACING AND BONDING

.1 Lay masonry in full bed of mortar, properly jointed with other work. Buttering corners of joints, and deep or excessive furrowing of mortar joints are not permitted.

.2 Fully bond intersections and external corners.

.3 Strike mortar joints flush where air/vapour barrier and moisture protection type membranes are scheduled, or where resilient base is scheduled.

.4 Isolate masonry partitions from vertical structural framing members with control joint.

.5 Extend and anchor non-loadbearing partitions to underside of structural deck.

.6 Use bull-nosed concrete masonry units at exposed corners.

3.5 CAVITY WALL

.1 Install cavity wall insulation over air/vapour barrier as specified in Section 07 21 19.13.

.2 Install mortar dropping control devices in cavity immediately above through wall flashing membranes.

.3 Install vertical cavity wall fillers at external corners to prevent wind driven moisture from crossing cavity. Seal filler to outer wythe using approved adhesive.

.4 Install cavity vents in veneer spaced at maximum 800 mm OC horizontally above through wall flashing, above shelf angles, and at bottom of cavity walls.

.5 Install cavity vents in veneer at top of cavity space at same OC spacing described above.

3.6 REINFORCEMENT AND ANCHORAGES

.1 Conform to CSA A370.

.2 Place masonry joint reinforcement continuous in every second bed joint.

.3 Place masonry joint reinforcement in first and second bed joints above and below openings. Extend 400 mm minimum each side of opening.

.4 Place joint reinforcement continuous in first and second bed joint below top of walls.

.5 Install reinforcing bars supported and secured against displacement.

.6 Reinforce joint corners and intersections of concrete unit masonry walls and partitions with strap anchors 400 mm OC.

.7 Secure wall ties to structural back-up for veneer at maximum 400 x 600 mm spacing.

.8 Double quantity of wall ties within 200 mm of changes in wall direction.

.9 Double quantity of wall ties within 200 mm of wall openings.

.10 Double quantity of wall ties along parapet walls.

3.7 MASONRY FLASHING

.1 Extend flashing through veneer, turn up, and bed into mortar joint of masonry, seal to concrete, or seal into sheathing over framed back up; as appropriate.

.2 Lap end joints and seal watertight.

.3 Connect sheet metal flashing to through wall flashing membrane using approved adhesive.

3.8 LINTELS

.1 Install loose steel lintels as scheduled. Set steel lintels dry to permit movement.

.2 Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled. Construct lintels using grout fill and reinforcing. Maintain minimum 200 mm bearing on each side of opening.

3.9 GROUTED COMPONENTS

.1 Install masonry grout to NCMA TEK 3-2A.

.2 Fill masonry cores located within 300 mm of a wall opening solid with masonry grout.

3.10 MOVEMENT AND CONTROL JOINTS

.1 Provide movement joints in masonry veneers to BIA Technical Note on Brick Construction 18A.

.2 Provide control joints in concrete unit masonry walls to NCMA TEK 10-2C.

.3 Do not continue horizontal joint reinforcing across control joints.

.4 Size joints as specified in Section 07 92 00 for sealant performance.

3.11 TOLERANCES

.1 Variation from Unit to Adjacent Unit: $\leq$ 1.5 mm.

.2 Variation of Joint Thickness: $\leq$ 3 mm in 1 000 mm.

3.12 CLEANING

.1 Clean masonry as work progresses.

.2 Allow mortar droppings on masonry to partially dry then remove by means of brushing with a stiff fibre brush.

.3 Post-Construction: Clean a 10 m^2 area of wall designated by Consultant as described below, and leave for one week. If no harmful effects appear, and after mortar has set and cured, clean masonry as follows:
   .1 Protect windows, sills, doors, trim, and other surfaces from damage.
   .2 Remove large particles with stiff fiber brushes or wood paddles without damaging surface. Saturate masonry with clean water and flush off loose mortar and dirt.
   .3 Scrub with solution of 25 mL trisodium phosphate and 25 mL household detergent dissolved in one Litre of clean water using stiff fibre brushes, then clean off immediately with clean water using hose.
   .4 Repeat cleaning process as often as necessary to remove mortar and other stains.

.4 Use alternative cleaning solutions and methods for difficult to clean masonry only after consultation with masonry unit manufacturer.

3.13 FIELD QUALITY CONTROL

.1 Perform field inspection and testing as described in Section 01 40 00.

.2 Submit sample cubes of mortar and grout for laboratory testing and test data as specified in Section 01 40 00, and to CSA S304.

.3 Report on compressive strength and water content of mortar and grout mixes.

.4 Submit product data on design mix, indicate Proportion or Property specification method used, required environmental conditions and admixture limitations.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 04 00 00 - Masonry.

.3 Section 05 12 00 - Structural Steel Framing.

.4 Section 07 84 00 - Firestopping.

.5 Section 09 90 00 - Painting and Coating.

1.2 REFERENCES

.1 AAMA 611-20: Voluntary Specification for Anodized Architectural Aluminum.

.2 AAMA 2603-22: Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (With Coil Coating Appendix).

.3 AAMA 2604-22: Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (With Coil Coating Appendix).

.4 AAMA 2605-22: Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (With Coil Coating Appendix).

.5 ASTM A123/A123M-24: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.6 ASTM A153/A153M-23: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.7 ASTM A240/A240M-22b: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

.8 ASTM A269/A269M-22: Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

.9 ASTM A276/A276M-17: Standard Specification for Stainless Steel Bars and Shapes.

.10 ASTM A307-21: Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

.11 ASTM A385/A385M-22: Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip).

.12 ASTM A449-14(2020): Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use.

.13 ASTM A563/A563M-24: Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric).

.14 ASTM A653/A653M-23: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.15 ASTM A780/A780M-20: Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

.16 ASTM A1008/A1008M-23e1: Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.

.17 ASTM B209/B209M-21a: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.18 ASTM B221M-21: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

.19 ASTM D6386-22: Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting.

.20 ASTM D7803-25: Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Powder Coating.

.21 ASTM F436/F436M-24: Standard Specification for Hardened Steel Washers Inch and Metric Dimensions.

.22 ASTM F467M-06a(2025): Standard Specification for Nonferrous Nuts for General Use (Metric).

.23 ASTM F468M-06(2025): Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use (Metric).

.24 ASTM F593-24: Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

.25 ASTM F594-22: Standard Specification for Stainless Steel Nuts.

.26 ASTM F3125/F3125M-25a: Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.

.27 CSA A500:16 (R2021): Building Guards.

.28 CSA G40.20-13 (R2023): General Requirements for Rolled or Welded Structural Quality Steel.

.29 CSA G40.21-13 (R2023): Structural Quality Steel.

.30 CSA S136-16 (R2021): North American Specification for the Design of Cold-Formed Steel Structural Members.

.31 CSA W47.1:19: Certification of Companies for Fusion Welding of Steel.

.32 CSA W47.2-11 (R2020): Certification of Companies for Fusion Welding of Aluminum.

.33 CSA W55.3-08 (R2023): Certification of Companies for Resistance Welding of Steel and Aluminum.

.34 CSA W59:24: Welded Steel Construction.

.35 CSA W59.2:24: Welded Aluminum Construction.

1.3 SHOP DRAWINGS

.1 Submit Shop Drawings as specified in Section 01 33 00.

.2 Shop Drawings: Project-specific drawings, prepared for each required custom-fabricated metal item, illustrating profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.

.3 Shop Drawings for metal ladders, balustrades, guards, railings, and handrails must be stamped, signed, and dated by fabricator's design engineer.

1.4 QUALIFICATIONS

.1 Fabricator's Design Engineer: A professional structural engineer experienced in designing metal ladders, balustrades, guards, railings, and handrails, licensed to practice at Place of the Work.

.2 Fabricator: A firm specializing in fabricating custom metal components, having minimum three years documented experience.

.3 Welders: Workers certified by CWB to CSA W47.1, CSA W47.2 and CSA W55.3; as applicable.

2 Products

2.1 DESIGN CRITERIA

.1 Design cold-formed steel fabrications to CSA S136.

.2 Design metal guards, including balustrades, railings, and handrails, to CSA A500 and applicable regulatory requirements, and capable of resisting:
.1 Uniform Load = 0.75 kN/m in any direction.
.2 Vertical Load = 1.5 kN/m.
.3 Loads on Pickets = 0.5 kN on 100 x 100 mm area.
.4 Non-concurrent Loads on Handrails = 0.9 kN applied at any point in any direction.
.5 Lateral Force = 1.0 kN at any point without damage or permanent set.

.3 Design galvanized metal fabrications to accommodate venting and drainage during hot dip galvanizing process, to ASTM A385/A385M.

2.2 MATERIALS

.1 Galvanized Sheet Steel: To ASTM A653/A653M, Structural Steel (SS) Grade 230, Types 1 and 2; cold-rolled sheet steel, galvanized; thicknesses as indicated.

.2 Sheet Steel: To ASTM A1008/A1008M, Structural Steel (SS) Grade 230, Types 1 and 2; cold-rolled sheet steel, thicknesses as indicated.

.3 Steel Sections and Plates: To CSA G40.20 and CSA G40.21, Grade 300W; profiles and sizes as indicated.

.4 Hollow Structural Steel Sections: To CSA G40.20 and CSA G40.21, Grade 350W, Class H; sizes as indicated.

.5 Stainless Steel Sheet, Sections and Plates: To ASTM A240/A240M, Type 304L for welded applications and Type 304 for other applications; thicknesses and sizes as indicated.

.6 Stainless Steel Tubing: To ASTM A269/A269M, Grade TP316L; thicknesses, diameters and sizes as indicated.

.7 Stainless Steel Bars and Shapes: To ASTM A276/A276M, Type 304L for welded applications and Type 304 for other applications; sizes and profiles as indicated.

.8 Extruded Aluminum: To ASTM B221M, 6063 alloy, T6 temper; profiles and sizes as indicated.

.9 Aluminum Sheet: To ASTM B209/B209M, 3003-H14 alloy for shop-painted or unfinished material and 5005-H32 alloy for anodized material; thicknesses as indicated.

2.3 ACCESSORIES

.1 Stainless Steel Bolts: To ASTM F593, Group 1.

.2 Stainless Steel Nuts and Washers: To ASTM F594, Group 1.

.3 High-Strength Bolts: To ASTM F3125/F3125M, Type 1 for interior applications, Type 3 for exterior applications; quenched and tempered steel heavy hex structural bolts.

.4 Medium-Strength Bolts: To ASTM A449, Type 1 for interior applications, Type 3 for exterior applications; quenched and tempered steel hex bolts.

.5 Machine Bolts: To ASTM A307, Grade A; carbon and alloy steel, galvanized where noted.

.6 Steel Nuts: To ASTM A563/A563M, Grade A, Heavy Hex Style for use with high strength bolts, and Hex Style for use with medium strength bolts and machine bolts; carbon and alloy steel; galvanized where noted.

.7 Steel Washers: To ASTM F436/F436M, Type 1 for interior applications, Type 3 for exterior applications; hardened steel washers, circular, bevelled and clipped types as required.

.8 Aluminum Bolts: To ASTM F468M, shop finished to match adjacent surfaces.

.9 Aluminum Nuts and Washers: To ASTM F467M, including plain washers; shop finished to match adjacent surfaces.

.10 Welding Materials: To CSA W59 and CSA W59.2.

2.4 PRIMERS

.1 Primer for Ferrous Metal Surfaces: Red oxide type.

.2 Primer for Galvanized Surfaces: Zinc-rich paint type.

2.5 FABRICATION

.1 Prior to fabrication, verify existing conditions and take field measurements to ensure perfect fit.

.2 Fabricate cold-formed steel components to CSA S136.

.3 Fabricate metal guards, including balustrades, railings, and handrails to CSA A500.

.4 Shop weld steel components to CSA W59.

.5 Shop weld aluminum components to CSA W59.2.

.6 Fit and shop assemble components in largest practical sections to accommodate delivery to Place of the Work.

.7 Seal joints with continuous welds.

.8 Grind visually-exposed joints flush and smooth with adjacent finish surface.

.9 Make visually-exposed joints butt tight, flush and hairline.

.10 Exposed Mechanical Fastenings: Flush countersunk screws or bolts; except where specifically noted otherwise.

.11 Supply components required for anchorage of fabrications.

2.6 FINISHES

.1 Shop Priming:
.1 Clean surfaces of rust, scale, grease, and foreign matter prior to shop priming.
.2 Do not prime surfaces designated to come into direct contact with concrete, or where field welding is required.
.3 Prime components using minimum two coats primer.

.2 Galvanizing:
.1 Galvanized Coating on Steel Components: To ASTM A123/A123M, Coating Grade 55; hot dipped zinc alloy coating.
.2 Galvanized Coating on Steel Hardware: To ASTM A153/A153M, Classes B3, C or D; hot dipped zinc alloy coating.
.3 Galvanized Coating on Sheet Steel: To ASTM A653/A653M, Coating Designation Z275; hot dipped zinc alloy coating.
.4 Prepare hot dip galvanized coatings to ASTM D6386 for subsequent paint application.
.5 Prepare hot dip galvanized coatings to ASTM D7803 for subsequent powder coating application.

.3 Stainless Steel: To AISI No. 4 - Brushed.

.4 Anodized Coating on Aluminum: To AAMA 611, AA-M10C21A31, Class II Clear Anodic Oxide coating (No. 17 - Clear).

.5 Monochromatic Paint Coating on Aluminum - Interior Applications: To AAMA 2603; one-coat acrylic resin liquid extrusion and coil coating, factory-applied to 0.02 mm dry film thickness; eg. Duracron by PPG Industries, Inc., colour as selected by Consultant.

.6 Monochromatic Paint Coating on Aluminum - Exterior Applications: To AAMA 2605; two-coat thermosetting fluoropolymer PVDF liquid extrusion and coil coating, factory-applied to 0.03 mm dry film thickness; eg. Duranar by PPG Industries, Inc., colour as selected by Consultant.

.7 Powder Coated Finish on Metal Components: To AAMA 2604; electrostatically sprayed polymer powder, factory-applied to 0.05 mm dry film thickness; colour as selected by Consultant.

.8 Monochromatic Paint Coating on Sheet Steel: Two-coat silicone modified polyester coil coating, factory-applied to 0.028 mm dry film thickness; eg. WeatherXL by The Sherwin-Williams Company, colour as selected by Consultant.

3 Execution

3.1 PREPARATION

.1 Make provision for erection loads with temporary bracing.

.2 Clean and strip primed steel items to bare metal where field welding is required.

.3 Supply items required to be cast into concrete and or embedded in masonry with setting templates, to appropriate Sections.

3.2 INSTALLATION

.1 Install Products plumb and level.

.2 Install Products accurately fitted, and free from distortion or defects.

.3 Provide fasteners and anchors necessary to secure components rigidly in place.

.4 Field weld steel components to CSA W59.

.5 Field weld aluminum components to CSA W59.2.

.6 Field bolt and weld to match shop bolting and welding.

.7 Mechanically fasten joints butted tight, flush, and hairline.

.8 Grind welds smooth and flush.

.9 After erection, prime welds, abrasions, and surfaces not yet shop primed or galvanized, except surfaces designated to come into direct contact with concrete.

.10 Make Good damaged or defective galvanized coatings to ASTM A780/A780M.

3.3 SCHEDULE

.1 Following is a list of principal items only. Refer to Drawings for items not specifically listed below.

.2 Sleeves and Openings: Including templates and required information, supplied to appropriate Sections.

.3 Attachments: Anchor bolts, washers, nuts, lag screws, expansion shields, toggles, straps, sleeves, and brackets; secured with sufficient self-tapping shake-proof screws with flat countersunk heads.

.4 Brackets: Fabricated from mild steel plate, sizes and configurations as required to support countertops, shelving, seating, benches, valances, coat hooks, and other similar components; pre-drilled for fastening of other components.

.5 Lateral Support Brackets for Masonry Partitions: 75 x 75 mm steel angles, 6 mm thick, as follows:
.1 Concealed Conditions: 200 mm long and spaced at 3 000 mm OC; minimum two anchors each.
.2 Exposed Conditions: Continuous lengths, anchored at 1 000 mm OC.

.6 Metal Balustrades, Guards, and Railings: Sizes and configurations as indicated on Drawings; engineered by fabricator to meet specified design criteria; fabricated from shop primed steel for interior applications and stainless steel for exterior applications.

.7 Elevator Pit Access Ladder: Extending minimum 1 220 mm above sill of lowest access door, with centreline of rung located 115 mm from wall and non-slip rungs spaced at 300 mm OC; installed in locations indicated on accepted elevator Shop Drawings; capable of sustaining minimum 135 kg load; fabricated from shop primed steel.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 06 20 00 - Finish Carpentry.

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

1.2 REFERENCES

.1 ASTM A153/A153M-23: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.2 ASTM F593-24: Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs.

.3 ASTM F594-22: Standard Specification for Stainless Steel Nuts.

.4 ASTM F1667-21: Standard Specification for Driven Fasteners: Nails, Spikes and Staples.

.5 CSA O80 Series:21: Wood Preservation.

.6 CSA O86:19: Engineering Design in Wood.

.7 CSA O112.9:21: Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).

.8 CSA O121:17 (R2022): Douglas Fir Plywood.

.9 CSA O141:23: Canadian Standard Lumber.

.10 CSA O151:17 (R2022): Canadian Softwood Plywood.

.11 NLGA Standard Grading Rules for Canadian Lumber (2022 Edition).

.12 CAN/ULC-S102-2018 (REV1): Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 QUALITY ASSURANCE

.1 Lumber Identification: Grade stamp clearly identifying assigned grade, mill of origin, moisture content at time of manufacture, species or species group, and grading authority having jurisdiction over mill of origin.

.2 Plywood Identification: Face or edge stamp depending on appearance requirement, clearly identifying panel grade, species designation, mill identification, certifying agency and waterproof glue bond designation.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Deliver and store Products under waterproof cover.

.3 Prevent damage to Products, existing properties and to the Work.

.4 Store Products where it does not hinder progress of the Work.

2 Products

2.1 MATERIALS

.1 Dimension Lumber: To CSA O141, S4S; SPF species kiln dried to S-DRY moisture content; preservative treated for exterior applications where noted on Drawings, sizes as indicated on Drawings; NLGA Light Framing Grade Category, Standard and Better Common Grade Mix.

.2 Plywood - Exterior Applications: To CSA O121, DFP species, SHG Grade, Exterior waterproof glue bond; veneer core, butt edge, unsanded faces; preservative treated, thicknesses as indicated on Drawings.

.3 Plywood - Interior Applications: To CSA O151, CSP species, SHG Grade, Exterior waterproof glue bond; veneer core, butt edge, unsanded faces; flame retardant treated where noted; thicknesses as indicated on Drawings.

2.2 ACCESSORIES

.1 Nails: To ASTM F1667, Type I (NL); common wire type for general use and spiral type for structural connections; sizes necessary to ensure adequate securement; and as follows:
.1 For Use with Preservative Treated Wood: Type 304 or 316 stainless steel.
.2 For Use with Untreated Wood: Galvanized steel.

.2 Spikes: To ASTM F1667, Type III (SP); common wire type for general use and spiral type for structural connections; sizes necessary to ensure adequate securement; and as follows:
.1 For Use with Preservative Treated Wood: Type 304 or 316 stainless steel.
.2 For Use with Untreated Wood: Galvanized steel.

.3 Staples: To ASTM F1667, Type IV (ST); common wire; leg length necessary to ensure adequate securement; and as follows:
.1 For Use with Preservative Treated Wood: Type 304 or 316 stainless steel.
.2 For Use with Untreated Wood: Galvanized steel.

.4 Screws: Bugle head, power driven type, sizes necessary to ensure adequate securement; types as follows:
.1 For Use with Preservative Treated Wood: Type 304 or 316 stainless steel.
.2 For Use with Untreated Wood: Galvanized steel.

.5 Stainless Steel Bolts: To ASTM F593, Group 1.

.6 Stainless Steel Nuts: To ASTM F594, Group 1.

.7 Adhesive: To CSA O112.9.

.8 Anchors: Toggle bolt type for anchorage to hollow masonry, expansion shield and lag bolt type for anchorage to solid masonry or concrete, or bolts or ballistic fasteners for anchorages to steel.

.9 Touch-Up Wood Preservative: To CSA O80; brush-applied copper azole (CBA-A or CA-B) or alkaline copper quaternary (ACQ) preservative.

.10 Touch-up Flame Retardant Coating: To CSA O80; brush-applied Dricon by Lonza.

2.3 FINISHES

.1 Flame Retardant Treatment
.1 Flame Retardant Treatment: To CSA O80; chemically treated and pressure impregnated; as follows:
.1 Surface Burning Characteristics (CAN/ULC-S102): Flame spread index $\underline{<}$ 25.
.2 Manufacturer and Product Name: eg. Dricon by Lonza.
.2 Flame retardant treated materials must bear a ULC classification label.

.2 Wood Preservative Treatment:
.1 Wood Preservative Treatment: To CSA O80; chemically treated and pressure impregnated using copper azole (CBA-A or CA-B) or alkaline copper quaternary (ACQ) preservative.
.2 Preservative treated materials must bear CSA classification label.
.3 Make preservative treated materials available for inspection by Consultant at place of treatment, before shipment to Place of the Work.

.3 Galvanized Coating on Steel Fasteners: To ASTM A153/A153M, Classes C or D; hot dipped zinc alloy coating.

3 Execution

3.1 SITE APPLIED WOOD TREATMENT

.1 When wood in contact with exterior cementitious materials, roofing and related metal flashings has not been previously preservative treated, brush apply two coats of touch-up wood preservative.

.2 Apply two coats of touch-up wood preservative to sawn ends of preservative treated material.

.3 Apply two coats of touch-up flame retardant coating to sawn ends of flame retardant treated material.

.4 Apply touch up coatings to CSA O80.

3.2 INSTALLATION

.1 Erect wood framing members level and plumb.

.2 Place horizontal members laid flat, crown side up.

.3 Construct framing members full length without splices.

.4 Secure plywood sheets perpendicular to framing members, with ends staggered and sheet edges directly to firm bearing.

.5 Provide wood blocking required for attachment of fitments and equipment by other Sections.

.6 Provide 19 mm thick flame retardant treated plywood backer board on wood blocking for mounting electrical equipment where indicated on Drawings.

.7 Construct curb and cant members of single pieces per location.

.8 Curb roof openings except where prefabricated curbs are provided.

.9 Form corners by lapping side members alternately.

.10 Coordinate work with installation of decking and support of decking at openings.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 06 10 00 - Rough Carpentry.

.2 Section 07 92 00 - Joint Sealants.

.3 Section 08 71 00 - Door Hardware.

.4 Section 09 90 00 - Painting and Coating.

1.2 REFERENCES

.1 ANSI A208.1-2009: Particleboard.

.2 ASTM F1667-21: Standard Specification for Driven Fasteners: Nails, Spikes and Staples.

.3 AWMAC NAAWS 4.0-2021: North American Architectural Woodwork Standards.

.4 CSA O141:23: Canadian Standard Lumber.

.5 CSA O151:17 (R2022): Canadian Softwood Plywood.

.6 ANSI/HPVA HP-1-2020: American National Standard for Hardwood and Decorative Plywood.

.7 NHLA Grading Rules.

1.3 SHOP DRAWINGS

.1 Submit Shop Drawings as specified in Section 01 33 00.

.2 Shop Drawings: Project-specific drawings, illustrating materials, dimensions, component profiles and sizes, fastening methods, jointing details, finishes, accessories, and hardware.

.3 Prepare Shop Drawings at minimum 1:10 scale.

1.4 SAMPLES

.1 Submit samples as specified in Section 01 33 00.

.2 Verification Samples: Duplicate samples, as follows:
.1 Melamine Composite Panel: 300 x 300 mm size, illustrating laminate-clad face colour, pattern and texture; core materials; and quality of PVC edgebanding.
.2 Hardwood Plywood: 300 x 300 mm size, illustrating full thickness of sheet, number of plies, edge and joint trim, and quality of wood grain.
.3 Hardwood Trim: 300 mm long, illustrating size and shape of profiles, and quality of wood grain.

1.5 QUALIFICATIONS

.1 Trim and Finish Carpenter: A firm employing workers specializing in finish carpentry work, having minimum three years documented experience.

2 Products

2.1 LUMBER

.1 Dressed Softwood Lumber (DL-SWD): To CSA O141, S4S; SPF species, kiln dried to maximum 7 percent moisture content, with mixed grain capable of receiving high quality opaque finish; sizes as indicated on Drawings.

.2 Dressed Hardwood Lumber (DL-HWD): To NHLA Select and Better Grade; Maple species, kiln dried to maximum 7 percent moisture content, with vertical grain capable of receiving high quality transparent finish; sizes as indicated on Drawings.

.3 Dimension Lumber: As specified in Section 06 10 00.

2.2 PLYWOOD

.1 Softwood Plywood (PLY-SWD): To CSA O151, CSP species, SEL TF Grade; softwood veneer core of minimum 9 plies; thicknesses as indicated on Drawings; capable of receiving high quality opaque finish.

.2 Softwood Plywood - Moisture-Resistant Core (PLY-SWD-MR): To CSA O151, CSP species, SEL TF Grade; composite core of moisture-resistant particle board to ANSI A208.1, Grade M-3 - Exterior Glue; thicknesses as indicated on Drawings; capable of receiving high quality opaque finish.

.3 Hardwood Plywood (PLY-HWD): To ANSI/HPVA HP-1, Architectural G1S, thicknesses as indicated on Drawings; as follows:
.1 Core: Hardwood veneer core, minimum 9 plies.
.2 Face Veneers: Maple species; Face Grade A; Plain-Sliced; of clear Pleasing match grain capable of receiving high quality transparent finish.

.4 Hardwood Plywood - Moisture-Resistant Core (PLY-HWD-MR): To ANSI/HPVA HP-1, Architectural G1S, thicknesses as indicated on Drawings; as follows:
.1 Core: Composite core, moisture-resistant particle board to ANSI A208.1, Grade M-3 - Exterior Glue.
.2 Face Veneers: Maple species; Face Grade A; Plain-Sliced; of clear Pleasing match grain capable of receiving high quality transparent finish.

2.3 COMPOSITE BOARDS AND PANELS

.1 Particleboard (PB): To ANSI A208.1, Grade M-2; made from 100 percent post-industrial wood fibres; minimum 635 kg/m^3 density and maximum 6 percent moisture content; no added urea formaldehyde (nauf); certified EPP by Composite Panel Association; thicknesses as indicated on Drawings.

.2 Melamine Composite Panel (MCP): Particleboard core with factory-applied low pressure laminate thermo-fused to both faces; Premium quality; thicknesses as indicated on Drawings; colours, textures, and patterns as selected by Consultant.

2.4 ACCESSORIES

.1 Contact Adhesive: Water base type.

.2 Wall Adhesive: Solvent release, cartridge type, compatible with wall substrate, capable of achieving durable bond.

.3 Nails: To ASTM F1667, Type I (NL), galvanized steel, common wire; sizes necessary to ensure adequate securement.

.4 Staples: To ASTM F1667, Type IV (ST); galvanized steel, common wire; leg length necessary to ensure adequate securement.

.5 Screws: Galvanized steel, tapered head suitable for counter sunk applications; sizes necessary to ensure adequate securement.

.6 Bolts, Nuts, Washers, Lags, and Blind Fasteners: Size and type to suit application; plain finish.

.7 Primer: Alkyd primer sealer type.

.8 Wood Filler: Solvent base, tinted to match surface finish colour.

.9 Joint Sealant: Interior general purpose sealant, Type SEAL-INT-GP as specified in Section 07 92 00.

3 Execution

3.1 INSTALLATION

.1 Install Products to AWMAC NAAWS 4.0, Custom Grade.

.2 Set and secure Products in place; straight, plumb, and level.

.3 Unless noted otherwise, install Products with nails, screws, or bolts with blind fasteners spaced at 400 mm OC, or adhesive as required by specific installation requirements.

.4 Finish exposed edges of veneer-clad panels with 3.2 mm thick hardwood edge trim, glued and nailed.

.5 Finish exposed edges of laminate-clad panels with 1.0 mm thick decorative laminate edgebanding, applied using hot melt adhesive.

.6 Install door hardware as specified in Section 08 71 00.

.7 Seal gaps and joints as specified in Section 07 92 00.

3.2 ADJUSTING AND CLEANING

.1 Set exposed fasteners.

.2 Apply wood filler over exposed nail and staple indentations. Allow to dry and sand smooth.

.3 Conceal countersunk fasteners with matching hardwood dowels, sanded smooth and flush to adjacent surface.

.4 Clean and prepare surfaces for site finishing. Coordinate with Section 09 90 00.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-In-Place Concrete.

.2 Section 07 16 16 - Crystalline Waterproofing.

.3 Section 07 21 00 - Thermal Insulation.

.4 Section 31 23 23 - Fill.

.5 Section 33 41 16 - Subdrainage Piping.

1.2 REFERENCES

.1 ASTM C836/C836M-18(2022): Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.

.2 ASTM D412-16(2021): Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.

.3 ASTM D903-98(2025): Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.

.4 ASTM D1621-16(2023): Standard Test Method for Compressive Properties of Rigid Cellular Plastics.

.5 ASTM D1876-08(2023): Standard Test Method for Peel Resistance of Adhesives (T-Peel Test).

.6 ASTM D2370-16(2021): Standard Test Method for Tensile Properties of Organic Coatings.

.7 ASTM D2697-03(2021): Standard Test Method for Volume Nonvolatile Matter in Clear or Pigmented Coatings.

.8 ASTM D4632/D4632M-15a(2023): Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

.9 ASTM D4716/D4716M-22: Standard Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.

.10 ASTM D5295/D5295M-18: Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems.

.11 ASTM D5385/D5385M-25: Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes.

.12 ASTM D6241-22a: Standard Test Method for Measuring Static Puncture Strength of Geotextiles and Geosynthetic-Related Products Using a 50 mm Probe.

.13 ASTM E96/E96M-24: Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.

.14 ASTM E154/E154M-08a(2025): Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.

1.3 PREINSTALLATION MEETINGS

.1 Conduct preinstallation meetings as specified in Section 01 31 00.

.2 Preinstallation Meeting: One week prior to commencing installation, to discuss proposed methods and Products.

.3 Representatives of Consultant, Contractor, Subcontractor, and manufacturer are to be in attendance.

.4 Do not conduct meeting unless identified parties are present.

1.4 PRODUCT DATA

.1 Submit Product data as specified in Section 01 33 00.

.2 Product Data: Manufacturer's standard data sheets, indicating properties and characteristics of:
- .1 Primers and mastics;
- .2 Waterproofing membranes and flashings;
- .3 Control and expansion joints;
- .4 Sealing at openings, projections and reglets;
- .5 Sealing of holes, slots and sleeves; and
- .6 Special details.

1.5 QUALIFICATIONS

.1 Applicator: A firm specializing in applying self-adhered sheet waterproofing, having minimum 5 years documented experience.

1.6 MOCK-UPS

.1 Construct mock-ups as specified in Section 01 40 00.

.2 Mock-Up: One 3 000 x 3 000 mm size mock-up panel, demonstrating typical detailing, soil anchors, base of foundation wall, concrete cold joints, water stops, and pipe penetrations.

.3 Accepted mock-ups will be used as the standard for acceptance of the Work.

.4 Remove and replace installed Product that does not conform to accepted mock-up.

.5 Remove mock-ups from Place of the Work upon Ready-for-Takeover.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Protect Products from rain and damage.

.3 Store membrane cartons on pallets and cover if left outside. Keep materials away from sparks and flames.

.4 Store adhesives at temperatures greater than 5 degrees C.

.5 Store Products at temperature not exceeding 32 degrees C for extended periods of time.

1.8 AMBIENT CONDITIONS

.1 Do not proceed with waterproofing application during rainy or inclement weather.

.2 Do not proceed with waterproofing application when ambient air and substrate temperatures are below -4 degrees C.

.3 Apply moderate temperature Products when ambient air and substrate temperatures are above 5 degrees C.

.4 Apply low temperature Products when ambient air and substrate temperatures are above -4 degrees C. Avoid using low temperature Products when ambient air and substrate temperatures are above 10 degrees C.

1.9 WARRANTY

.1 Submit extended warranty in accordance with General Conditions of the Contract.

.2 Extended Warranty: For a period of 5 years, covering against failure to resist penetration of water, except where such failures are the result of structural failure.
.1 Hairline cracking of concrete due to temperature change or shrinkage is not considered structural failure.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers of self-adhering sheet waterproofing having Product considered acceptable for use:
.1 Carlisle Construction Materials.
.2 Dörken Systems, Inc.
.3 Henry (a Carlisle Company).
.4 IKO Industries Ltd.
.5 Soprema Inc.
.6 W. R. Meadows of Canada Limited.

.2 Manufacturers of drainage composite boards having Product considered acceptable for use:
.1 Big 'O'.
.2 DMX Plastics Limited.
.3 Dörken Systems, Inc.
.4 Grace Construction Products.
.5 Henry (a Carlisle Company).
.6 JDR Enterprises, Inc.
.7 W. R. Meadows of Canada Limited.

.3 Substitution Procedures: Refer to Section 01 25 00.

2.2 PERFORMANCE CRITERIA

.1 Self-Adhering Sheet Waterproofing: Capable of preventing moisture migration to interior, and meeting the following performance criteria:
.1 Hydrostatic Pressure Resistance (ASTM D5385/D5385M): 70.38 metres.
.2 Elongation (ASTM D412): > 970 percent.
.3 Peel Adhesion (ASTM D903): > 2 065 N/m.
.4 Lap Adhesion (ASTM D1876): > 1 505 N/m.
.5 Puncture Resistance (ASTM E154/E154M): > 214 N.
.6 Water Vapour Permeance (ASTM E96/E96M): < 2.6 Ng/Pa•s•m^2.

.2 Drainage Composite Boards: Meeting the following performance criteria:
.1 Core Compressive Strength (ASTM D1621): 718 kPa.
.2 Core Flow Rate (ASTM D4716/D4716M): 211 Lpm/m.
.3 Fabric Grab Tensile Strength (ASTM D4632/D4632M): 445 N.
.4 Fabric Puncture (ASTM D6241): 1.22 kN.

.3 Liquid Membrane: Meeting the following performance criteria:
.1 VOC Content: 26 g/L.
.2 Solids Content by Volume (ASTM D2697): 98 percent.
.3 Tensile Strength (ASTM D2370): > 480 kPa.
.4 Elongation (ASTM D2370): 440 percent.
.5 Water Vapour Transmission (ASTM E96/E96M): 0.1 ng/Pa•s•m.

2.3 MATERIALS

.1 Self-Adhering Sheet Waterproofing: 1.5 mm thick self-adhering sheet; polymeric membrane laminated to a heavy duty cross-laminated polyethylene carrier film; as follows:
  .1 Moderate Temperature Applications: eg. Mel-Rol by W. R. Meadows of Canada Limited.
  .2 Low Temperature Applications: eg. Mel-Rol Low Temp by W. R. Meadows of Canada Limited.

.2 Drainage Composite Board: 11.0 mm thick, moulded polystyrene sheet with raised dimples, bonded to a high strength, non-woven polypropylene filter fabric; eg. Mel-Drain 5035 by W. R. Meadows of Canada Limited.

.3 Flexible Flashing: Self-adhering waterproofing membrane, as specified above.

.4 Primer:
  .1 Moderate Temperature Applications: Water-based non-combustible adhesive; eg. Mel-Prime W/B by W. R. Meadows of Canada Limited.
  .2 Low Temperature Applications: Solvent-based flammable adhesive, with flash point of 10 degrees C; eg. Mel-Prime by W. R. Meadows of Canada Limited.

.5 Mastic: Rubberized, single component asphalt-base elastomeric mastic, Black colour; eg. Pointing Mastic by W. R. Meadows of Canada Limited.

.6 Liquid Membrane: To ASTM C836/C836M, cold-applied, solvent-free single-component low-VOC liquid waterproofing membrane, Black colour; eg. Hydralastic 836 by W. R. Meadows of Canada Limited.

.7 Patching Compound: Non-metallic, non-shrinking, rapid set high strength concrete compound; eg. Sealtight Speed-Crete by W. R. Meadows of Canada Limited.

.8 Detail Strips: eg. Mel-Rol Strip by W. R. Meadows of Canada Limited.

.9 Termination Bars: High strength plastic, trapezoidal profile, complete with pre-drilled holes spaced at 150 mm OC.

3 Execution

3.1 EXAMINATION

.1 Refer to Section 01 71 00.

.2 Verify concrete has been properly cured for minimum 7 days prior to membrane application.

.3 Ensure surfaces are unfrozen, clean, dry, smooth, and free of voids.

3.2 PREPARATION

.1 Clean and prepare concrete surfaces to ASTM D5295/D5295M.

.2 Treat shrinkage cracks with one layer of membrane material 150 mm wide.

.3 Patch damaged surfaces, including tie-wire holes, with approved patching compound.

.4 Prime and treat penetrations with two layers of membrane.

.5 Prime concrete substrate at manufacturer's recommended rate of coverage and allow to dry until tack-free.

.6 Re-prime surfaces that have not been covered with waterproofing membrane within 24 hours.

3.3 APPLICATION

.1 Apply sheet membrane waterproofing vertically full height of wall between bottom of footing and grade line.

.2 Apply 19 mm bead of liquid membrane to internal corner conditions.

.3 Apply 305 mm wide strip of flexible flashing to internal and external corner conditions.

.4 Overlap seams minimum 65 mm.

.5 Apply a bead of mastic to vertical and horizontal terminations of sheet membrane.

.6 Position membrane horizontally from low to high point so laps shed water. Stagger end laps.

.7 Apply double thickness of membrane over construction joints, control joints, expansion joints, and over cracks greater than 1.6 mm wide.

.8 Ensure positive adhesion of membrane to surfaces.

3.4 DRAINAGE COMPOSITE BOARDS

.1 Install drainage composite boards with filter fabric joints lapped.

.2 Install drainage composite boards vertically on foundation walls, ensuring positive drainage directly to foundation drainage pipe.

.3 Secure drainage composite boards to wall surfaces at finished grade.

.4 Install drainage composite boards horizontally where indicated on Drawings, securely fastened to substrate.

3.5 FIELD QUALITY CONTROL

.1 Advise Consultant prior to application and again on completion.

.2 Do not allow backfill operations to commence until application has been reviewed and accepted by Consultant.

3.6 CLEANING

.1 Remove material staining other surfaces.

3.7 PROTECTION

.1 Refer to Section 01 76 00.

.2 Protect completed installation from damage prior to and during backfill operations.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

1.2 PREINSTALLATION MEETINGS

.1 Conduct preinstallation meetings as specified in Section 01 31 00.

.2 Preinstallation Meeting: Schedule one week prior to commencing installation.

.3 Arrange for Contractor, Consultant, Subcontractor, and manufacturer's representative to be present.

.4 Verify Project requirements, substrate conditions, co-ordination with other Sections, manufacturer’s installation instructions, and manufacturer’s warranty requirements.

1.3 SEQUENCING

.1 Comply with manufacturer’s written recommendations for sequencing construction operations after waterproofing applications.

.2 Sequence operations to avoid detrimental performance of waterproofing application.

1.4 PRODUCT DATA

.1 Submit Product data and regulatory approvals as specified in Section 01 33 00.

.2 Product Data: Manufacturer’s standard data sheets, specifications, installation instructions, and field reports.

1.5 TEST AND EVALUATION REPORTS

.1 Submit test reports as specified in Section 01 33 00.

.2 Test Reports: Manufacturer's standard test results indicating Products meet specified performance criteria, prepared by independent testing agency, and current within past 5 years.

1.6 CERTIFICATES

.1 Submit manufacturer's certification as specified in Section 01 33 00.

.2 Certification: Product certification signed by manufacturer, verifying compliance with specified performance characteristics and physical properties.

1.7 QUALIFICATIONS

.1 Installer: Manufacturer-approved firm with skilled personnel specializing in applying crystalline waterproofing systems, having minimum 5 years documented experience.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Deliver Products in manufacturer’s original, unopened, undamaged containers with identification labels intact.

.3 Protect Products from exposure to direct sunlight and harmful weather conditions.

.4 Store Products in a dry location at minimum 7 degrees C.

1.9 AMBIENT CONDITIONS

.1 Apply Products when substrate and ambient air temperature are kept above 5 degrees C during, and for at least 48 hours before and after application.

.2 Do not apply Products when precipitation is imminent.

.3 Do not apply Products to frozen or frost filled surfaces.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers having Product considered acceptable for use:
.1 Kryton International, Inc.
.2 Tremco Construction Products Group.
.3 Xypex Chemical Corporation.
.4 W. R. Meadows of Canada Limited.

.2 Substitution Procedures: Refer to Section 01 25 00.

2.2 MATERIALS

.1 Crystalline Waterproofing: Single-component, Portland cement-based slurry containing silica-based aggregates and additives; eg. Gemite CEM-KOTE CW PLUS by W. R. Meadows of Canada Limited, colour as selected by Consultant.

.2 Hydraulic Cement Repair Mortar: One-component, fast-setting, hydraulic repair mortar; eg. Meadow-Plug by W. R. Meadows of Canada Limited.

.3 Thin-Patch Mortar: One-component, polymer modified cementitious repair mortar; eg. Meadow-Patch T1 by W. R. Meadows of Canada Limited.

.4 Overhead and Vertical Structural Repair Mortar: One-component glass fiber reinforced non-sagging cementitious patching compound; eg. Meadow-Crete OV by W. R. Meadows of Canada Limited.

.5 Horizontal Structural Repair Mortar: One-component glass fiber reinforced cementitious patching compound; eg. Meadow-Crete H by W. R. Meadows of Canada Limited.

.6 Flexible Cementitious Coating: Flexible, two-component fiber-reinforced, breathable, cementitious slurry; eg. Gemite CEM-KOTE FLEX ST by W. R. Meadows of Canada Limited, colour as selected by Consultant

.7 Reinforcing Fabric: 0.42 mm thick, non-woven polymeric reinforcing fabric; eg. Gemite Reinforcing Fabric NW by W. R. Meadows of Canada Limited, White colour.

2.3 MIXING

.1 Thoroughly mix Products in recommended quantities to achieve a smooth, lump free mixture of brushable consistency, or stiffer for trowel application.

.2 Discard mixed Product after 20 minutes. Do not re-temper.

3 Execution

3.1 PREPARATION

.1 Ensure concrete surfaces are clean and free of laitance, dirt film, paint, coatings, and other foreign matter harmful to the performance of waterproofing materials.

.2 Ensure concrete surface has open capillary system to provide tooth and suction for crystalline waterproofing material. When manufacturer determines concrete surfaces are too smooth, acid etch, sandblast, or waterblast surface as recommended by waterproofing manufacturer.

.3 Rout out defects, such as, cracks, faulty construction joints, honeycombing, and other defects. Make Good as described below.

.4 Surface Repair
- .1 Patch honeycombing and air pockets with thin-patch mortar.
- .2 Use appropriate structural repair mortar for patching defects in excess of 6 mm.
- .3 Chip away excess concrete fins and protrusions and patch smooth.
- .4 Use hydraulic cement repair mortar to stop active water leaks.

.5 Treatment of Existing Cracks and Non-Structural Joints
- .1 Identify existing cracks and joints and apply 0.8 -1.0 mm thick layer of flexible cementitious coating, approximately 250 mm wide.
- .2 Embed reinforcing fabric over entire area and work-in using trowel.
- .3 Ensure coating totally covers reinforcing fabric.
- .4 Allow coating to dry, then apply additional coat of flexible cementitious coating to build up a total thickness of 1.6 mm.

.6 Treatment of Construction Joints and Tie Holes
- .1 Prime strips/reglets in pre-formed 25 x 25 mm cavities with crystalline waterproofing in slurry consistency.
- .2 Fill area flush with appropriate structural repair mortar.

.7 Treatment of Inside Corners
- .1 Apply thin coat of crystalline waterproofing coating in slurry consistency.
- .2 Install 50 x 50 mm cove over inside corners with appropriate structural repair mortar.

3.2 APPLICATION

.1 Saturate concrete surfaces designated for crystalline waterproofing treatment with clean water to enhance crystallization formation process within concrete. Remove excess surface water before application of waterproofing.

.2 Apply Products evenly to concrete substrate, ensuring brush or broom strokes are parallel and uniform in texture.

.3 Dry-sprinkle waterproofing to freshly poured slab surfaces and power trowel.

.4 Work crystalline waterproofing well into concrete surface.

.5 Moist cure crystalline waterproofing for minimum 4 days. Protect treated surfaces from rapid drying, rain, and frost.

.6 Where treated surfaces are designated to receive painted or tiled finishes, cure waterproofing for minimum 4 weeks before proceeding with finish. At end of curing period, saturate surfaces with water, neutralize with 1:8 solution of muriatic acid, and thoroughly rinse with water.

.7 Repair leaks resulting from curing and shrinkage cracks by installing plugs, seal-strips, and additional surface treatment.

3.3 FIELD QUALITY CONTROL

.1 Manufacturer’s Field Services: Arrange for manufacturer’s field service consisting of Product-use recommendations and inspection of completed installation.

3.4 PROTECTION

.1 Refer to Section 01 76 00.

.2 Protect installed Product from damage.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 04 00 00 - Masonry.

.3 Section 07 21 19.13 - Foamed-in-Place Urethane Insulation.

.4 Section 07 26 00 - Vapour Retarders.

.5 Section 07 27 00 - Air Barriers.

.6 Section 07 52 00 - 2 Ply Modified Bitumen Membrane Roofing.

.7 Section 07 84 00 - Firestopping.

.8 Section 09 21 16 - Gypsum Board Assemblies.

.9 Section 31 23 23 - Fill.

.10 Section 32 11 23 - Aggregate Base Courses.

1.2 REFERENCES

.1 ASTM C167-25: Standard Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations.

.2 ASTM C518-21: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

.3 ASTM C1104/C1104M-19(2025): Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.

.4 ASTM D1621-16(2023): Standard Test Method for Compressive Properties of Rigid Cellular Plastics.

.5 ASTM D2842-19: Standard Test Method for Water Absorption of Rigid Cellular Plastics.

.6 ASTM E96/E96M-24: Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.

.7 CGSB 71-GP-24M: Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation.

.8 CAN/ULC-S102-2018 (REV1): Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.9 CAN/ULC-S114-2018: Standard Method of Test for Determination of Non-Combustibility in Building Materials.

.10 CAN/ULC-S701.1-2017: Standard for Thermal Insulation, Polystyrene Boards.

.11 CAN/ULC-S702.1: 2021: Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification.

.12 ULC-S702.2-15: Standard for Mineral Fibre Thermal Insulation for Buildings, Part 2: Installation.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Store, handle and protect Products as specified in Section 01 60 00.

.2 Minimize time plastic-type insulation Products are stored or exposed to sunlight at Place of the Work.

.3 Store Products away from construction activity and sources of ignition.

.4 Protect Products from damage during handling, installation, and at point of installation.

1.4 AMBIENT CONDITIONS

.1 Apply Products only when surfaces and ambient temperatures are within manufacturer's prescribed limits.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers of extruded polystyrene rigid board insulation having Product considered acceptable for use:
.1 DuPont de Nemours, Inc.
.2 Owens-Corning Canada Inc.

.2 Manufacturers of mineral fibre batt and blanket insulation having Product considered acceptable for use:
.1 CertainTeed Canada, Inc.
.2 Knauf Insulation.
.3 Owens-Corning Canada Inc.
.4 Rockwool.

.3 Substitution Procedures: Refer to Section 01 25 00.

2.2 REGULATORY REQUIREMENTS

.1 Conform to applicable regulatory requirements for combustibility and surface burning characteristic requirements of polystyrene insulations.

.2 Ensure foamed plastic insulations contain zero HFC and HCFC blowing agents, and conform to Global Warming Potential (GWP) values required by The Montreal Protocol.

2.3 MATERIALS

.1 Rigid Board Insulation (INS-RB-1): To CAN/ULC-S701.1, Type 4; extruded polystyrene (XPS) rigid board insulation, closed cell type, with integral high density skin; and as follows:
.1 Aged Thermal Resistance (ASTM C518): RSI $\geq$ 0.88 per 25 mm of thickness.
.2 Board Size: 600 x 2 400 mm.
.3 Board Edges: Shiplapped.
.4 Compressive Strength (ASTM D1621): 207 kPa.
.5 Water Absorption (ASTM D2842): $\leq$ 0.3 percent by volume.
.6 Water Vapour Permeance (ASTM E96/E96M): 50 ng/Pa•s•m^2.
.7 Thickness: As indicated on Drawings.
.8 Manufacturer and Product Name: eg. Styrofoam Brand SM30 by DuPont de Nemours, Inc.

.2 Batt Insulation (INS-BB-1): To CAN/ULC-S702.1, Type 1; mineral fibre non-rigid, friction fit thermal batt insulation, manufactured from glass, rock, or slag fibers; and as follows:
.1 Aged Thermal Resistance (ASTM C518): RSI $\geq$ 0.75 per 25 mm of thickness.
.2 Batt Size: 413 x 1 219 mm.
.3 Facing: Unfaced.
.4 Density (ASTM C167): $\geq$ 32 kg/m^3.
.5 Water Vapour Transmission (ASTM E96/E96M - Dessicant Method): 2 404 ng/Pa•s•m^2.
.6 Combustibility (CAN/ULC-S114): Noncombustible.

.7 Batt Thickness: As indicated on Drawings.
.8 Manufacturer and Product Name: eg. ComfortBatt by Rockwool.

.3 Mechanical Fasteners: Stainless steel screw type fastener, complete with 75 mm OD moulded plastic disc washer.

.4 Adhesive for Use with Polystyrene: To CGSB 71-GP-24M, Type 1.

.5 Adhesive for Use with Other Materials: Mastic type, synthetic rubber base, fungi resistant, gun or trowel application.

3 Execution

3.1 EXAMINATION

.1 Refer to Section 01 71 00.

.2 Ensure air seals and vapour retarders are in place.

3.2 RIGID BOARDS

.1 Unless specified otherwise, secure rigid board insulation with adhesive, applied in three continuous beads per board length.

.2 Install insulation boards on wall surface either horizontally or vertically as required. Place membrane surface of insulation solidly against substrate and securely fasten.

.3 Do not crush insulation face when fastening with mechanical fasteners.

.4 Stagger side and end joints.

.5 Butt edges and ends tight to adjacent board and to protrusions.

3.3 BATTS AND BLANKETS

.1 Install mineral fibre batts and blankets to ULC-S702.2.

.2 Install batt insulation in spaces without gaps and voids.

.3 Fit insulation tight in spaces and tight to exterior side of facility service components within plane of insulation.

3.4 FIELD QUALITY CONTROL

.1 Notify Consultant and independent inspection company to inspect thermal insulation before, during, and upon completion of installation.

3.5 PROTECTION

.1 Refer to Section 01 76 00.

.2 Protect insulation edges at end of each Working Day.

.3 Protect insulation in areas where welding will be carried out.

.4 Replace insulation damaged by others.

.5 Protect insulation requiring a thermal barrier in accordance with applicable regulatory requirements.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-In-Place Concrete.

.2 Section 04 00 00 - Masonry.

.3 Section 07 21 00 - Thermal Insulation.

.4 Section 07 26 00 - Vapour Retarders.

.5 Section 07 27 00 - Air Barriers.

.6 Section 07 92 21 - Sprayed Foam Sealant.

1.2 REFERENCES

.1 ASTM D1621-16(2023): Standard Test Method for Compressive Properties of Rigid Cellular Plastics.

.2 ASTM D1622-20: Standard Test Method for Apparent Density of Rigid Cellular Plastics.

.3 ASTM D1623-17(2023): Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.

.4 ASTM D2240-15(2021): Standard Test Method for Rubber Property-Durometer Hardness.

.5 ASTM D2842-19: Standard Test Method for Water Absorption of Rigid Cellular Plastics.

.6 ASTM D6226-15: Standard Test Method for Open Cell Content of Rigid Cellular Plastics.

.7 ASTM E96/E96M-24: Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.

.8 ASTM E2178-21a: Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials.

.9 CUFCA Manual for Installers of Spray Polyurethane Foam Thermal Insulation.

.10 CAN/ULC-S102-2018 (REV1): Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.11 CAN/ULC-S705.1-18: Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material Specification.

.12 CAN/ULC-S705.2-2020: Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Application.

.13 CAN/ULC-S718-2018: Standard for Site Quality Assurance Program for Spray Applied Polyurethane Foam.

.14 CAN/ULC-S770-15 (R2020): Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams.

1.3 CERTIFICATES

.1 Submit certificates as specified in Section 01 40 00.

.2 Submit a copy of foam contractor's license under a recognized third-party quality assurance program.

.3 Submit a copy of applicator certification issued by third-party.

1.4 TEST AND EVALUATION REPORTS

.1 Submit test reports as specified in Section 01 33 00.

.2 Test Reports: Manufacturer's standard test results indicating Products meet specified performance criteria, prepared by independent testing agency, and current within past 5 years.

1.5 QUALIFICATIONS

.1 Applicator: A firm employing persons certified as approved applicators in accordance with CAN/ULC-S718.

.2 Independent Inspection Agency: A urethane foam insulation and air barrier system inspector certified in accordance with CAN/ULC-S718.

1.6 MOCK-UPS

.1 Construct mock-ups as specified in Section 01 40 00.

.2 Mock-Up: A 3 000 x 3 000 mm size mock-up panel, demonstrating typical conditions, including window corner condition, door corner condition, inside corner and outside corner.

.3 Conduct the following tests on mock-up panel and report results for the following criteria:
.1 Sprayed foam insulation core density,
.2 Adhesion between transition sheet membrane and substrate,
.3 Adhesion between sprayed foam insulation and transition sheet membrane, and
.4 Cohesion or adhesion between sprayed foam insulation and substrate.

.4 Verify results comply with inspector's daily report.

.5 Accepted mock-ups will be used as the standard for acceptance of the Work.

.6 Remove and replace installed Product that does not conform to accepted mock-up.

.7 Remove mock-ups from Place of the Work upon Ready-for-Takeover.

1.7 DELIVERY STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Deliver and store Product in original packaging, bearing manufacturer's name, quantity, expiry date, CCMC numbers, and other appropriate technical indicators and references.

.3 Cold Weather Storage: Store Products during cold weather in heated storage area.

1.8 AMBIENT CONDITIONS

.1 Apply Product when surface and ambient air temperatures are within manufacturer's prescribed limits.

.2 Ventilate area as specified in Section 01 50 00.

.3 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.

1.9 FIELD CONDITIONS

.1 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.

.2 Protect workers as recommended by insulation manufacturer.

.3 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers having Product considered acceptable for use:
- .1 BASF Canada Inc.
- .2 Carlisle Spray Foam Insulation.
- .3 Elastochem Specialty Chemicals, Inc.
- .4 Genyk Inc.
- .5 Huntsman Building Solutions.
- .6 Soprema Inc.

.2 Substitution Procedures: Refer to Section 01 25 00.

2.2 PERFORMANCE CRITERIA

.1 Foamed-in-Place Urethane Insulation: Meeting the following properties:
- .1 Density (ASTM D1622): $\geq$ 28 kg/m^3.
- .2 Open Cell Content (ASTM D6226): $\leq$ 10 percent.
- .3 Long-Term Thermal Resistance (CAN/ULC-S770): RSI $\geq$ 1.80 @ 50 mm thick.
- .4 Air Permeance (ASTM E2178): $\leq$ 0.02 L/s•m^2 @ 75 Pa.
- .5 Flame Spread Index (CAN/ULC-S102): < 500.
- .6 Compressive Strength (ASTM D1621, 10% parallel to rise): $\geq$ 170 kPa.
- .7 Tensile Strength (ASTM D1623): $\geq$ 200 kPa.
- .8 Water Absorption by Volume (ASTM D2842): $\leq$ 4 percent.
- .9 Water Vapour Permeance (ASTM E96/E96M): $\leq$ 60 ng/Pa•s•m^2 with outer skin in place.
- .10 Product Global Warming Potential: GWP $\leq$ 1.0 kg CO^2 eq / m^2 @ RSI 1.

.2 Ensure continuity of building enclosure thermal barriers, air barriers and vapour retarders in conjunction with materials specified in other Sections.

.3 Seal gaps between building enclosure components and wall and roof opening frames.

2.3 MATERIALS

.1 Foamed-in-Place Insulation (INS-FIP-1): To CAN/ULC-S705.1, Type 2; two-component, closed cell polyurethane cellular plastic foam, containing zero HFC blowing agent; eg. Walltite v.5 by BASF Canada.

.2 Primers: As recommended for specific substrate by CUFCA Manual for Installers of Spray Polyurethane Foam Thermal Insulation.

.3 Transition Sheet Membrane: Air/vapour barrier sheet membrane, as specified in Section 07 27 00.

3 Execution

3.1 EXAMINATION

.1 Refer to Section 01 71 00.

.2 Ensure surfaces are free of frost, oil, grease, oxidation, dirt, loose paint, loose scale, or other deleterious material that would impair bond.

.3 Ensure penetrating items are installed before commencing insulation application.

3.2 PREPARATION

.1 Mask and cover adjacent areas to protect from overspray.

.2 Apply primers for special conditions as recommended by manufacturer.

.3 Cover wide joints with transition sheet membrane as specified in Section 07 27 00.

.4 Clean area of work prior to application of sprayed foam insulation.

3.3 APPLICATION

.1 Spray apply Product to CAN/ULC-S705.2, and CUFCA Manual for Installers of Spray Polyurethane Foam Thermal Insulation.

.2 Apply sprayed foam insulation in consecutive layers of not less than 12 mm and not more than 25 mm thick each. Apply sufficient layers to achieve total thickness indicated.

.3 Avoid formation of sub-layer air pockets.

.4 Apply Product in overlapping layers, so as to obtain a smooth, uniform surface.

.5 Maintain 75 mm clearance around chimneys, heating vents, steam pipes, recessed lighting fixtures and other heat sources.

.6 Do not apply Product to inside of exit openings or electrical junction boxes.

3.4 FIELD QUALITY CONTROL

.1 Manufacturer's Field Service: Arrange for manufacturer's technical representative to regularly inspect application (minimum twice per week) and confirm that thermal barrier and air barrier systems are applied in strict accordance with CCMC requirements.

.2 Conduct field inspection and testing in accordance with CAN/ULC-S718.

.3 Test completed application daily for core density and cohesion/adhesion to substrate. Record results in daily report forms.

.4 After Product has properly cured, conduct tests verifying adhesion between sprayed foam insulation and transition sheet membrane and between sprayed foam insulation and wall substrate; using CUFCA recommended equipment.

.1 Conduct adhesion tests at wall corners and building angles, at wall-to-slab junctions, and at wall-to-roof junctions.

.2 Perform one set of tests for every wall less than 30 metres in length. Perform two sets of tests for every wall greater than 30 metres and less than 60 metres in length, with an additional set of tests conducted for every additional 30 metres, or part thereof, in wall length.

.3 Where adhesion is determined to be lower than 110 kPa, remove defective Product, clean substrate and Provide new Product. Re-test as required at no additional cost to Owner.

.5 Verify adhesion of transition sheet membranes at perimeters of openings. Conduct adhesion tests randomly on 15 percent of wall openings, and at every tenth column or beam.

3.5 TOLERANCES

.1 Maximum Variation in Applied Thickness: Plus or minus 6 mm.

3.6 CLEANING

.1 Refer to Section 01 74 00.

.2 Remove overspray from non-prescribed surfaces without causing damage to surfaces.

.3 Remove protective covers from adjacent surfaces.

3.7 WASTE MANAGEMENT

.1 Refer to Section 01 74 00.

.2 On a daily basis, dispose of waste foam and decontaminate empty drums. Conform to authorities having jurisdiction.

3.8 PROTECTION

.1 Refer to Section 01 76 00.

.2 Protect completed installation from damage.

.3 Make Good damage.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 04 00 00 - Masonry.

.2 Section 06 10 00 - Rough Carpentry.

.3 Section 07 21 00 - Thermal Insulation.

.4 Section 07 21 19.13 - Foamed-in-Place Urethane Insulation.

.5 Section 07 27 00 - Air Barriers.

.6 Section 07 52 00 - 2 Ply Modified Bitumen Membrane Roofing.

.7 Section 07 92 00 - Joint Sealants.

.8 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

.1 ASTM E96/E96M-24: Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.

.2 CAN/CGSB-51.34-M86: Vapour Barrier, Polyethylene Sheet for Use In Building Construction.

.3 SWI Sealant and Caulking Guide Specification.

1.3 SEQUENCING

.1 Sequence installation of Products in conjunction with other air barrier and vapour retarder materials and seals.

1.4 PRODUCT DATA

.1 Submit Product data as specified in Section 01 33 00.

.2 Product Data: Manufacturer's standard data sheets, indicating Product physical characteristics, performance criteria, and limitations.

2 Products

2.1 PERFORMANCE CRITERIA

.1 Ensure continuity of building enclosure vapour retarder in conjunction with materials specified in other Sections.

.2 Seal gaps between building enclosure components and opening frames.

2.2 MATERIALS

.1 Plastic Sheet Vapour Retarder: To CAN/CGSB-51.34-M; polyethylene sheet, as follows:
.1 Thickness: 0.15 mm.
.2 Water Vapour Permeance (ASTM E96/E96M): $\leq$ 2.2 ng/Pa•s•m^2.
.3 Manufacturer and Product Name: eg. Super Six by Polytarp Products.

.2 Adhesive: Compatible with sheet barrier and substrate, permanently non-curing.

.3 Joint Sealant: Interior general purpose sealant, Type SEAL-INT-GP as specified in Section 07 92 00.

3 Execution

3.1 PREPARATION

.1 Ensure substrates are clean, dry, and free of oil, grease, dirt, excess mortar, and other contaminants.

.2 Cure new concrete for minimum two weeks.

.3 Prime substrate prior to applying self-adhered membranes.

3.2 INSTALLATION

.1 Install Products to SWI Sealant and Caulking Guide Specification.

.2 Position sheet joints or laps over firm bearing to achieve an effective and permanent seal.

.3 Seal laps, joints, and terminations with joint sealant to ensure complete, continuous seal of building envelope.

3.3 FIELD QUALITY CONTROL

.1 Inspect vapour retarders prior to concealment, and identify gaps, holes, and punctures.

.2 Seal gaps, holes, and punctures in vapour retarder membranes with joint sealant, as specified in Section 07 92 00.

.3 Request Consultant inspection of vapour retarders prior to concealment. Work that has been concealed prior to Consultant inspection will be exposed while Consultant remains at Place of the Work, inspected, and then only concealed upon Consultant acceptance.

3.4 CLEANING

.1 Refer to Section 01 74 00.

.2 Clean extra materials from adjacent surfaces.

.3 Leave a suitable substrate for subsequent installations.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 04 00 00 - Masonry.

.3 Section 07 21 00 - Thermal Insulation.

.4 Section 07 21 19.13 - Foamed-in-Place Urethane Insulation.

.5 Section 07 26 00 - Vapour Retarders.

.6 Section 07 52 00 - 2 Ply Modified Bitumen Roof Membrane.

.7 Section 07 92 00 - Joint Sealants.

.8 Section 07 92 21 - Sprayed Foam Sealant.

.9 Section 08 12 13 - Hollow Metal Frames.

.10 Section 08 51 13 - Aluminum Windows.

1.2 REFERENCES

.1 ASTM D412-16(2021): Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.

.2 ASTM E96/E96M-24: Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.

.3 ASTM E154/E154M-08a(2025): Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.

.4 ASTM E2178-21a: Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials.

.5 SWI Sealant and Caulking Guide Specification.

.6 CAN/ULC-S741-2008 (R2016): Standard for Air Barrier Materials - Specification.

.7 CAN/ULC-S742-2011 (R2016): Standard for Air Barrier Assemblies - Specification.

1.3 SEQUENCING

.1 Sequence installation in conjunction with other air and vapour barrier materials and seals.

1.4 PRODUCT DATA

.1 Submit Product data as specified in Section 01 33 00.

.2 Product Data: Manufacturer's standard data sheets, indicating Product physical properties, performance criteria, and limitations.

1.5 MANUFACTURER'S INSTRUCTIONS

.1 Submit manufacturer's instructions as specified in Section 01 33 00.

.2 Manufacturer's Instructions: Manufacturer's standard installation instructions, indicating substrate preparation, and Product installation requirements and techniques.

1.6 QUALIFICATIONS

.1 Applicators: A firm recognized by manufacturer as suitable for applying specified air barrier Products.

1.7 DELIVERY STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Deliver Products in undamaged containers and original packaging indicating name of manufacturer and product.

.3 Store roll materials on end in original packaging.

.4 Store adhesives and primers at 5 degrees C to facilitate handling.

.5 Keep solvent away from open flame or excessive heat.

.6 Protect rolls from direct sunlight until ready for use.

1.8 AMBIENT CONDITIONS

.1 Apply sheet membranes when ambient air temperature is above 5 degrees C.

.2 Apply membranes only during dry conditions, and to dry substrates that are free of snow, ice and water.

.3 Apply only dry materials, during weather that will not introduce moisture into assembly.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers having Product considered acceptable for use:
.1 Carlisle Construction Materials.
.2 Henry (a Carlisle Company).
.3 IKO Industries Ltd.
.4 Soprema Inc.
.5 Tremco Construction Products Group.
.6 W. R. Meadows of Canada Limited.

.2 Substitution Procedures: Refer to Section 01 25 00.

2.2 PERFORMANCE CRITERIA

.1 Ensure continuity of building enclosure air barrier in conjunction with adjacent Products.

.2 Seal gaps between building enclosure components and opening frames.

2.3 MATERIALS

.1 Air/Vapour Barrier Sheet Membrane: To CAN/ULC-S741 and CAN/ULC-S742, Class A1; SBS rubberized asphalt sheet membrane, self-adhering grade; and as follows:
.1 Thickness: $\geq$ 1.0 mm.
.2 Air Leakage (ASTM E2178): $\leq$ 0.02 L/s•m^2 @ 75 Pa.
.3 Water Vapour Permeance (ASTM E96/E96M, Method A): $\leq$ 1.71 ng/Pa•s•m^2.
.4 Elongation (ASTM D412 - Modified): 200 percent.
.5 Tensile Strength (ASTM D412 - Modified): 3.45 MPa.
.6 Puncture Resistance (ASTM E154/E154M): 178 N.
.7 Product and Manufacturer Name: eg. Blueskin SA by Henry (a Carlisle Company).

.2 Air/Vapour Barrier Patching Compound: To CAN/ULC-S741 and CAN/ULC-S742, Class A1; single-component, trowel- or brush-applied solvent type synthetic rubber; and as follows:
.1 Air Leakage (ASTM E2178): $\leq$ 0.02 L/s•m^2 @ 75 Pa.
.2 Water Vapour Permeance (ASTM E96/E96M, Method A): $\leq$ 1.7 ng/Pa•m^2•s.
.3 Solids Content by Weight: 72 percent.
.4 Product and Manufacturer Name: eg. Air-Bloc 21 by Henry (a Carlisle Company).

2.4 ACCESSORIES

.1 Attachments: Galvanized steel bars and anchors.

.2 Adhesive: Compatible with sheet barrier and substrate, permanently non-curing.

.3 Primer: As recommended by self-adhering membrane manufacturer.

.4 Joint Sealant: Exterior flashing sealant, Type SEAL-EXT-FL as specified in Section 07 92 00.

3 Execution

3.1 PREPARATION

.1 Ensure surfaces are clean, dry and free of oil, grease, dirt, excess mortar, and other contaminants.

.2 Cure new concrete for minimum two weeks.

.3 Fill spalled concrete or open mortar joints to an even plane.

.4 Apply primer to porous surfaces designated to receive self-adhering sheet membranes.

3.2 INSTALLATION

.1 Install Products to SWI Sealant and Caulking Guide Specification.

.2 Provide air tight joints.

.3 Seal Products completely around projections and penetrations.

.4 Fully adhere sheet membranes to primed substrate, using consecutive weatherboard method.

.5 Eliminate wrinkles, gaps, bubbles, air pockets, and fishmouths.

.6 Apply transition sheet membranes at openings and transitional connections.

.7 Leave sufficient amount of excess membrane over top of parapet walls, and around wall openings, for tie-in by other Sections.

.8 Cut membrane neatly around penetrations. Use heated trowel to soften and form membrane. Seal with air/vapour barrier patching compound.

.9 Do not leave installed membranes exposed to UV or weather for more than 42 days.

3.3 FIELD QUALITY CONTROL

.1 Inspect air barriers prior to concealment and identify gaps, holes, and punctures.

.2 Seal gaps, holes, and punctures with air/vapour barrier patching compound.

.3 Request Consultant inspection of air barriers prior to concealment. Work that has been concealed prior to Consultant inspection will be exposed while Consultant remains at Place of the Work, inspected, and only concealed upon Consultant acceptance.

3.4 CLEANING

.1 Refer to Section 01 74 00.

.2 Clean extra material from adjacent surfaces.

.3 Leave suitable substrate for subsequent construction.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 04 00 00 - Masonry.

.3 Section 05 50 00 - Metal Fabrications.

.4 Section 07 92 00 - Joint Sealants.

.5 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

.1 ASTM C303-21: Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.

.2 ASTM C1104/C1104M-19(2025): Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.

.3 ASTM E119-26: Standard Test Methods for Fire Tests of Building Construction and Materials.

.4 ASTM E2174-24: Standard Practice for On-Site Inspection of Installed Firestop Systems.

.5 ASTM E2393-20a: Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.

.6 ASTM E3456-25: Standard Practice for On-Site Identification of Firestop Systems and Judgments.

.7 CAN/ULC-S101-14 (REV1): Standard Method of Fire Endurance Tests of Building Construction and Materials.

.8 CAN/ULC-S102-2018 (REV1): Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.9 CAN/ULC-S114-2018: Standard Method of Test for Determination of Non-Combustibility in Building Materials.

.10 CAN/ULC-S115:2023: Standard Method of Fire Tests of Firestop Systems.

.11 CAN/ULC-S129-15 (REV1): Standard Method of Test for Smoulder Resistance of Insulation (Basket Method).

.12 CAN/ULC-S702.1:2021: Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification.

.13 ULC List of Equipment and Materials.

1.3 PREINSTALLATION MEETINGS

.1 Prior to commencing installation of firestopping and smoke seals, arrange and conduct preinstallation meeting as specified in Section 01 31 00.

.2 Preinstallation Meeting: Discuss proposed methods and materials to be used in each instance.

.3 Representatives of Owner, Contractor, Consultant, Subcontractor, manufacturers, and authority having jurisdiction are to be in attendance.

.4 Do not conduct meeting unless identified parties are present.

1.4 PRODUCT DATA

.1 Submit Product data as specified in Section 01 33 00.

.2 Product Data: Sealant manufacturer's standard installation instructions and standard drawings, indicating ULC or WHI test designations.

1.5 SHOP DRAWINGS

.1 Submit Shop Drawings as specified in Section 01 33 00.

.2 Shop Drawings: Project-specific drawings, illustrating sizes of openings, nature of penetrations and tested method of firestop and smoke seal protection being proposed.
.1 Shop Drawings are to be stamped, signed, and dated by manufacturer's design engineer.
.2 Submit Shop Drawings to Consultant and to authority having jurisdiction for review and acceptance.

1.6 CERTIFICATES

.1 Submit certification as specified in Section 01 33 00.

.2 Certificate: Sealant manufacturer's letter of certification verifying Products meet or exceed specified requirements.

1.7 TEST AND EVALUATION REPORTS

.1 Submit test reports as specified in Section 01 33 00.

.2 Test Reports: Manufacturer's standard test results indicating Products meet specified performance criteria, prepared by independent testing agency, and current within past 5 years.

1.8 FIELD QUALITY CONTROL SUBMITTALS

.1 Submit field quality control submittals as specified in Section 01 40 00.

.2 Manufacturer's Field Inspection Reports: Manufacturer's written acceptance of installation based on regular inspections.

.3 Engineered Judgements: Where completed installations deviate from tested design assembly, submit engineered judgements prepared by manufacturer's design engineer verifying compliance with applicable regulatory requirements.

1.9 QUALIFICATIONS

.1 Manufacturer's Design Engineer: A professional engineer having minimum 10 years documented experience designing firestop and smoke seal systems, licensed to practice at Place of the Work.

.2 Installer: A firm specializing in installing firestop and smoke seal systems, approved or certified as an installer by manufacturer.

1.10 MOCK-UPS

.1 Construct mock-ups as specified in Section 01 40 00.

.2 Mock-ups: One full-size mock-up of each penetration firestop system, fire-resistive joint system, perimeter fire containment system, and continuity head-of-wall joint system, complete with smoke seals required on Project. Include representative substrates and penetrating components, for each fire rating required at each type of wall, floor and roof construction.

.3 Comply with Project requirements as to thickness and density of application to achieve required fire rating.

.4 Accepted mock-ups will be used as the standard for acceptance of the Work.

.5 Remove and replace installed Product that does not conform to accepted mock-up.

.6 Remove mock-ups from Place of the Work upon Ready-for-Takeover.

1.11 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Deliver Products to Place of the Work in original unopened packages.

.3 Store Products in an enclosed shelter, preventing damage to containers.

1.12 AMBIENT CONDITIONS

.1 Do not apply sealants when temperature of substrate material and surrounding air is below 5 degrees C.

.2 Maintain sealant at minimum 18 degrees C for best workability.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers having Product considered acceptable for use:
.1 3M Company Canada.
.2 AD Fire Protection.
.3 Hilti Canada.
.4 Nuco Inc.
.5 Specified Technologies Inc.
.6 Tremco Construction Products Group.
.7 The Rectorseal Corporation.

.2 Substitution Procedures: Refer to Section 01 25 00.

2.2 DESIGN AND PERFORMANCE CRITERIA

.1 Seal empty holes and penetrations at floors, fire rated walls, and smoke barrier walls.

.2 Seal holes accommodating penetrating items such as cables, cable trays, pipes, ducts, and conduits.

.3 Design firestopping system to maintain integrity of time rated construction by providing a seal against spread of heat, flame, and smoke.

.4 Systems shall be ULC or ULI classified or listed by WHI for appropriate required time rating.

.5 Provide firestop and smoke seal systems to CAN/ULC-S115 and as described below:
.1 Asbestos free materials and systems fully capable of maintaining an effective barrier against gases, flame and smoke in compliance with CAN/ULC-S115, not exceeding opening sizes stated.

.2 Service Penetration Assemblies: Certified by CAN/ULC-S115 and used by ULC Guide 40 U19. Service components listed as certified in this guide are noted under Label Service of ULC.

.6 Fire resistance rating of firestopping assembly must meet or exceed fire resistance rating of floor or wall being penetrated.

.7 Provide elastomeric seal at openings around penetrations for pipes, ductwork, and other mechanical items requiring sound and vibration control. Do not use cementitious or rigid seals at such locations.

.8 Damming and back up materials, supports, and anchoring devices shall be to manufacturer's recommendations, and in strict accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.9 Firestopping compounds shall not contain volatile solvents or require special application to protect plastic pipe from firestopping compound.

2.3 MATERIALS

.1 Primer: As recommended by sealant manufacturer for specific material, substrate and end use.

.2 Firestop Accessories: Firestop foams, boards, blocks, collars, wraps, puttys and plugs; to CAN/ULC-S115; ULC labelled; types as listed in tested assemblies.

.3 Firestop Insulation: To CAN/ULC-S702.1, Type 2; mineral fibre manufactured from rock or slag, suitable for manual application; and having the following physical properties when tested to the identified standard:
.1 Density (ASTM C303): $\geq$ 72 kg/m^3.
.2 Combustibility (CAN/ULC-S114): Noncombustible.
.3 Melt Temperature: > 1 175 degrees C.
.4 Surface Burning Characteristics: To CAN/ULC-S102, as follows:
.1 Flame Spread Index $\leq$ 0.
.2 Smoke Developed Index $\leq$ 0.
.5 Moisture Sorption (ASTM C1104/C1104M): 0.04 percent.
.6 Smoulder Resistance (CAN/ULC-S129): 0.01 percent.

.4 Firestop Sealants: To CAN/ULC-S115; ULC labelled; non-sagging type for vertical applications; types as listed in tested assemblies.

3 Execution

3.1 EXAMINATION

.1 Refer to Section 01 71 00.

.2 Confirm compatibility of surfaces to receive sealant materials.

.3 Verify surfaces of openings are sound, clean, dry, and ready to receive application of sealant.

.4 Verify penetrating elements are securely fixed and properly located.

3.2 PREPARATION

.1 Protect adjacent surfaces and equipment from damage.

.2 Clean contact surfaces of dirt, dust, grease, oil, loose material, or other matter which may impair sealant bond.

.3 Remove incompatible materials which affect bond by scraping, brushing, water cleaning, solvent cleaning, or sandblasting.

3.3 APPLICATION

.1 Install firestop insulation in compacted thicknesses required by ULC design. Compress insulation approximately 33 percent.

.2 Apply sealant in strict accordance with ULC certification.

.3 Coordinate and cooperate with adjacent, contiguous and related Subcontractors to ensure a proper and timely installation.

.4 Seal holes and voids made by penetrating items to ensure an effective fire and smoke barrier.

.5 Seal intersections and penetrations of floors, ceilings, walls, and columns.

.6 Seal around cutouts for facility services.

.7 Wrap non-insulated heated pipes that may be subject to movement with non-combustible smooth material to permit pipe to move without damaging firestopping and smoke seal.

.8 Maintain integrity of insulation and vapour retarders on insulated pipes and ducts at fire separation.

.9 Where floor openings exceed 100 mm in width and may be subjected to traffic or loading, install cover plate systems capable of supporting same loading as floor.

.10 Identify installed penetration firestop systems, fire-resistive joint systems, perimeter fire containment systems, and continuity head-of-wall joint systems to ASTM E3456.
.1 Affix firestop identification labels/tags to, or adjacent to, each installed system.

3.4 FIELD QUALITY CONTROL

.1 Perform field inspection as specified in Section 01 40 00.

.2 Inspect penetration firestop systems to ASTM E2174.

.3 Inspect fire-resistive joint systems and perimeter fire containment systems to ASTM E2393.

.4 Examine finished penetrations to ensure proper installation before concealing or enclosing any areas of work.

.5 Keep areas of work accessible until inspection has been completed.

.6 Manufacturer's Field Service: Inspect and confirm completed installation is in strict accordance with ULC requirements.

.7 Correct defective work and re-inspect to verify compliance with requirements.

3.5 CLEANING

.1 Refer to Section 01 74 00.

.2 Immediately remove spots, smears, stains, residues, adhesives, and other disfigurements from installation, including from adjacent surfaces.

.3 Do not use Products containing volatile solvents.

.4 Leave the Work in a clean and satisfactory condition.

3.6 PROTECTION

.1 Refer to Section 01 76 00.

.2 Protect firestop and smoke seal assemblies from damage.

.3 Make Good damaged firestop and smoke seal assemblies immediately prior to Ready-for-Takeover.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-In-Place Concrete.

.2 Section 04 00 00 - Masonry.

.3 Section 06 20 00 - Finish Carpentry.

.4 Section 07 13 26 - Self-Adhering Sheet Waterproofing.

.5 Section 07 26 00 - Vapour Retarders.

.6 Section 07 27 00 - Air Barriers.

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

.8 Section 07 84 00 - Firestopping.

.9 Section 07 92 21 - Sprayed Foam Sealant.

.10 Section 08 12 13 - Hollow Metal Frames.

.11 Section 08 51 13 - Aluminum Windows.

.12 Section 08 80 00 - Glazing.

.13 Section 09 21 16 - Gypsum Board Assemblies.

.14 Section 09 30 00 - Tiling.

.15 Section 09 51 23 - Acoustical Tile Ceilings.

.16 Section 09 66 13 - Portland Cement Terrazzo Flooring.

1.2 REFERENCES

.1 ASTM C919-19: Standard Practice for Use of Sealants in Acoustical Applications.

.2 ASTM C920-18(2024): Standard Specification for Elastomeric Joint Sealants.

.3 ASTM C1193-25: Standard Guide for Use of Joint Sealants.

.4 ASTM C1330-23: Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.

.5 ASTM C1521-19(2020): Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.

.6 CAN/CGSB-19.13-M87: Sealing Compound, One Component, Elastomeric, Chemical Curing.

.7 CAN/CGSB-19.17-M90: One Component Acrylic Emulsion Base Sealing Compound.

1.3 SAMPLES

.1 Submit samples as specified in Section 01 33 00.

.2 Selection Samples: Duplicate samples of each specified joint sealant, illustrating available colour selections.

1.4 MANUFACTURER REPORTS

.1 Submit manufacturers' reports as specified in Section 01 40 00.

.2 Manufacturers' Reports: Manufacturer field review reports, as specified below.

1.5 QUALIFICATIONS

.1 Applicators: Workers experienced with applying joint sealants, having minimum three years documented experience.

1.6 MOCK-UPS

.1 Construct mock-ups as specified in Section 01 40 00.

.2 Mock-ups: One full-size, 300 mm long mock-up of each required joint sealant applied to each required substrate, demonstrating joint width and tooled appearance. Allow to cure

.3 Conduct adhesion pull tests on mock-ups to ASTM C1521, Method A - Destructive Procedure. Sealant adhesion pull tests to fail only cohesively, not adhesively.

.4 Replace failed mock-ups, and re-test until successful results are achieved.

.5 Accepted mock-ups will be used as the standard for acceptance of the Work.

.6 Remove and replace installed Product that does not conform to accepted mock-up.

.7 Remove mock-ups from Place of the Work upon Ready-for-Takeover.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Deliver Products in manufacturer's sealed packages.

.3 Store Products in warm, dry conditions.

1.8 AMBIENT CONDITIONS

.1 Do not install solvent curing sealants in enclosed building spaces.

.2 Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.9 WARRANTY

.1 Submit extended warranty in accordance with General Conditions of the Contract.

.2 Extended Warranty: For a period of two years, including coverage of installed sealants and accessories which fail to achieve air tight and watertight seal, exhibit loss of either adhesion or cohesion, or do not cure.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers of exterior weatherseal sealants, glazing sealants, interior general purpose sealants, and interior mildew-resistant sealants having Product considered acceptable for use:
.1 Dow Chemical Company.
.2 General Electric.
.3 Master Builders Solutions Canada, Inc.
.4 Tremco Construction Products Group.

.2 Manufacturers of exterior flashing sealants having Product considered acceptable for use:
.1 Henry (a Carlisle Company).
.2 Tremco Construction Products Group.
.3 W. R. Meadows of Canada Limited.

.3 Manufacturers of interior tiling sealants having Product considered acceptable for use:
.1 Mapei.

.4 Substitution Procedures: Refer to Section 01 25 00.

2.2 PERFORMANCE CRITERIA

.1 Seal gaps between dissimilar Products, visible or otherwise.

.2 Protect building components from air infiltration and moisture penetration.

2.3 MATERIALS

.1 Exterior Weatherseal Sealant (SEAL-EXT): To ASTM C920, Type S, Grade NS, Class 35, Use NT, M, A and O; one-part, moisture curing, low modulus polyurethane sealant; accommodating joint movement of plus or minus 35 percent, with 30- to 90-minute skin time; eg. Dymonic FC by Tremco Construction Products Group, colours as selected by Consultant.

.2 Exterior Flashing Sealant (SEAL-EXT-FL): To ASTM C920, Type S, Grade NS, Class 35, Use NT; one-part, silyl-terminated polyether (STPE) polymer-based sealant; accommodating joint movement of plus or minus 35 percent; eg. 925 BES Sealant by Henry (a Carlisle Company), colour as selected by Consultant.

.3 Glazing Sealant (SEAL-GLZ): To CAN/CGSB-19.13-M, Type MG-2-25-A-L; one-part, moisture curing, acetoxy silicone sealant; eg. Proglaze by Tremco Construction Products Group, Clear colour.

.4 Interior General Purpose Sealant (SEAL-INT-GP): To CAN/CGSB-19.17-M; one-part, siliconized acrylic latex, mildew-resistant, accommodating joint movement of plus or minus 12-1/2 percent; eg. Tremflex 834 by Tremco Construction Products Group, colours as selected by Consultant.

.5 Interior Mildew-Resistant Sealant (SEAL-INT-MR): To ASTM C920, Type S, Grade NS, Class 25, Use NT, G, A, and O; one-part, acetoxy silicone sealant, complete with integral fungicide; eg. Tremsil 200 by Tremco Construction Products Group, colours as selected by Consultant.

.6 Interior Tiling Sealant (SEAL-INT-TILE): Single-component, 100 percent silicone sealant; neutral cure, low odour type; Mapesil T Plus by Mapei, colours to match adjacent tile grout colours.

2.4 ACCESSORIES

.1 Primer: Non-staining type, recommended by sealant manufacturer to suit application.

.2 Joint Cleaner: Isopropyl alcohol or xylene; non-corrosive and non-staining, as recommended by sealant manufacturer; compatible with joint forming materials.

.3 Backer Rod: To ASTM C1330, Type B - Bi-cellular; diameter sized 130 - 150 percent larger than designated joint width.

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

3 Execution

3.1 PREPARATION

.1 Clean and prime joints to requirements of manufacturer's instructions.

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

.3 Mask joint edges where irregular surface or sensitive joint border exists to ensure neat application.

3.2 APPLICATION

.1 Install joint sealants to ASTM C1193.

.2 Install acoustical sealants to ASTM C919.

.3 Apply sealant with pressure gun having proper size nozzle and extrusion nozzle where required.

.4 Use sufficient pressure to fill joints solid to joint filler.

.5 Shape nozzle to finish sealant in a neat concave bead.

.6 Apply sealant sufficiently in from normal face of joints to form a positive shadow line.

.7 Tool sealant smooth and slightly concave, free from ridges, wrinkles, air pockets and embedded impurities.

.8 Ensure proper configuration and depth achieved. Depth of sealant at point of adhesion shall be not more than one-half the width.

3.3 FIELD QUALITY CONTROL

.1 Inspect completed sealant joints for adhesion and cohesion to ASTM C1521.

.2 Inspect completed sealant joints for holes, gaps and areas where leaks could become present.

.3 Reject failed joints, joints filled with only skin bead and joints having insufficient volume of sealant.

.4 Remove material from rejected joints, clean, and re-seal to attain proper width-to-depth joint coverage.

3.4 MANUFACTURER SERVICES

.1 Arrange for sealant manufacturer's representative to be present during mock-up adhesion pull tests, and prior to commencement of sealant installation.

.2 Consult with manufacturer's representative as to joint conditions.

.3 Arrange for manufacturer's representative to regularly inspect joint sealant application (minimum twice per week).

.4 Submit written field review reports, confirming sealant installation is in strict accordance with manufacturer's recommendations.

3.5 CLEANING

.1 Refer to Section 01 74 00.

.2 Remove excess sealant and droppings using cleaner which will not damage adjacent surfaces.

.3 Make Good surfaces defaced or disfigured as a result of sealant application.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 04 00 00 - Masonry.

.3 Section 07 21 00 - Thermal Insulation.

.4 Section 07 21 19.13 - Foamed-in-Place Urethane Insulation.

.5 Section 07 26 00 - Vapour Retarders.

.6 Section 07 27 00 - Air Barriers.

.7 Section 07 92 00 - Joint Sealants.

.8 Section 08 12 13 - Hollow Metal Frames.

.9 Section 08 51 13 - Aluminum Windows.

1.2 REFERENCES

.1 SWI Sealant and Caulking Guide Specification.

.2 CAN/ULC-S710.1-2019: Standard for Bead-Applied One Component Polyurethane Air Sealant Foam, Part 1: Material Specification.

.3 CAN/ULC S710.2-11: Standard for Thermal Insulation - Bead Applied One-Component Polyurethane Air Sealant Foam, Part 2: Application.

.4 CAN/ULC-S711.1-2019: Standard for Bead-Applied Two Component Polyurethane Air Sealant Foam, Part 1: Material Specification.

.5 CAN/ULC S711.2-11: Standard for Thermal Insulation - Bead Applied Two-Component Polyurethane Air Sealant Foam, Part 2: Application.

1.3 SEQUENCING

.1 Sequence installation of Products in conjunction with air barriers and vapour retarders.

1.4 PRODUCT DATA

.1 Submit Product data as specified in Section 01 33 00.

.2 Product Data: Manufacturer's standard data sheets, indicating Product physical properties, performance criteria, and limitations.

1.5 MANUFACTURER'S INSTRUCTIONS

.1 Submit manufacturer's instructions as specified in Section 01 33 00.

.2 Manufacturer's Instructions: Manufacturer's standard installation instructions, indicating preparation and installation requirements and techniques.

1.6 DELIVERY STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Deliver Products in undamaged containers and original packaging indicating names of manufacturer and Product.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers having Product considered acceptable for use:
.1 DuPont de Nemours, Inc.
.2 Henkel Canada Corporation.

.2 Substitution Procedures: Refer to Section 01 25 00.

2.2 PERFORMANCE CRITERIA

.1 Ensure continuity of building enclosure air barrier in conjunction with Products specified in other Sections.

.2 Seal gaps between building enclosure components and opening frames.

2.3 MATERIALS

.1 Sprayed Foam Sealant (SFS-1): To CAN/ULC-S710.1; one-component polyurethane sealant.

.2 Sprayed Foam Sealant (SFS-2): To CAN/ULC-S711.1; two-component polyurethane sealant.

3 Execution

3.1 PREPARATION

.1 Ensure surfaces are clean and dry.

.2 Ensure surfaces are free of oil, grease, dirt, excess mortar, and other contaminants.

3.2 INSTALLATION

.1 Install sprayed foam sealant in accordance with authorities having jurisdiction.

.2 Avoid overfilling restricted spaces.

.3 Seal gaps between air barrier membranes and frames installed in openings.

.4 Apply sprayed foam sealant Type SFS-1 to cracks or openings 6 mm to 50 mm wide. Conform to CAN/ULC S710.2.

.5 Apply sprayed foam sealant Type SFS-2 to gaps over 50 mm wide, and to voids in hidden cavities. Conform to CAN/ULC S711.2.

3.3 CLEANING

.1 Refer to Section 01 74 00.

.2 Clean extra material from adjacent surfaces.

.3 Leave a suitable substrate for subsequent construction.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 04 00 00 - Masonry.

.3 Section 07 52 00 - 2 Ply Modified Bitumen Membrane Roofing.

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

.5 Section 07 84 00 - Firestopping.

.6 Section 07 92 00 - Joint Sealants.

.7 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

.1 AAMA 611-20: Voluntary Specification for Anodized Architectural Aluminum.

.2 ASTM A123/A123M-24: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.3 ASTM A153/A153M-23: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.4 ASTM A240/A240M-22b: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

.5 ASTM A653/A653M-23: Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.6 ASTM B221M-21: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

.7 ASTM E119-26: Standard Test Methods for Fire Tests of Building Construction and Materials.

.8 ASTM E814-24: Standard Test Method for Fire Tests of Penetration Fire Stop Systems.

.9 CSA G40.20-13 (R2023): General Requirements for Rolled or Welded Structural Quality Steel.

.10 CSA G40.21-13 (R2023): Structural Quality Steel.

1.3 PRODUCT DATA

.1 Submit Product data as specified in Section 01 33 00.

.2 Product Data: Manufacturer's standard data sheets, indicating materials, component profiles and sizes, and applicable UL Classifications or WH Listings.

1.4 SHOP DRAWINGS

.1 Submit Shop Drawings as specified in Section 01 33 00.

.2 Shop Drawings: Project-specific drawings, illustrating layouts, dimensions, affected adjacent construction, anchorage, finishes, splices, and accessories.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver and store Products as specified in Section 01 60 00.

.2 Provide temporary protective cover to finished metal surfaces.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers having Product considered acceptable for use:
.1 The C/S Group.
.2 Inpro Architectural Products.
.3 MM Systems Corporation.
.4 Nystrom, Inc.
.5 Watson Bowman Acme Inc.

.2 Substitution Procedures: Refer to Section 01 25 00.

2.2 DESIGN AND PERFORMANCE CRITERIA

.1 Design joint covers to permit restrained movement of expansion joint without disengagement of cover. Consider special movement conditions.

.2 Fire Rated Joint Covers:
.1 UL classified or WH listed.
.2 Tested to ASTM E119 and ASTM E814, including hose stream test at full rated period.
.3 Design expansion joint covers with fire rating not less than fire rating of adjacent construction.
.4 Design expansion joint covers from inorganic materials, that will not create smoke or contribute fuel during a fire.

.3 Allowable Loads:
.1 Normal Position:
.1 Uniform Load: 9.58 kPa.
.2 Concentrated Load: 8.90 kN.
.3 Deflection: $\leq$ 3 mm.
.2 Fully Open Position:
.1 Uniform Load: 9.58 kPa.
.2 Concentrated Load: 8.90 kN.
.3 Stress: $\leq$ 193 053 kPa.
.4 Deflection: $\leq$ 3 mm.

.4 Spherical and pin type centering bars must be fully engaged with base member.

2.3 MATERIALS

.1 Extruded Aluminum: To ASTM B221M, 6063-T5 or 6061-T651 alloys.

.2 Sheet Steel: To ASTM A653/A653M, Commercial Steel (CS) Types A, B, and C; cold-rolled sheet steel, galvannealed.

.3 Steel Sections and Plates: To CSA G40.20 and CSA G40.21.

.4 Stainless Steel: To ASTM A240/A240M, Type 304.

2.4 ACCESSORIES

.1 Water Barrier: Flexible polyvinyl chloride, EPDM.

.2 Fire Barrier: Ceramic fiber insulation.

.3 Flame Sealant: As specified in Section 07 84 00.

.4 Centering Bars: C-1074 tempered steel with protective coating.

.5 Fasteners: As recommended by joint cover manufacturer.

2.5 FABRICATION

.1 Shop assemble components and package with anchors and fittings. Supply components in single lengths where possible; minimize site splicing.

.2 Fabricate special transitions, corner fittings and end closures.

.3 Mitre and weld joints.

.4 Flexible Floor Joint Covers:
.1 Fasten cover plates through center of spring steel centering bars.
.2 Centering Bars: Complete with a corrosion resistant coating; attached to nylon spheres or steel pins, which are retained in tracks of extruded base members. Set centering bars diagonally at 250 mm OC maximum.
.3 Cover Plates: Aluminum with smooth surface.

.5 Fabricate roof joint covers with sealing washers and gaskets, splice covers, counterflashing flanges, and end closures.

.6 Fabricate fire rated joint covers with fire barrier and flame sealant to ensure required fire rating is met.

2.6 FINISHES

.1 Galvanized Coating on Steel Components: To ASTM A123/A123M, Coating Grade 55; hot dipped zinc alloy coating.

.2 Galvanized Coating on Steel Hardware: To ASTM A153/A153M, Classes B3, C or D; hot dipped zinc alloy coating.

.3 Galvannealed Coating on Sheet Steel: To ASTM A653/A653M, Coating Designation ZF120; wiped zinc-iron coating, with streak-free matte grey appearance.

.4 Stainless Steel: To AISI No. 4 - Brushed.

.5 Mill Finish on Aluminum - Floor and Roof Applications: Manufacturer's standard mill finish.

.6 Anodized Coating on Aluminum - Wall and Ceiling Applications: To AAMA 611, AA-M10C21A31, Class II Clear Anodic Oxide coating (No. 17 - Clear).

.7 Expandable Gasket: Colours as selected by Consultant.

3 Execution

3.1 INSTALLATION

.1 Install Products plumb, level, and accurately fitted.

.2 Install Products flush with adjacent surfaces, and free from distortion or defects.

.3 Rigidly anchor work to substrate.

.4 Set expansion joint system to proper width for ambient air temperature at time of setting.

.5 Provide water barriers at exterior joints, and where otherwise indicated on Drawings.

.6 Provide drainage fittings where required.

3.2 ADJUSTING

.1 Adjust joint cover to freely accommodate joint movement.

3.3 CLEANING

.1 Refer to Section 01 74 00.

.2 Remove manufacturer's standard protective wrap only after work in adjacent areas has been completed.

.3 Clean exposed surfaces with a suitable cleaner that will not harm factory-applied finishes.

3.4 SCHEDULE

.1 Floor-to-Floor Joint Cover: 25 mm wide cover; fire-rated; eg. Flush Thinline GFT-100M with FB22 Fire Barrier by The C/S Group.

.2 Floor-to-Wall Joint Cover: 25 mm wide cover; fire-rated; eg. Flush Thinline GFTW-100 with FB22 Fire Barrier by The C/S Group.

.3 Wall-to-Wall Joint Cover: 25 mm wide cover; fire-rated; eg. Flush Thinline FWF-100 with FB24 Fire Barrier by The C/S Group.

.4 Wall-to-Wall Corner Joint Cover: 25 mm wide cover; fire-rated; eg. Flush Thinline FWFC-100 with FB24 Fire Barrier by The C/S Group.

.5 Ceiling-to-Ceiling Joint Cover: 25 mm wide cover; fire-rated; eg. Flush Thinline FCF-100 with FB24 Fire Barrier by The C/S Group.

.6 Ceiling-to-Ceiling Corner Joint Cover: eg. Flush Thinline FCFC-100 with FB24 Fire Barrier by The C/S Group.

.7 Ceiling-to-Wall Joint Cover: 25 mm wide cover; fire-rated; eg. Flush Thinline FWFC-100 with FB24 Fire Barrier by The C/S Group.

.8 Exterior Roof-to-Roof Joint Cover: 25 mm wide cover; eg. Exterior Roof Cover RJT-100 by The C/S Group.

.9 Exterior Roof-to-Wall Cover: 25 mm wide cover; eg. Exterior Roof Cover RJTW-100 by The C/S Group.

.10 Exterior Wall-to-Wall Joint Cover: 25 mm wide cover; eg. Exterior Facade Cover RJT-100V by The C/S Group.

.11 Exterior Wall-to-Wall Corner Cover: 25 mm wide cover; eg. Exterior Facade Cover RJTW-100V by The C/S Group.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 04 00 00 - Masonry.

.3 Section 07 26 00 - Vapour Retarders.

.4 Section 07 27 00 - Air Barriers.

.5 Section 07 92 00 - Joint Sealants.

.6 Section 07 92 21 - Sprayed Foam Sealant.

.7 Section 08 13 13 - Hollow Metal Doors.

.8 Section 08 71 00 - Door Hardware.

.9 Section 08 80 00 - Glazing.

.10 Section 09 21 16 - Gypsum Board Assemblies.

.11 Section 09 90 00 - Painting and Coating.

1.2 REFERENCES

.1 AAMA/WDMA/CSA 101/I.S. 2/A440-22: North American Fenestration Standard / Specification for Windows, Doors and Skylights.

.2 ASTM A653/A653M-23: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.3 ASTM E283/E283M-26: Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.4 CSA A500:16 (R2021): Building Guards.

.5 CSA W59:24: Welded Steel Construction.

.6 CSDMA Canadian Fire Labeling Guide for Commercial Steel Door and Frame Products.

.7 CSDMA Canadian Metric Conversion Guide for Steel Doors and Frames (Modular Construction).

.8 CSDMA Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.

.9 CSDMA Recommended Dimensional Standard for Steel Doors and Frames.

.10 CSDMA Recommended Specifications for Commercial Steel Door and Frame Products.

.11 NFPA 80-2025: Standard for Fire Doors and Other Opening Protectives.

.12 ANSI/NFRC 100-2023: Procedure for Determining Fenestration Product U-factors.

.13 ANSI/NFRC 200-2023: Procedure for Determining Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

.14 CAN/ULC-S104-15 (R2020): Standard Method for Fire Tests of Door Assemblies.

.15 CAN/ULC-S105:2016 (R2020): Standard Specification for Fire Door Frames Meeting Performance Required by CAN/ULC-S104.

.16 CAN/ULC-S106-15 (R2020): Standard Method for Fire Tests of Window and Glass Block Assemblies.

.17 ULC List of Equipment and Materials.

1.3 PRODUCT DATA

.1 Submit Product data as specified in Section 01 33 00.

.2 Product Data: Manufacturer's standard data sheets indicating frame components, available ratings, sizes, and thicknesses.

1.4 SHOP DRAWINGS

.1 Submit Shop Drawings as specified in Section 01 33 00.

.2 Shop Drawings: Project-specific drawings, illustrating opening sizes, frame configurations, fire ratings, anchor types and spacings, locations of cut outs, reinforcing, and shop finishes.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Store Products to CSDMA Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.

1.6 WARRANTY

.1 Submit extended warranty in accordance with General Conditions of the Contract.

.2 Extended Warranty: For a period of two years, covering against twisting, buckling, weld failure, and corrosion.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers having Product considered acceptable for use:
- .1 All Steel Doors 2000 Limited.
- .2 Artek Door (1985) Limited.
- .3 Baron Metal Industries Inc.
- .4 Daybar Industries Limited.
- .5 Fleming Door Products Ltd.
- .6 Gensteel Doors.
- .7 Metal Door Limited.
- .8 Trillium Steel Doors Limited.
- .9 Vision Hollow Metal Limited.

.2 Substitution Procedures: Refer to Section 01 25 00.

2.2 REGULATORY REQUIREMENTS

.1 Fire Rated Frame Assemblies: Permanently labelled to NFPA standards for fire rated class indicated, as tested to CAN/ULC-S104 and CAN/ULC-S106.

2.3 PERFORMANCE CRITERIA

.1 Exterior Hollow Metal Frames: To AAMA/WDMA/CSA 101/I.S. 2/A440, and meeting the following performance criteria:
- .1 Air Leakage of Glazed Frames (ASTM E283/E283M): $\leq$ 1.0 L/s•m^2 @ 75 Pa.

.2 Assembly Thermal Transmittance (ANSI/NFRC 100): U $\leq$ 2.15 W/m^2 degrees C.
.3 Assembly Solar Heat Gain Coefficient (ANSI/NFRC 200): SHGC $\leq$ 0.40.

2.4 DESIGN CRITERIA

.1 Design Products required to act as a building guard by applicable regulatory requirements to CSA A500.

2.5 MATERIALS

.1 Sheet Steel: To ASTM A653/A653M, Commercial Steel (CS) Type B; cold-rolled sheet steel, with regular and paintable galvanneal coatings as noted; thicknesses as indicated.

.2 Bituminous Coating: Fibrous asphalt emulsion.

.3 Sprayed Foam Sealant: As specified in Section 07 92 21.

.4 Touch-up Primer: Zinc-rich alkyd primer.

.5 Welding Materials: To CSA W59.

.6 Joint Sealant: As specified in Section 07 92 00, types as follows:
.1 Exterior Applications: Exterior weatherseal sealant, Type SEAL-EXT.
.2 Transition Sheet Connections: Exterior flashing sealant, Type SEAL-EXT-FL.
.3 Interior Applications: Interior general purpose sealant, Type SEAL-INT-GP.

2.6 MANUFACTURED UNITS

.1 Exterior Hollow Metal Multi-Opening Frame: Sheet steel, 1.60 mm nominal coated thickness, with paintable galvanneal finish; two-piece construction with continuous thermal break; sizes and configurations as indicated on Drawings; eg. TB Series Mercury 3 Energy Efficient Thermal Break Frame by Fleming Door Products Ltd.

.2 Interior Hollow Metal Double Egress Door Frame: Sheet steel, 1.60 mm nominal coated thickness, with paintable galvanneal finish; fire rating as scheduled; sizes as indicated on Drawings; eg. DE-Series Frame by Fleming Door Products Ltd.

.3 Interior Hollow Metal Door and Multi-Opening Frame: Sheet steel, 1.60 mm nominal coated thickness, with paintable galvanneal finish; fire rating as scheduled; sizes and configurations as indicated on Drawings; eg. M-Series Frame by Fleming Door Products Ltd.

2.7 ACCESSORIES

.1 Anchors: Cold-rolled commercial quality steel, regular galvanneal finish, nominal coated thicknesses as follows:
.1 T-Strap Type: 1.30 mm.
.2 Stirrup-strap Type: 50 x 250 mm size, 1.60 mm thick.
.3 Jamb Floor Type: 1.60 mm thick.
.4 Stud Type: 1.00 mm thick.

.2 Reinforcements: Cold-rolled commercial quality steel, regular galvanneal finish, nominal coated thicknesses as follows:
.1 Flush Bolt, Lock and Strike Reinforcement: 1.60 mm
.2 Hinge Reinforcements: 3.51 mm.
.3 Door Closer and Holder Reinforcements: 2.74 mm.

.3 Jamb Spreaders: 1.00 mm nominal coated thickness, cold-rolled commercial quality steel, regular galvanneal finish.

.4 Mortar Guard Boxes: 0.84 mm nominal coated thickness, cold-rolled commercial quality steel, regular galvanneal finish.

.5 Glazing Stops: Rolled steel channel shape, butted corners; prepared for countersink style tamper-proof screws.

.6 Weatherstripping for Thermally-Broken Frames: Compression type; S44 by Pemko.

.7 Threshold Saddles: Thermally broken aluminum threshold; 273x3AFG Thermal Barrier Saddle by Pemko.

.8 Bumpers: Resilient rubber.

.9 Thermal Break: Rigid neoprene or polyvinyl chloride (PVC) extrusion.

2.8 FABRICATION

.1 Fabricate frames as welded units.

.2 Conform to CSDMA Recommended Specifications for Commercial Steel Door and Frame Products.

.3 Fabricate fire-rated frames to CAN/ULC-S105.

.4 Provide fire labels to CSDMA Canadian Fire Labeling Guide for Commercial Steel Door and Frame Products.

.5 Fabricate frames with fixed or removable mullions as noted on Drawings; to profiles shown, with hardware reinforcement plates welded in place.

.6 Welding
.1 Perform welding to CSA W59.
.2 Fill open joints, seams, and depressions with filler or by continuous brazing or welding.
.3 Grind exposed welds smooth and flush, to true sharp arrises and profiles.
.4 Sand welds to a smooth, true, uniform finish.

.7 Mitre corners of frames. Cut frame mitres accurately and weld continuously on inside of frame.

.8 Protect strike and hinge reinforcements and other openings with mortar guard boxes welded to frame.

.9 Reinforce frames wider than 1 220 mm with roll formed steel channels fitted tightly into frame head, flush with top.

.10 Fit frames with channel or angle spreaders, minimum two per frame, to ensure proper frame alignment. Install stiffener plates to spreaders between frame trim where required to prevent bending of trim and to maintain alignment when setting and during construction.

.11 Provide adjustable T-strap anchors in frames to be installed in masonry openings, spaced at 600 mm OC.

.12 Where frames are required to terminate at finished floor, Provide plates for anchorage to floor slab.

.13 Prepare interior door frames for single stud door silencers, as follows:
.1 Single Door Frames: Three on strike jamb.
.2 Double Egress Door Frames: Two on head for each door leaf.

.14 Fabricate frames and screens to accommodate scheduled glazing. Secure glazing stops to frames with counter sunk oval head sheet metal screws.

.15 Prepare frames for scheduled door hardware and building security system devices. Blank, mortise, reinforce, drill and tap components.

.16 Thermally-Broken Frames:
.1 Provide wall and floor anchors suitable for installation, purpose made not to permit thermal conductivity.
.2 Do not fix sections together with screws, grommets or other thermally conductive fastening device.
.3 Provide full frame width drip caps.
.4 Provide compression type weatherstripping.
.5 Conform to accepted Shop Drawings.

2.9 FINISHES

.1 Paintable Galvanneal Coating: To ASTM A653/A653M, Coating Designation ZF120; wiped zinc-iron coating, with streak-free matte grey appearance.

.2 Regular Galvanneal Coating: To ASTM A653/A653M, Coating Designation ZF75; wiped zinc-iron coating, with streak-free matte grey appearance.

3 Execution

3.1 INSTALLATION

.1 Install Products to CSDMA Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.

.2 Install Products plumb, square, aligned, without twist, and at correct elevation.

.3 Install threshold saddles across bottom of exterior door frames.

.4 Coordinate with masonry and wallboard construction for anchor placement.

.5 Fill designated frames set in masonry walls and partitions solid with non-shrink grout or mortar, as specified in Section 04 00 00.

.6 Connect exterior frames to air/vapour barrier transition sheet membranes to achieve an airtight seal.

.7 Fill gaps between exterior frames and adjacent wall assemblies with sprayed foam sealant, as specified in Section 07 92 21.

.8 Seal gaps between frames and walls with joint sealant, as specified in Section 07 92 00.

3.2 FIELD QUALITY CONTROL

.1 Perform field inspection and testing as specified in Section 01 40 00.

.2 Field Inspection and Testing: Arrange for independent testing agency to test installed Products designated as building guards; verifying installed Products meet performance criteria required by applicable regulatory requirements.

.3 Make Good rejected Products not meeting required performance criteria.

.4 Re-test replacement Products at no additional cost to Owner.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 08 12 13 - Hollow Metal Frames.

.2 Section 08 71 00 - Door Hardware.

.3 Section 08 80 00 - Glazing.

.4 Section 09 90 00 - Painting and Coating.

1.2 REFERENCES

.1 AAMA/WDMA/CSA 101/I.S. 2/A440-22: North American Fenestration Standard / Specification for Windows, Doors and Skylights.

.2 ASTM A653/A653M-23: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.3 ASTM E283/E283M-26: Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.4 CSA W59:24: Welded Steel Construction.

.5 CSDMA Canadian Fire Labeling Guide for Commercial Steel Door and Frame Products.

.6 CSDMA Canadian Metric Conversion Guide for Steel Doors and Frames (Modular Construction).

.7 CSDMA Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.

.8 CSDMA Recommended Dimensional Standard for Steel Doors and Frames.

.9 CSDMA Recommended Specifications for Commercial Steel Door and Frame Products.

.10 NFPA 80-2025: Standard for Fire Doors and Other Opening Protectives.

.11 ANSI/NFRC 100-2023: Procedure for Determining Fenestration Product U-factors.

.12 ANSI/NFRC 200-2023: Procedure for Determining Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

.13 CAN/ULC-S104-15 (R2020): Standard Method for Fire Tests of Door Assemblies.

.14 CAN/ULC-S702.1:2021: Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification.

.15 CAN/ULC-S705.1-18: Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material Specification.

.16 ULC List of Equipment and Materials.

1.3 PRODUCT DATA

.1 Submit Product data as specified in Section 01 33 00.

.2 Product Data: Manufacturer's standard data sheets, indicating materials, component sizes and thicknesses, and available finishes.

1.4 SHOP DRAWINGS

.1 Submit Shop Drawings as specified in Section 01 33 00.

.2 Shop Drawings: Project-specific drawings, illustrating door elevations and sizes, internal reinforcement, fire ratings, closure method, size and location of cut outs, and shop finishes.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Store hollow metal doors to CSDMA Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.

1.6 WARRANTY

.1 Submit extended warranty in accordance with General Conditions of the Contract.

.2 Extended Warranty: For a period of two years, covering against twisting, buckling, delamination of steel stiffeners, weld failure and corrosion.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers having Product considered acceptable for use:
- .1 All Steel Doors 2000 Limited.
- .2 Artek Door (1985) Limited.
- .3 Baron Metal Industries Inc.
- .4 Daybar Industries Limited.
- .5 Fleming Door Products Ltd.
- .6 Gensteel Doors.
- .7 Metal Door Limited.
- .8 Trillium Steel Doors Limited.
- .9 Vision Hollow Metal Limited.

.2 Substitution Procedures: Refer to Section 01 25 00.

2.2 REGULATORY REQUIREMENTS

.1 Fire Rated Doors: Permanently labelled to NFPA standards for fire rated class indicated, as tested to CAN/ULC-S104.

2.3 PERFORMANCE CRITERIA

.1 Exterior Hollow Metal Doors: To AAMA/WDMA/CSA 101/I.S. 2/A440, and meeting the following performance criteria:
- .1 Air Leakage of Glazed Doors (ASTM E283/E283M): $\leq$ 5.1 L/s•m^2 @ 75 Pa.
- .2 Assembly Thermal Transmittance (ANSI/NFRC 100):
  - .1 Glazed Doors: U $\leq$ 3.94 W/m^2 degrees C.
  - .2 Opaque Doors: U $\leq$ 2.56 W/m^2 degrees C.
- .3 Assembly Solar Heat Gain Coefficient (ANSI/NFRC 200): SHGC $\leq$ 0.40.

2.4 MATERIALS

.1 Sheet Steel: To ASTM A653/A653M, Commercial Steel (CS) Type B; cold-rolled sheet steel, with regular and paintable galvanneal coatings as noted; thicknesses as indicated.

.2 Foamed-in-Place Insulation: To CAN/ULC-S705.1; injected polyurethane foam having LTTR thermal resistance of RSI $\geq$ 0.9 per 25 mm of thickness.

.3 Semi-Rigid Board Insulation: To CAN/ULC-S702.1, Type 1; mineral fibre semi-rigid board having an aged thermal resistance of RSI $\geq$ 0.68 per 25 mm of thickness.

.4 Reinforcements: Sheet steel, regular galvanneal finish, nominal coated thicknesses as follows:
.1 Flush Bolt, Lock and Strike Reinforcement: 1.60 mm
.2 Hinge Reinforcements: 3.51 mm.
.3 Door Closer and Holder Reinforcements: 2.74 mm.

.5 Touch-up Primer: Zinc-rich alkyd primer.

.6 Welding Materials: To CSA W59.

2.5 MANUFACTURED UNITS

.1 Exterior Hollow Metal Flush Doors: 45 mm thick, constructed as follows:
.1 Door Faces: Sheet steel panels, 1.30 mm nominal coated thickness, flush design, paintable galvanneal finish.
.2 Vertical Steel Stiffeners: Sheet steel profiles, 0.76 mm nominal coated thickness, 22 mm deep, interlocking design, regular galvanneal finish.
.3 Door Edges: Tack welded.
.4 Glazing Stops: Rolled steel channel shape, butted corners; prepared for countersunk tamper-proof screws.
.5 Core: Foamed-in-place insulation.
.6 Manufacturer and Product Name: eg. Trio-E by Fleming Door Products Ltd.

.2 Interior Hollow Metal Flush Doors - Fire Rated: 45 mm thick, fire rating as scheduled; constructed as follows:
.1 Door Faces: Sheet steel panels, 1.60 mm nominal coated thickness, flush design, paintable galvanneal finish.
.2 Vertical Steel Stiffeners: Sheet steel profiles, 1.00 mm nominal coated thickness, 44 mm deep, interlocking design, regular galvanneal finish.
.3 Door Edges: Continuously welded.
.4 Glazing Stops: Rolled steel channel shape, butted corners; prepared for countersunk tamper-proof screws.
.5 Core: Semi-rigid board insulation.

.3 Interior Hollow Metal Flush Doors - Non-Rated: 45 mm thick; constructed as follows:
.1 Door Faces: Sheet steel panels, 1.60 mm nominal coated thickness, flush design, paintable galvanneal finish.
.2 Vertical Steel Stiffeners: Sheet steel profiles, 1.00 mm nominal coated thickness, 44 mm deep, interlocking design, regular galvanneal finish.
.3 Door Edges: Continuously welded.
.4 Glazing Stops: Rolled steel channel shape, butted corners; prepared for countersunk tamper-proof screws.
.5 Core: Semi-rigid board insulation.

2.6 FABRICATION

.1 Fabricate doors to CSDMA Recommended Specifications for Commercial Steel Door and Frame Products.

.2 Provide fire labels on fire rated doors to CSDMA Canadian Fire Labeling Guide for Commercial Steel Door and Frame Products.

.3 Provide continuous faces free from joints, tool markings and abrasions; with hardware reinforcement plates welded in place.

.4 Welding
.1 Perform welding to CSA W59.
.2 Fill open joints, seams, and depressions with filler, or by continuous brazing, or welding.
.3 Grind exposed welds smooth and flush, to true sharp arrises and profiles.
.4 Sand welds to a smooth, true, uniform finish.

.5 Fabricate doors to accommodate scheduled glazing. Secure glazing stops to doors with counter sunk oval head sheet metal screws.

.6 Prepare doors for scheduled door hardware and building security system devices. Blank, mortise, reinforce, drill and tap components.

.7 Reinforce and stiffen designated doors with vertical steel stiffeners spaced at 152 mm OC, continuous for full height of door, laminated as follows:
- .1 Exterior Doors: To inner door face.
- .2 Interior Doors: To both door faces.

.8 Completely fill door cores with specified core materials.

.9 Reinforce door edges with channel reinforcing.

.10 Bevel stiles minimum 3 mm.

.11 Door Edges:
- .1 Tack Welded: Tack weld door edge seams at 150 mm OC and fill remaining seam with body filler. Finish to a smooth, seamless appearance.
- .2 Continuously Welded: Continuously weld door edge seams to a smooth, seamless appearance.

.12 Provide flush top edge and bottom closures on exterior doors, sealed watertight.

2.7 FINISHES

.1 Paintable Galvanneal Coating: To ASTM A653/A653M, Coating Designation ZF120; wiped zinc-iron coating, with streak-free matte grey appearance.

.2 Regular Galvanneal Coating: To ASTM A653/A653M, Coating Designation ZF75; wiped zinc-iron coating, with streak-free matte grey appearance.

3 Execution

3.1 INSTALLATION

.1 Install doors to CSDMA Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.

3.2 TOLERANCES

.1 Diagonal Distortion: $\leq$ 1.5 mm measured with straight edge, corner to corner.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 04 00 00 - Masonry.

.2 Section 05 50 00 - Metal Fabrications.

.3 Section 09 21 16 - Gypsum Board Assemblies.

.4 Section 09 90 00 - Painting and Coating.

1.2 REFERENCES

.1 ASTM A1008/A1008M-23e1: Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.

.2 ASTM B221M-21: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

.3 ASTM E119-26: Standard Test Methods for Fire Tests of Building Construction and Materials.

.4 NFPA 80-2025: Standard for Fire Doors and Other Opening Protectives.

.5 CAN/ULC-S702.1:2021: Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification.

.6 ULC List of Equipment and Materials.

1.3 SHOP DRAWINGS

.1 Submit Shop Drawings as specified in Section 01 33 00.

.2 Shop Drawings: Project-specific drawings, illustrating materials, profiles, accessories, locations, and dimensions.

1.4 CERTIFICATIONS

.1 Submit certification reports as specified in Section 01 33 00.

.2 Fire Test Certification Report: Certifying performance within specified fire rating.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Store Products in a dry, protected, well-vented area.

.3 Remove protective wrapping immediately after installation.

1.6 WARRANTY

.1 Submit extended warranty in accordance with General Conditions of the Contract.

.2 Manufacturer's Extended Warranty: For a period of 5 years, covering parts against defects.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers having Product considered acceptable for use:
.1 Acudor Access Doors.
.2 Bilco Canada.
.3 Cendrex.
.4 Nystrom, Inc.
.5 The Williams Brothers Corporation.

.2 Substitution Procedures: Refer to Section 01 25 00.

2.2 REGULATORY REQUIREMENTS

.1 Fire Rated Assemblies: To NFPA requirements for fire rated class indicated.

2.3 MATERIALS

.1 Sheet Steel: To ASTM A1008/A1008M, Commercial Steel (CS) Types A, B, and C; cold-rolled sheet steel; thicknesses as specified below.

.2 Extruded Aluminum: To ASTM B221M, 6061-T5 alloy, mill finish; thicknesses as specified below.

.3 Insulation: To CAN/ULC-S702.1, Type 1; non-rigid mineral fibre insulation, made from rock or slag fibers.

.4 Gypsum Board: As specified in Section 09 21 16.

2.4 MANUFACTURED UNITS

.1 Gypsum Board Wall and Ceiling Access Panel - Fire-Rated: 1-1/2 hour B-label with maximum temperature rise of 110 degrees C; suitable for both horizontal or vertical installation; sizes as indicated on Drawings; and meeting the following characteristics:
.1 Door: 48 mm deep, 1.21 mm thick sheet steel, insulated with non-rigid mineral fibre insulation, completely filling door cavity.
.2 Box Frame: 1.52 mm thick sheet steel, complete with 25 mm wide, 0.61 mm thick galvanized steel perforated flange.
.3 Closer: Automatic, spring-type.
.4 Hinge: Fully concealed, 170 degree opening pivot-type.
.5 Latch: Self-latching direct action latch, opposite hinge.
.6 Lock: Ultra lock with key (code 151).
.7 Finish: Powder coated paintable finish.
.8 Manufacturer and Product Name: eg. Model WB-FR DW Standard Drywall Fire Rated Access Door by The Williams Brothers Corporation.

.2 Gypsum Board Wall Access Panel - Non-Rated: Suitable for vertical installation in gypsum board partitions; sizes as indicated on Drawings; and meeting the following characteristics:
.1 Door: 1.52 mm thick sheet steel, recessed design to receive gypsum board infill.
.2 Box Return Frame: 1.52 mm thick sheet steel, complete with 25 mm wide, 0.61 mm thick galvanized steel perforated flange.
.3 Hinge: Fully-concealed rod type hinge.
.4 Latch: Flush, stainless steel cam.
.5 Lock: Medium barrel cylinder lock.
.6 Finish: Powder coated paintable finish.
.7 Manufacturer and Product Name: eg. Model WB-RDW Recessed Drywall Access Door by The Williams Brothers Corporation.

.3 Gypsum Board Ceiling Access Panel - Non-Rated: Suitable for horizontal installation in gypsum board ceilings; sizes as indicated on Drawings; and meeting the following characteristics:
- .1 Door: 2.0 mm thick extruded aluminum, complete with 16 mm thick moisture resistant gypsum board infill, brush gasket, and safety chain.
- .2 Box Return Frame: 2.0 mm thick extruded aluminum, concealed flange of depth to match adjacent ceiling board thickness.
- .3 Hinge: Concealed pivot hinge, allowing for door removal.
- .4 Latch: Push to open.
- .5 Finish: Mill finish.
- .6 Manufacturer and Product Name: eg. Model WB-NTG Trimless Gypsum Access Door by The Williams Brothers Corporation.

.4 Masonry Wall Access Panel - Fire-Rated: 1-1/2 hour B-label with maximum temperature rise of 110 degrees C; suitable for both horizontal or vertical installation in masonry or concrete partitions or bulkheads; and meeting the following characteristics:
- .1 Door and Trim: 48 mm deep, 1.21 mm thick sheet steel, with rolled safety edge on inside of door; insulated with non-rigid mineral fibre insulation, completely filling door cavity.
- .2 Box Return Frame: 1.52 mm thick sheet steel, complete with 4 masonry strap anchors.
- .3 Panel Closer: Automatic, spring-type.
- .4 Hinge: Fully-concealed rod type hinge, 170 degree opening.
- .5 Latch: Self-latching direct-action latch, opposite hinge.
- .6 Lock: Ultra lock with key included with each door.
- .7 Finish: Powder coated paintable finish.
- .8 Manufacturer and Product Name: eg. Model WB-FRS-U Standard Ultra Fire Rated Access Door by The Williams Brothers Corporation.

.5 Masonry Wall Access Panel - Non-Rated: Suitable for both horizontal or vertical installation in masonry or concrete partitions or bulkheads; and meeting the following characteristics:
- .1 Door: 1.90 mm thick sheet steel.
- .2 Return Frame: 1.21 mm thick sheet steel, complete with 4 masonry strap anchors.
- .3 Hinges: Fully-concealed offset type, 170 degree opening.
- .4 Latch: Flush, stainless steel cam.
- .5 Lock: Key cylinder lock with key (code 151).
- .6 Finish: Powder coated paintable finish.
- .7 Manufacturer and Product Name: eg. Model WB-GP Premium General Purpose Access Door by The Williams Brothers Corporation.

2.5 FINISHES

.1 Aluminum: Standard factory mill finish.

.2 Powder Coated Paintable Finish: Electrostatically spray-applied polymer powder, White colour; paintable type.

3 Execution

3.1 PREPARATION

.1 Coordinate installation of access panels in masonry walls with Section 04 00 00.

.2 Coordinate installation of access panels in gypsum board partitions and ceilings with Section 09 21 16.

.3 Coordinate exact locations of access panels with facility services Subcontractors.

3.2 INSTALLATION

.1 Install Products straight, plumb, and level.

.2 Install Products flush with adjacent surfaces.

.3 Install Products for long life under hard use.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 04 00 00 - Masonry.

.2 Section 06 10 00 - Rough Carpentry.

.3 Section 07 26 00 - Vapour Retarders.

.4 Section 07 27 00 - Air Barriers.

.5 Section 07 92 00 - Joint Sealants.

.6 Section 07 92 21 - Sprayed Foam Sealant.

.7 Section 08 80 00 - Glazing.

1.2 REFERENCES

.1 AAMA CW-10-15: Care and Handling of Architectural Aluminum from Shop to Site.

.2 AAMA/WDMA/CSA 101/I.S. 2/A440-22: North American Fenestration Standard / Specification for Windows, Doors and Skylights.

.3 AAMA 502-21: Voluntary Specification for Field Testing of Newly Installed Fenestration Products.

.4 AAMA 611-20: Voluntary Specification for Anodized Architectural Aluminum.

.5 AAMA 1503-09: Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.

.6 ASTM A123/A123M-24: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.7 ASTM A153/A153M-23: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.8 ASTM A653/A653M-23: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.9 ASTM B209/B209M-21a: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.10 ASTM B221M-21: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

.11 ASTM E90-23: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.12 ASTM E283/E283M-26: Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.13 ASTM E330/E330M-14(2021): Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.14 ASTM E331-00(2023): Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

.15 ASTM E783-02(2018): Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.

.16 ASTM E1105-15(2023): Standard Test Method for Field Measurement of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.

.17 CSA A440.4:19 (R2024): Window, Door and Skylight Installation.

.18 ANSI/NFRC 100-2023: Procedure for Determining Fenestration Product U-factors.

.19 ANSI/NFRC 200-2023: Procedure for Determining Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

1.3 SHOP DRAWINGS

.1 Submit Shop Drawings as specified in Section 01 33 00.

.2 Shop Drawings: Project-specific drawings, illustrating:
- .1 Large scale details of members and materials, of brackets and anchorage devices, and of connection and jointing details;
- .2 Fully dimensioned layouts for positioning of brackets and anchorage devices to structures;
- .3 Dimensions and thicknesses;
- .4 Glazing details, description of materials including catalogue numbers, Product names, and manufacturer's name;
- .5 Aluminum alloy and temper designations;
- .6 Finish specifications; and
- .7 Other pertinent data.

.3 Submit documentation of:
- .1 Compliance with AAMA/WDMA/CSA 101/I.S. 2/A440.
- .2 Thicknesses, profiles, and descriptions of components used in assembly.
- .3 Engineering calculations verifying assembly has been designed, constructed, and attached to withstand forces anticipated for Project, and meet specified performance criteria.

.4 Shop Drawings, including engineering calculations, are to be stamped, signed, and dated by fabricator's design engineer.

1.4 CERTIFICATES

.1 Submit certifications as specified in Section 01 40 00.

.2 Frame Certification: A certificate from aluminum extruder certifying aluminum alloys and tempers meet or exceed specified types.

1.5 TEST AND EVALUATION REPORTS

.1 Submit test reports as specified in Section 01 33 00.

.2 Test Reports: Manufacturer's standard test results indicating Products meet specified performance criteria, prepared by independent testing agency, and current within past 5 years.

1.6 CLOSEOUT SUBMITTALS

.1 Submit closeout submittals as specified in Section 01 78 00.

.2 Maintenance Data: Manufacturer's standard maintenance and cleaning instructions; sufficient quantity for inclusion in operation and maintenance manual.

1.7 QUALIFICATIONS

.1 Fabricator's Design Engineer: A professional structural engineer experienced in designing aluminum windows, licensed to practice at Place of the Work.

.2 Fabricator and Installer: A firm specializing in fabricating and installing aluminum windows, having minimum 5 years documented experience.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Conform to AAMA CW-10.

.3 Take precautionary measures and adequately protect frames and frame finishes to prevent damage during fabrication, storage, shipping, handling, and installation.

.4 Deliver, handle, and store Products by methods approved by manufacturer. Protect from damage and staining.

.5 Deliver and store Products carefully to avoid damage to window frame.

1.9 WARRANTY

.1 Submit extended warranties in accordance with General Conditions of the Contract.

.2 Manufacturer's Extended Warranty: For a period of 10 years, covering the following:
.1 Finish: Replace any window unit whose finish shows defects, such as but not limited to delamination, blistering, or excessive fading.
.2 Performance: Replace or repair any window unit with air leakage, water leakage, defects, or malfunctions under normal usage.

.3 Installer's Extended Warranty: For a period of two years, protecting against air leakage, water leakage, operational defects, and malfunction under normal usage.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers having Product considered acceptable for use:
.1 Alumicor.
.2 Commdoor Aluminum.
.3 CRL US Aluminum.
.4 Kawneer.

.2 Substitution Procedures: Refer to Section 01 25 00.

2.2 DESCRIPTION

.1 Aluminum Windows: Extruded aluminum frame sections, shop fabricated, with factory anodized finish; site-glazed with sealed insulating glass units; complete with metal sills, metal flashings, connection flanges, anchorages, and attachment devices.

.2 Basis of Design: AA 6600 Thermal Window by Kawneer.

.3 Configuration: As indicated on Window Schedule.

2.3 PERFORMANCE CRITERIA

.1 Aluminum Windows: To AAMA/WDMA/CSA 101/I.S. 2/A440, and meeting the following performance criteria:
.1 NAFS Performance Class: AW-PG70-FW.

.2 Air Leakage (ASTM E283/E283M): $\leq$ 0.23 L/s•m^2 @ 75 Pa.
.3 Water Resistance (ASTM E331): No leakage at 720 Pa test pressure differential.
.4 Uniform Load Deflection (ASTM E330/E330M): $\leq$ L/175 at 3 352 Pa, for both positive and negative directions.
.5 Condensation Resistance Factor (AAMA 1503): $CRF_{frame} \geq 77$, $CRF_{glass} \geq 72$.
.6 Sound Transmission Loss (ASTM E90): STC $\geq$ 38 dB, OITC $\geq$ 32 dB.
.7 Assembly Thermal Transmittance (ANSI/NFRC 100): U $\leq$ 2.15 W/m^2 degrees C.
.8 Assembly Solar Heat Gain Coefficient (ANSI/NFRC 200): SHGC $\leq$ 0.40.

2.4 DESIGN CRITERIA

.1 Design assembly to drain water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system to exterior.

.2 Design intermediate members within units to be either solid or tubular design to suit wind loading, weight carrying requirements, and wind deflection limitations.

.3 Design coupling mullions to permit unit module construction and accommodate thermal expansion. When required, reinforce wind load carrying members with steel reinforcement suitably treated to prevent electrolytic action.

2.5 MATERIALS

.1 Extruded Aluminum: To ASTM B221M, 6063-T5 alloy.

.2 Sheet Aluminum: To ASTM B209/B209M, 5005-H32 alloy.

.3 Sheet Steel: To ASTM A653/A653M, Commercial Steel (CS) Types A, B, and C; cold-rolled sheet steel, galvanized.

.4 Steel Sections: Shaped to suit mullion sections.

.5 Fastener: Stainless steel.

.6 Bituminous Coating: Fibred asphalt emulsion.

.7 Thermal Break: Rigid polyamide.

.8 Vapour Retarder: As specified in Section 07 26 00.

.9 Air Barriers: As specified in Section 07 27 00.

.10 Sprayed Foam Sealant: As specified in Section 07 92 21.

.11 Glazing Sealant: Type SEAL-GLZ as specified in Section 07 92 00.

.12 Glazing Materials: As specified in Section 08 80 00.

.13 Joint Sealants: As specified in Section 07 92 00, Types as follows:
.1 Exterior Applications: Exterior weatherseal sealant, Type SEAL-EXT.
.2 Transition Sheet Connections: Exterior flashing sealant, Type SEAL-EXT-FL.
.3 Interior Applications: Interior general purpose sealant, Type SEAL-INT-GP.

.14 Touch-Up Primer for Galvanized Metal Surfaces: Zinc-rich paint type.

2.6 COMPONENTS

.1 Frames and Mullions: 1.78 mm thick extruded aluminum; 152 mm deep profile; thermally broken with interior tubular section insulated from exterior; applied glazing stops; drainage holes; internal weep drainage system.

.2 Metal Sills: 2.5 mm thick extruded aluminum sections, complete with pre-formed clip anchor; sufficient depth to extend beyond wall face, full length pieces to minimize joints; and with integral drip edge profile and end dams.

.3 Metal Flashing: 2.0 mm thick extruded aluminum, finish to match mullion sections where exposed.

.4 Connection Flange: 3.0 mm thick extruded aluminum angle, size as indicated on Drawings.

.5 Glass: Sealed insulating glass units, Type SIG-CLR-1 as specified in Section 08 80 00.

2.7 FABRICATION

.1 Fabricate Products to AAMA/WDMA/CSA 101/I.S. 2/A440.

.2 Fabricate Products with minimum clearances, and shim spacing around perimeter of assembly.

.3 Make joints flush, hairline, and weatherproof.

.4 Arrange fasteners and attachments to conceal from view.

.5 Overlap and seal glazing flanges of abutting members for entire depth and width of flanges to ensure a solid, unbroken air and water barrier. Glass stops shall be screwless, lock-in type.

.6 Provide fully resilient settings for glass and panels by use of EPDM elastomeric glazing gaskets on both sides of glass installed in window frames.

.7 Provide connection flange to full perimeter of frame, attached from interior side of frame with concealed fasteners cut flush with flange face. Pre-drill fastener holes into flange to accommodate immediate on-site installation.

2.8 FINISHES

.1 Anodized Coating on Aluminum: To AAMA 611, AA-M10C21A31, Class II Clear Anodic Oxide coating (No. 17 - Clear).

.2 Galvanized Coating on Steel Components: To ASTM A123/A123M, Coating Grade 55; hot dipped zinc alloy coating.

.3 Galvanized Coating on Steel Hardware: To ASTM A153/A153M, Classes B3, C or D; hot dipped zinc alloy coating.

.4 Galvanized Coating on Sheet Steel: To ASTM A653/A653M, Coating Designation Z275; hot dipped zinc alloy coating.

2.9 SOURCE QUALITY CONTROL

.1 Perform shop inspection and testing as specified in Section 01 40 00.

.2 Shop Inspection and Testing: Random tests conducted by independent testing agency on fabricated window framing at point of manufacture, verifying compliance with specified performance criteria.

3 Execution

3.1 PREPARATION

.1 Apply heavy coat of bituminous paint on surfaces of aluminum placed in contact with concrete, mortar, plaster, or dissimilar metals.

.2 Provide fastenings and anchors required to be built in to adjacent work to other Sections.

3.2 INSTALLATION

.1 Install Products to CSA A440.4.

.2 Install Products in correct locations, level, square, and plumb.

.3 Install Products free from distortion, properly aligned, and at proper elevations.

.4 Make joints neat, fine, and weathertight.

.5 Allow for expansion and contraction of components.

.6 Provide additional mouldings and closures necessary.

.7 Use appropriate fasteners compatible with materials being fastened. Conceal fasteners.

.8 Fasten connection flange to wall assembly and connect building envelope air barrier membrane to flange.

.9 Seal connection flange to transition sheet membranes with continuous bead of joint sealant prior to application of sprayed foam sealant.

.10 Provide trim panning and flashings of sufficient size to neatly finish window frame to interior and exterior window opening.

.11 Fill gaps between exterior frames and adjacent wall assemblies with sprayed foam sealant, as specified in Section 07 92 21.

.12 Install glass as specified in Section 08 80 00.

.13 Provide sills in place with anchoring devices located at ends and evenly spaced at 600 mm OC. Fasten expansion joint cover plates and drip deflectors with self-tapping stainless steel screws.

.14 Maintain 6 - 9 mm space between butted ends of continuous sills. For sills over 1 220 mm in length, maintain 3 - 6 mm space at each end.

.15 Install end dams at each sill.

.16 Grind smooth exposed edges of aluminum sills, ensuring no sharp edges.

.17 Seal perimeter joints with joint sealant, as specified in Section 07 92 00.

3.3 TOLERANCES

.1 Deviation From Plumb and Level: $\leq$ 3 mm in 3 000 mm.

3.4 FIELD QUALITY CONTROL

.1 Perform field inspection and testing as specified in Section 01 40 00.

.2 Field Inspection and Testing: One set of tests, conducted by independent testing agency to AAMA 502, on a completed installation, verifying compliance with specified performance criteria.

.3 Perform field tests as follows:
.1 Air Infiltration Test: To ASTM E783.
.2 Water Infiltration Test: To ASTM E1105.

.4 Make Good Products not meeting specified performance criteria.

.5 Re-test replacement Products at no additional cost to Owner.

3.5 CLEANING

.1 Refer to Section 01 74 00.

.2 Clean glass and aluminum surfaces.

.3 Do not scratch or damage surfaces.

.4 Do not remove protective cover from windows until after final cleaning operations have been completed.

3.6 PROTECTION

.1 Refer to Section 01 76 00.

.2 Protect completed installation from damage resulting from subsequent construction operations.

.3 Make Good damage.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 08 12 13 - Hollow Metal Frames.

.2 Section 08 13 13 - Hollow Metal Doors.

1.2 ALLOWANCES

.1 Contract Price includes a stipulated sum cash Allowance as specified in Section 01 21 00.

.2 Cash Allowance: Cost for supply only of door hardware.

1.3 REFERENCES

.1 ANSI/BHMA A156.1-2016: Butts and Hinges.

.2 ANSI/BHMA A156.2-2017: Bored & Preassembled Locks and Latches.

.3 ANSI/BHMA A156.3-2014: Exit Devices.

.4 ANSI/BHMA A156.4-2019: Door Controls - Closers.

.5 ANSI/BHMA A156.5-2014: Cylinders and Input Devices for Locks.

.6 ANSI/BHMA A156.6-2010: Architectural Door Trim.

.7 ANSI/BHMA A156.8-2010: Door Controls - Overhead Stops & Holders.

.8 ANSI/BHMA A156.12-2018: Interconnected Locks & Latches.

.9 ANSI/BHMA A156.13-2017: Mortise Locks.

.10 ANSI/BHMA A156.14-2013: Sliding and Folding Hardware.

.11 ANSI/BHMA A156.15-2015: Release Devices - Closer Holder, Electromagnetic and Electromechanical.

.12 ANSI/BHMA A156.16-2018: Auxiliary Hardware.

.13 ANSI/BHMA A156.17-2014: Self Closing Hinges & Pivots.

.14 ANSI/BHMA A156.18-2016: Materials and Finishes.

.15 ANSI/BHMA A156.19-2013: Power Assist & Low Energy Power Operated Doors.

.16 ANSI/BHMA A156.21-2014: Thresholds.

.17 ANSI/BHMA A156.22-2017: Door Gasketing and Edge Seal Systems.

.18 ANSI/BHMA A156.23-2017: Electromagnetic Locks.

.19 ANSI/BHMA A156.24-2012: Delayed Egress Locks.

.20 ANSI/BHMA A156.25-2018: Electrified Locking Devices.

.21 ANSI/BHMA A156.26-2017: Continuous Hinges.

.22 ANSI/BHMA A156.28-2018: Recommended Practices for Mechanical Keying Systems.

.23 ANSI/BHMA A156.29-2017: Exit Locks, Exit Alarms, Alarms for Exit Devices.

.24 ANSI/BHMA A156.31-2019: Electric Strikes and Frame Mounted Actuators.

.25 ANSI/BHMA A156.36-2016: Auxiliary Locks.

.26 ANSI/BHMA A156.37-2014: Multipoint Locks.

.27 CSDMA Recommended Dimensional Standard for Steel Doors and Frames.

.28 CSDMA Canadian Fire Labeling Guide for Commercial Steel Door and Frame Products.

.29 CSDMA Canadian Metric Conversion Guide for Steel Doors and Frames (Modular Construction).

.30 ANSI/DHI A115.IG-1994: Installation Guide for Doors and Hardware.

.31 DHI Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames.

.32 DHI Recommended Locations for Architectural Hardware for Flush Wood Doors.

.33 DHI Sequence and Format for the Hardware Schedule.

.34 DHI Keying Systems and Nomenclature.

.35 DHI Abbreviations and Symbols.

.36 NFPA 80-2025: Standard for Fire Doors and Other Opening Protectives.

.37 NFPA 105-2025: Standard for Smoke Door Assemblies and Other Opening Protectives.

.38 ANSI/UL 1784-15: Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives.

1.4 PREINSTALLATION MEETINGS

.1 Refer to Section 01 31 00.

.2 Prior to installation of hardware, arrange a meeting between Owner, Contractor, Consultant, manufacturer, hardware Supplier, architectural hardware consultant, and installation Subcontractor to review materials, procedures and coordinate related work.

1.5 PRODUCT DATA

.1 Submit Product data as specified in Section 01 33 00.

.2 Product Data: Manufacturer's standard data sheets, illustrating materials, sizes, and operating features for each specified piece of door hardware.

.3 Submit templates to installer prior to installation.

1.6 SHOP DRAWINGS

.1 Submit Shop Drawings as specified in Section 01 33 00.

.2 Shop Drawings: Project-specific documents, including door hardware schedule, keying schedule, and wiring diagrams, as follows:
  .1 Door Hardware Schedule, prepared by architectural hardware consultant (AHC), in vertical format, to DHI Sequence and Format for the Hardware Schedule.
  .2 Keying Schedule: Prepared by architectural hardware consultant (AHC), to DHI Keying Systems and Nomenclature, including special keying notes and stamping instructions. Do not order locks and cylinders until key schedule has been accepted by Consultant.
  .3 Wiring Diagrams: A written description of the functional use of power-operated door hardware. Include door and frame elevations showing location of each scheduled power-operated hardware item, including a wiring diagram showing number and size of conductors.

1.7 SAMPLES

.1 Submit samples as specified in Section 01 33 00.

.2 Samples: One sample of each hardware item complete with fasteners, clearly labeled with hardware schedule designation and manufacturer's name and model number.

1.8 CLOSEOUT SUBMITTALS

.1 Submit closeout submittals as specified in Section 01 78 00.

.2 Operating and Maintenance Data: Including maintenance instructions for each hardware item, catalogue cut sheets and Product data sheets for each Product, parts list for each Product, an updated copy of door hardware schedule illustrating actual Products installed, and a copy of final keying schedule.

1.9 EXTRA STOCK MATERIALS

.1 Supply extra stock materials as specified in Section 01 78 00.

.2 Extra Stock Materials: Clearly labeled to identify type of hardware, manufacturer name, model number, and finish; for each of the following:
.1 Three key lock cylinders for each master keyed group.
.2 Two installation tools for passage sets, locksets and privacy sets.

1.10 QUALIFICATIONS

.1 Hardware Supplier: A firm specializing in supplying institutional door hardware, and having minimum 10 years documented experience.

.2 Hardware Supplier Personnel: Employ a qualified architectural hardware consultant (AHC) to supervise scheduling and supplying of door hardware.

1.11 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Package hardware separately for each opening in a package which contains all hardware for that opening and is designated with applicable heading number, door number and key-set symbol.

.3 Store Products in a clean, dry and secure area, on adequate shelving to permit organization so item numbers are readily visible.

.4 Supply Products complete with keys, templates and installation instructions, together with all required screws, expansion shields, anchors, jigs and other related accessories for satisfactory attachment and installation of hardware.

1.12 WARRANTY

.1 Submit manufacturers' standard extended warranties for each item of hardware.

2 Products

2.1 REGULATORY REQUIREMENTS

.1 Conform to applicable regulatory requirements and NFPA requirements for fire rated doors, frames, and hardware.
  .1 Ensure smoke control requirements are met by means of gasketing systems to NFPA 105, as tested to ANSI/UL 1784.
  .2 Ensure fire exit requirements are met with regard to automatic closers, fusible links, positive latching, and direction of travel.

2.2 KEYING

.1 Conform to ANSI/BHMA A156.28.

.2 Key doors to Owner's existing GMK or MK system.

.3 Each system to be construction master keyed (CMK), and supplied complete with three keys per lock, 5 master keys (MK) or grand master keys (GMK), and 10 construction keys.

.4 Provide visual key control (VKC) on face of each cylinder and on change keys.

2.3 DOOR HARDWARE

.1 Butt Hinges: To ANSI/BHMA A156.1, Grade 1.

.2 Continuous Hinges: To ANSI/BHMA A156.26.

.3 Self-Closing Hinges and Pivots: To ANSI/BHMA A156.17.

.4 Locksets and Latchsets: To ANSI/BHMA A156.2, Grade 1.

.5 Exit Devices: To ANSI/BHMA A156.3.

.6 Closers: To ANSI/BHMA A156.4; surface-mounted type.

.7 Cylinders and Input Devices: To ANSI/BHMA A156.5, Operational Class, Grade 1.

.8 Overhead Door Stops: To ANSI/BHMA A156.8.

.9 Interconnected Locks and Latches: To ANSI/BHMA A156.12, Grade 1.

.10 Mortise Locks: To ANSI/BHMA A156.13, Operational Class, Grade 1.

.11 Auxiliary Locks: To ANSI/BHMA A156.36, Grade 1.

.12 Multipoint Locks: To ANSI/BHMA A156.13, Operational Class, Grade 1.

.13 Sliding and Folding Door Hardware: To ANSI/BHMA A156.14.

.14 Powered Release Devices: To ANSI/BHMA A156.15.

.15 Powered Door Operators: To ANSI/BHMA A156.19.

.16 Powered Door Locks: To ANSI/BHMA A156.23; electromagnetic type.

.17 Powered Locking Devices: To ANSI/BHMA A156.25.

.18 Powered Strikes and Actuators: To ANSI/BHMA A156.31.

.19 Delayed Egress Locks: To ANSI/BHMA A156.24.

.20 Alarms for Exit Devices: To ANSI/BHMA A156.29.

.21 Door Trim: Protection plates, push plates, door pulls, push bars, and pull bars; to ANSI/BHMA A156.6.

.22 Thresholds: To ANSI/BHMA A156.21.

.23 Auxiliary Hardware: To ANSI/BHMA A156.16.

.24 Door Gaskets and Weatherstripping: To ANSI/BHMA A156.21.

2.4 FINISHES

.1 Conform to ANSI/BHMA A156.18.

.2 Unless specified otherwise, Provide door hardware with ANSI/BHMA 626 - Satin Chromium Plated finish.

3 Execution

3.1 EXAMINATION

.1 Refer to Section 01 71 00.

.2 Verify doors and frames are ready to receive hardware, and that dimensions are as indicated on accepted Shop Drawings and door hardware schedule.

.3 Verify power supply of 120V AC, 20 amps, 3 phase, 60 Hz is available to power-operated devices.

3.2 INSTALLATION

.1 Install hardware to ANSI/DHI A115.IG.

.2 Use templates provided by hardware manufacturer.

.3 Provide routing or mortising for hinges and other items required to be mortised or rebated or otherwise housed within material.

.4 Install hardware at mounting heights specified in manufacturers' templates or as indicated in hardware schedule.

.5 Install hardware using only manufacturer-supplied and -approved fasteners, in strict accordance with manufacturers' published installation instructions. Provide suitable security-type fasteners as specified in hardware sets.

.6 Ensure locksets, latchsets and deadbolts are of correct hand before installation to ensure cylinder is in correct position. Handing is part of installation procedure.

.7 Ensure exit devices are of correct hand and adjust device cam for proper outside trim function prior to installation. Handing is part of installation procedure.

.8 Install head seal prior to installation of “PA”-parallel arm mounted door closers and push side mounted door stops and holders.

.9 Counter sink through-bolt of door pull under push plate during installation.

.10 Mount closers, automatic operators and hold-open devices as noted in hardware schedule.

.11 Secure thresholds with machine screws and anchors.

3.3 FIELD QUALITY CONTROL

.1 Examine installed hardware and notify Consultant of improper installations, defective Products or where installation does not conform to Contract Documents.

3.4 ADJUSTING

.1 Replace Products exhibiting scratched or damaged surfaces.

.2 Properly tighten fasteners, and ensure fasteners are installed to full required complement.

.3 Adjustment is inclusive of spring power, closing speed, latching speed, and back-check at time of installation.

.4 Adjust delayed-action door operators and closers to forty-second delay to accommodate barrier-free access. Time period to be approved by Owner.

3.5 DEMONSTRATION

.1 Refer to Section 01 79 00.

.2 Demonstrate operation and maintenance of hardware items, including proper use, servicing, adjusting, and lubrication procedures.

3.6 PROTECTION

.1 Refer to Section 01 76 00.

.2 Cover surfaces with removable protective film.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 07 92 00 - Joint Sealants.

.2 Section 08 12 13 - Hollow Metal Frames.

.3 Section 08 13 13 - Hollow Metal Doors.

.4 Section 08 51 13 - Aluminum Windows.

1.2 REFERENCES

.1 AAMA 800-16: Voluntary Specifications and Test Methods for Sealants.

.2 ANSI Z97.1-2009: Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.

.3 ASTM C509-06(2021): Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.

.4 ASTM C864-05(2019): Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.

.5 ASTM C1115-17: Standard Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.

.6 ASTM C1281-16(2023): Standard Specification for Preformed Tape Sealants for Glazing Applications.

.7 ASTM C1376-21a: Standard Specification for Pyrolitic and Vacuum Deposition Coatings on Flat Glass.

.8 ASTM E1300-24: Standard Practice for Determining Load Resistance of Glass in Buildings.

.9 CAN/CGSB-12.1-2022: Safety Glazing.

.10 CAN/CGSB-12.8-2017: Insulating Glass Units.

.11 CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials.

.12 GANA Glazing Manual.

.13 GANA GIB 01-0300: Proper Procedures for Cleaning Architectural Glass.

.14 IGMA TM-3000-90(16): North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use.

.15 IGMA TM-4510-18(19): IGMA Quality Procedures for the Fabrication of Insulating Glass Units to the ISO 9001:2008 Standard.

.16 ANSI/NFRC 100-2023: Procedure for Determining Fenestration Product U-factors.

.17 ANSI/NFRC 200-2023: Procedure for Determining Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

.18 CAN/ULC-S104-15 (R2020): Standard Method for Fire Tests of Door Assemblies.

.19 CAN/ULC-S106-15 (R2020): Standard Method for Fire Tests of Window and Glass Block Assemblies.

1.3 PRODUCT DATA

.1 Submit Product data as specified in Section 01 33 00.

.2 Product Data: Manufacturer's standard data sheets, indicating structural, physical, and environmental characteristics, thickness and size limitations, and special handling and installation requirements.

1.4 SAMPLES

.1 Submit samples as specified in Section 01 33 00.

.2 Verification Samples: Duplicate 300 x 300 mm size samples of each specified sealed insulating glass unit, illustrating colouration and design.

1.5 CERTIFICATES

.1 Submit certificates as specified in Section 01 33 00.

.2 Certificate of Compliance: Manufacturer's standard certificate of compliance, attesting fire-rated glazing materials comply with CPSC requirements.

1.6 TEST AND EVALUATION REPORTS

.1 Submit test reports as specified in Section 01 33 00.

.2 Test Reports: Manufacturer's standard test results indicating Products meet specified performance criteria, prepared by independent testing agency, and current within past 5 years.

1.7 QUALITY ASSURANCE

.1 Conform to glazing installation methods and quality standards specified in:
.1 GANA Glazing Manual,
.2 IGMA TM-3000, North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use, and
.3 IGMA TM-4510, IGMA Quality Procedures for the Fabrication of Insulating Glass Units to the ISO 9001:2008 Standard.

.2 Select glazing compounds and sealants in accordance with glass manufacturers' instructions.

1.8 WARRANTY

.1 Submit extended warranty in accordance with General Conditions of the Contract.

.2 Manufacturer's Extended Warranty: For a period of 5 years, covering complete replacement of sealed insulating glass units experiencing seal failure or interpane dusting and misting.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers of single pane glass and sealed insulating glass units having Product considered acceptable for use:
.1 Cardinal Glass Industries.
.2 Guardian Glass.
.3 Saint-Gobain Glass.
.4 Vitro Architectural Glass.

.2 Manufacturers of fire-rated ceramic glass having Product considered acceptable for use:
.1 Nippon Sheet Glass Co., Ltd.
.2 Schott North America, Inc.

.3 Substitution Procedures: Refer to Section 01 25 00.

2.2 REGULATORY REQUIREMENTS

.1 Fire-rated Glass: Each lite to bear a permanent, non-removable label designating type of glass, fire rating and UL mark.

2.3 DESIGN CRITERIA

.1 Design glass Products to ASTM E1300.
.1 Determine necessary glass thickness to withstand dead loads and positive and negative live loads acting normal to plane of glass.
.2 Limit glass deflection to 1/200 or flexure limit of glass with full recovery of glazing materials, whichever is less.

.2 Design Products installed as exterior glazing to contribute to continuity of building enclosure air and vapour seals.

2.4 PERFORMANCE CRITERIA

.1 Sealed Insulating Glass Units (SIG-CLR-1): Having the following tested physical properties:
.1 Visible Light Transmittance (VLT): 70 percent.
.2 Visible Light Reflectance:
.1 Exterior: 11 percent.
.2 Interior: 12 percent.
.3 Coefficient of Heat Transmission, Winter, Argon-Filled (ANSI/NFRC 100): U = 1.36 W/m^2 degrees C.
.4 Solar Heat Gain Coefficient (ANSI/NFRC 200): SHGC = 0.39.
.5 Colour Rendering Index: CRI = 95.

2.5 SINGLE PANE GLASS

.1 Tempered Safety Glass: To CAN/CGSB-12.1, Class A; clear float glass fully tempered horizontally to achieve a net strength of not less than 4 to 5 times greater than regular annealed glass; 6 mm thick unless noted otherwise.

.2 Fire-Rated Ceramic Glass: Fire-rated and impact safety-rated glass ceramic with surface-applied safety film; having impact safety rating meeting ANSI Z97.1, Class A and CPSC 16 CFR 1201, Categories I and II; and as follows:
.1 Thickness: 5 mm.
.2 Style: Clear.
.3 Grade: Standard.
.4 Visible Light Transmittance: 88 percent.
.5 Visible Light Reflectance: 9 percent.
.6 Fire Rating (CAN/ULC S104 and CAN/ULC-S106): 90 minutes.
.7 Manufacturer and Product Name: eg. FireLite NT by Nippon Sheet Glass Co., Ltd.

2.6 SEALED INSULATING GLASS UNITS

.1 Sealed Insulating Glass Units (SIG-CLR-1): To CAN/CGSB-12.8; double pane with warm edge seal; comprised as follows:
.1 Outer Pane: 6 mm thick Clear tempered safety glass, sputtered Low-E coating on #2 surface.
.2 Interpane Space: Filled with minimum 90 percent Argon gas.
.3 Inner Pane: 6 mm thick Clear tempered safety glass.

.4 Overall Thickness: 25 mm.
.5 Manufacturer's Name and Product: eg. Solarban 60 (2) Clear + Clear by Vitro Architectural Glass.

2.7 COATINGS AND FILMS

.1 Low-E Coating: To ASTM C1376, Kind CV; magnetron sputtered vacuum deposition (MSVD) coating; eg. Solarban 60 Solar Control Low-E by Vitro Architectural Glass.

2.8 ACCESSORIES

.1 Warm Edge Seal: Polyisobutylene primary seal with a secondary seal comprised of either silicone, butyl, polysulphide or urethane, as recommended by sealed insulating glass unit manufacturer for each particular glazing application.

.2 Dense Compression Gasket: Moulded or extruded gaskets, made from neoprene or EPDM to ASTM C864, or thermoplastic polyolefin rubber to ASTM C1115; of profile and hardness required to maintain watertight seal.

.3 Soft Compression Gasket: To ASTM C509, Type II; moulded or extruded, closed-cell, integral-skinned gaskets made from neoprene, EPDM or thermoplastic polyolefin rubber; Black colour; profile and hardness required to maintain watertight seal.

.4 Back-Bedding Mastic Glazing Tapes: To ASTM C1281 and AAMA 800, preformed, butyl-based elastomeric tape with 100 percent solids content; non-staining and non-migrating in contact with non-porous surfaces; with or without spacer rod; packaged on rolls with release paper backing.

.5 Expanded Cellular Glazing Tapes: Closed cell, PVC foam tape, factory-coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; to AAMA 800 for the following types:
.1 Tape Acts as Primary Seal: Type 1.
.2 Tape Used in Combination with Full-Bead of Sealant: Type 2.

.6 Glazing Tape for Fire-rated Glass Applications: Fiberfrax Alumino-Silicate Fiber glazing tape by Unifrax Corporation.

.7 Setting Blocks: Elastomeric material, having a Shore A durometer hardness of 85, plus or minus 5.

.8 Setting Blocks for Fire-rated Glass Applications: Calcium silicate.

.9 Spacers: Elastomeric blocks or continuous extrusions, having a Shore A durometer hardness sufficient to maintain glass lites in place both during and after installation.

.10 Edge Blocks: Elastomeric material of sufficient hardness to limit glass lateral movement.

.11 Glazing Sealant: SEAL-GLZ as specified in Section 07 92 00.

.12 Cleaners, Primers and Sealers: Types recommended by sealant and gasket manufacturers.

2.9 FABRICATION

.1 Fabricate sealed insulating glass units to IGMA TM-4510.

3 Execution

3.1 EXAMINATION

.1 Refer to Section 01 71 00.

.2 Verify openings for glazing are correctly sized within tolerance, and clean.

3.2 PREPARATION

.1 Clean contact surfaces with solvent and wipe dry.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

3.3 INSTALLATION

.1 Conform to GANA Glazing Manual.

.2 Install exterior glazing forming part of building envelope to IGMA TM-3000 to achieve airtight and watertight seal.

.3 Protect glass edges from damage during handling and installation. Remove damaged glass from Place of the Work and dispose of in accordance with authorities having jurisdiction. Damaged glass is defined as glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

.4 Install setting blocks in sill rabbets, sized and located in accordance with GANA Glazing Manual. Set blocks in heel bead of glazing sealant.

.5 Do not exceed edge pressures stipulated by glass manufacturer for installing glass lites.

.6 Provide spacers for glass lites where length plus width is larger than 1 270 mm.

.7 Provide edge blocking necessary to prevent glass lites from moving sideways in glazing channel, in accordance with GANA Glazing Manual.

.8 Tape Glazing: Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sight line of stops. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
   .1 Cover vertical framing joints by applying tapes first to heads and sills, and then to jambs.
   .2 Cover horizontal framing joints by applying tapes first to jambs, and then to heads and sills.
   .3 Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant.
   .4 Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets, formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work towards center of openings.

.9 Gasket Glazing: Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
   .1 Insert soft compression gasket between glass and frame or fixed stop such that it is securely in place, with joints miter cut and bonded together at corners.
   .2 Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets, formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work towards center of openings.
   .3 Install gaskets so they protrude evenly past face of glazing stops.
   .4 Compress gaskets to produce weather tight seal without developing bending stress in glass.
   .5 Seal gasket joints with compatible sealant.

3.4 CLEANING

.1 Refer to Section 01 74 00.

.2 Remove glazing materials from finish surfaces.

.3 Remove non-permanent labels upon Ready-for-Takeover.

.4 Clean glass surfaces to GANA GIB 01-0300.

3.5 PROTECTION

.1 Refer to Section 01 76 00.

.2 Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface.

.3 Protect glass from contact with contaminating substances resulting from subsequent construction operations.

.4 Remove and replace Products that have been damaged, including but not limited to having been broken, chipped, cracked or abraded; regardless of cause, before Ready-for-Takeover.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 04 00 00 - Masonry.

.3 Section 06 10 00 - Rough Carpentry.

.4 Section 06 20 00 - Finish Carpentry.

.5 Section 07 92 00 - Joint Sealants.

.6 Section 08 12 13 - Hollow Metal Frames.

.7 Section 08 31 00 - Access Door and Panels.

.8 Section 09 30 00 - Tiling.

.9 Section 09 51 23 - Acoustical Tile Ceilings.

.10 Section 09 90 00 - Painting and Coating.

1.2 REFERENCES

.1 ASTM A641/A641M-19(2025): Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

.2 ASTM A653/A653M-23: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.3 ASTM A792/A792M-23: Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.4 ASTM C475/C475M-17(2022): Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

.5 ASTM C514-04(2020): Standard Specification for Nails for the Application of Gypsum Board.

.6 ASTM C645-24: Standard Specification for Nonstructural Steel Framing Members.

.7 ASTM C754-20: Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

.8 ASTM C840-25: Standard Specification for Application and Finishing of Gypsum Board.

.9 ASTM C954-22: Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

.10 ASTM C1002-20: Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

.11 ASTM C1047-19: Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

.12 ASTM C1178/C1178M-24: Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.

.13 ASTM C1264-19(2024): Standard Specification for Sampling, Inspection, Rejection, Certification, Packaging, Marking, Shipping, Handling, and Storage of Gypsum Panel Products.

.14 ASTM C1396/C1396M-24: Standard Specification for Gypsum Board.

.15 ASTM C1629/C1629M-24: Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.

.16 ASTM C1658/C1658M-24: Standard Specification for Glass Mat Gypsum Panels.

.17 ASTM E90-23: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.18 CGC Gypsum Construction Handbook.

.19 CAN/CGSB-71.25-M88: Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.

.20 CISCA Ceiling Systems Handbook, 2012 Edition.

.21 GA-214-2021: Levels of Finish for Gypsum Panel Products.

.22 CAN/ULC-S101-14 (REV1): Standard Method of Fire Endurance Tests of Building Construction and Materials.

.23 ULC List of Equipment and Materials.

1.3 QUALIFICATIONS

.1 Installers: A firm specializing in erecting metal framing and installing gypsum board, having minimum 5 years documented experience.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Conform to ASTM C1264.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers of non-loadbearing metal framing having Product considered acceptable for use:
- .1 Bailey Metal Products Limited.
- .2 CGC Inc.
- .3 Dietrich Metal Framing.

.2 Manufacturers of gypsum board and coated tile backer board having Product considered acceptable for use:
- .1 CertainTeed Canada, Inc.
- .2 CGC Inc.
- .3 G-P Gypsum Corporation.

.3 Substitution Procedures: Refer to Section 01 25 00.

2.2 DESCRIPTION

.1 Interior Partitions: Vertical non-load bearing metal stud framing clad with wall boards mechanically-fastened or adhered on one or both sides, and including acoustical insulation and accessories where indicated.

.2 Suspended Ceilings: Horizontal non-load bearing channels and framing carrying mechanically-fastened ceiling boards.

.3 A non-load bearing (non-structural) member is defined as a member in a steel-framed system which is limited to transverse (out-of-plane) load of not more than 480 Pa, a superimposed axial load, exclusive of sheathing materials, of not more than 1 460 N/m, or a superimposed axial load of not more than 890 N.

.4 A load bearing (structural) stud may be used in a non-load bearing application; however, non-load bearing members (studs or track) may never be used in a load bearing (axial or lateral loading) application.

2.3 PERFORMANCE CRITERIA

.1 Provide metal wall framing systems with maximum design limit of 240 Pa and maximum allowable deflection of L/360.

.2 Provide metal ceiling framing systems with maximum allowable deflection of L/240.

.3 Fire-Resistance Rated Assemblies: Provide Products and construction identical to those tested in listed assemblies. Conform to CAN/ULC-S101.

.4 Sound Rated Assemblies: Provide Products and construction identical to those tested in listed assemblies. Conform to ASTM E90.

.5 Seismic Requirements: Provide seismic restraint as required by applicable regulatory requirements, to CISCA guidelines.

2.4 METAL FRAMING

.1 Metal Wall Studs: To ASTM C645; 0.455 mm thick sheet steel; galvanized or galvalumed finish; C-Shape with 32 mm wide flange, complete with serrated faces and knock-outs for electrical fitments; depths as indicated on Drawings.

.2 Heavy Duty Metal Wall Studs: To ASTM C645; 0.836 mm thick sheet steel; galvanized or galvalumed finish; C-Shape with 32 mm wide flange, complete with serrated faces and knock-outs for electrical fitments; depths as indicated on Drawings.

.3 Shaft Wall Metal Studs: To ASTM C645; 0.836 mm thick sheet steel; galvanized or galvalumed finish; CH- and E-Shapes, complete with serrated faces and knock-outs for electrical fitments; depths as indicated on Drawings.

.4 Metal Floor and Ceiling Tracks: To ASTM C645; 0.455 mm thick sheet steel; galvanized or galvalumed finish; U-Shape with 32 mm wide flanges; depths as indicated on Drawings.

.5 Heavy Duty and Shaft Wall Metal Floor and Ceiling Tracks: To ASTM C645; 0.836 mm thick sheet steel; galvanized or galvalumed finish; U-Shape with 32 mm wide flanges; depths as indicated on Drawings.

.6 Metal Ceiling Deflection Track: To ASTM C645; 0.455 mm thick sheet steel; galvanized or galvalumed finish; U-Shape with long legs, designed to accommodate structural deflections; depths as indicated on Drawings.

.7 Furring: To ASTM C645; 0.455 mm thick sheet steel; galvanized or galvalumed finish; and as described below:
  .1 C-Shaped Furring Channels: 13 mm wide flange, 19 mm deep unless noted otherwise on Drawings.
  .2 Hat-Shaped Furring Channels: 13 mm wide flange, 22 mm deep unless noted otherwise on Drawings.
  .3 Z-Shaped Furring: With slotted or non-slotted web, 32 mm face flange, 22 mm wall attachment flange; depth as indicated on Drawings.
  .4 Resilient Furring Channels: Designed to reduce sound transmission; 13 mm deep unless noted otherwise on Drawings.

.8 Carrying Channels: To ASTM C754; 1.37 mm thick cold-formed steel with galvanized or galvalumed finish; having minimum yield strength of 228 MPa; C-Shape with 13 mm flange width, 38 mm deep unless noted otherwise on Drawings.

.9 Furring Brackets: 0.79 mm thick sheet steel; galvanized or galvalumed finish; adjustable, with corrugated-edge.

.10 Flat Strap and Backing Plates: 0.455 mm thick sheet steel; galvanized or galvalumed finish; lengths and widths as indicated on Drawings.

.11 Channel Bridging: 0.455 mm thick sheet steel; galvanized or galvalumed finish; 13 mm wide flange, 19 mm deep unless noted otherwise on Drawings.

.12 Hanger Wire: To ASTM A641/A641M; zinc-coated, soft-annealed, 3.77 mm OD steel wire.

.13 Tie Wire: To ASTM A641/A641M; zinc-coated, soft-annealed, 1.21 mm OD steel wire.

2.5 BOARDS

.1 Moisture/Mould Resistant Gypsum Wall Board (GB-MR-1): To ASTM C1396/C1396M; 12.7 mm thick gypsum panel with water- and mould-resistant gypsum core and paper facers on both sides, with tapered edges; eg. Sheetrock Brand Ultralight Panels Mold Tough by CGC Inc.

.2 Moisture/Mould Resistant Gypsum Wall Board (GB-MR-2): To ASTM C1396/C1396M, Type X; 15.9 mm thick gypsum panel with water- and mould-resistant gypsum core and paper facers on both sides, with tapered edges; eg. Sheetrock Brand Mold Tough Panels FireCode X by CGC Inc.

.3 Fire-Rated Gypsum Board (GB-FR): To ASTM C1396/C1396M, Type C; fire-rated gypsum panel with water- and mould-resistant gypsum core and paper facers on both sides, with tapered edges; ULC labelled; thicknesses as indicated on Drawings; eg. Sheetrock Brand Mold Tough Panels FireCode C by CGC Inc.

.4 Abuse-Resistant Gypsum Board (GB-AR): To ASTM C1629/C1629M, Type X; Level II - Mild to Moderate Duty; 15.9 mm thick gypsum abuse-resistant panel with water- and mould-resistant gypsum core and paper facers on both sides, with tapered long edges and square ends; eg. Sheetrock Brand Panels Mold Tough AR FireCode X by CGC Inc.

.5 Gypsum Shaft Liner Board (GB-SL): To ASTM C1658/C1658M, Type X; 25 mm thick; double bevelled edges; silicone treated gypsum core, with coated glass mat facers both sides; eg. Sheetrock Brand Glass-Mat Liner Panels by CGC Inc.

.6 Gypsum Backing Board (GB-BB): To ASTM C1396/C1396M; 12.7 mm thick; paper-faced; square edges.

.7 Gypsum Ceiling Board (GB-CLG): To ASTM C1396/C1396M; 12.7 mm thick; paper-facers, eased edges; maximum 6.5 kg/m^2 weight; eg. Sheetrock Brand Ultralight Interior Ceiling Board Sag-Resistant by CGC Inc.

.8 Coated Tile Backer Board (GB-TB): To ASTM C1178/C1178M; 12.7 mm thick coated glass mat-faced gypsum panel, with silicone-treated gypsum core, glass fiber mesh facers both sides, and a co-polymer waterproof coating on tile-face side, square edges; Dens-Shield Tile Backer by G-P Gypsum Corporation.

2.6 ACCESSORIES

.1 Foam Gasket: 3.2 mm thick adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement; width to suit track depth.

.2 Corner Beads, Casing Beads, Control Joints, and Edge Trim: To ASTM C1047; metal type.

.3 Reveals and Trim Reglets: Extruded aluminum profiles; as indicated on Drawings.

.4 Nail Fasteners: To ASTM C514; galvanized steel.

.5 Steel Drill Screws: To ASTM C954; galvanized steel.

.6 Self-Tapping Screws: To ASTM C1002, galvanized steel, as follows:
.1 For Securement to Metal Framing: Type S, Fine Thread.
.2 For Securement to Gypsum Backing Board: Type G, Coarse-pitch High-thread.

.7 Adhesive: To CAN/CGSB-71.25-M.

.8 Joint Tape: Fiberglass joint tape, 50 mm wide, self-adhering type; eg. Mould Resistant Fiberglass Drywall Tape by CGC Inc.

.9 Joint Compound: Ready-mixed drying type drywall compound, to ASTM C475/C475M; eg. Synko Brand Classic All Purpose Drywall Compound by CGC Inc.

.10 Joint Sealant: Interior general purpose sealant, Type SEAL-INT-GP as specified in Section 07 92 00.

.11 Water: Potable.

2.7 MIXING

.1 Thoroughly mix joint and skim coat materials to homogeneous mixture with trowelling consistency.

2.8 FINISHES

.1 Galvanized Coating on Metal Framing Components: To ASTM A653/A653M, Coating Designation Z120; hot dipped zinc alloy coating.

.2 Galvalumed Coating on Metal Framing Components: To ASTM A792/A792M, Coating Designation AZM150; hot dipped aluminum-zinc alloy coating.

3 Execution

3.1 PREPARATION

.1 Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure.
.1 Ensure inserts and other provisions for anchorages to building structure have been installed to receive hangers at required spacings.
.2 Supply concrete inserts and other devices to other related Sections for installation in advance.

3.2 METAL WALL FRAMING

.1 Install metal wall framing to ASTM C754 and CGC Gypsum Construction Handbook.

.2 Where metal framing is installed directly against exterior masonry walls or dissimilar metals at exterior walls, Provide foam gasket between metal framing and exterior wall.

.3 Install studs with flanges pointing in same direction.

.4 Space metal stud framing in straight walls and partitions at maximum 400 mm OC.

.5 Install track floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions of structure.

.6 Where framing extends to overhead structural supports, Provide deflection track to create a slip-type head joints to produce joints at tops of framing system that prevent axial loading of finished assemblies due to deflection of structure.

.7 Screw vertical studs at door opening jambs to jamb anchor clips at door frames. Install track section for cripple studs at head and secure to jamb studs.
- .1 Provide two studs at each jamb.
- .2 Provide cripple studs at head adjacent to each jamb stud, with minimum 13 mm clearance from jamb stud to allow for installation of control joint in finished assembly.

.8 Provide framing below sills of openings to match framing required above opening heads.

.9 Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated. Support closures and make partitions continuous from floor to underside of solid structure.

.10 Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

.11 Attach furring directly to concrete or masonry using stub nails, screws designed for masonry attachment or power-driven fasteners; spaced at 610 mm OC.

.12 Z-Furring Members:
- .1 Erect insulation vertically and hold in place with Z-furring members spaced at 610 mm OC.
- .2 Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or power-driven fasteners spaced at 610 mm OC.
- .3 At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel.
- .4 At interior corners, space second member no more than 305 mm from corner and butt insulation to fit.

.13 Unless indicated otherwise, Provide supplementary framing and furring to conceal pipes, conduit, and ducts.

.14 Provide supplementary framing and blocking necessary to support fixtures, fitments, equipment, and furnishings being secured to gypsum board assemblies. Maintain fire rating of wall assembly where applicable.

.15 Install bracing at terminations in assemblies.

.16 Do not bridge building control joints and expansion joints with non-load bearing steel framing members. Frame both sides of joints independently.

.17 Installation Tolerances: Install framing members so fastening surfaces vary not more than 3 mm from plane formed by faces of adjacent framing members.

3.3 SUSPENDED CEILING FRAMING

.1 Install ceiling framing to ASTM C754 and CISCA installation standards for required seismic design category.

.2 Isolate suspension system from building structure. Prevent transfer of loading imposed by structural movement.

.3 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum.

.4 Size supplemental suspension members and hangers to support ceiling loads within established performance limits.

.5 Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or similar devices.

.6 Secure wire hangers by looping and wire tying, either directly to structure or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate; and in a manner that will not cause hangers to fail or deteriorate.

.7 Do not attach hangers to steel roof decking, or to rolled-in hanger tabs of composite steel floor decking.

.8 Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.

.9 Do not connect or suspend steel framing from ducts, pipes, or conduit.

.10 For fire-resistance-rated assemblies, wire tie furring channels to supports.

.11 Installation Tolerances: Level to within 3 mm in 3 600 mm, measured lengthwise on each member that will receive finishes, and transversely between parallel members that will receive finishes.

3.4 BOARD INSTALLATION

.1 Install board Products to ASTM C840 and CGC Gypsum Construction Handbook.

.2 Install gypsum ceiling board perpendicular to supports.

.3 Screw fasten boards to furring or framing.

.4 Install abuse-resistant gypsum board on heavy duty metal stud and track framing.

.5 Install shaft liner gypsum board on shaft wall metal stud and track framing.

.6 Double Layer Applications: Use gypsum backing board for first layer, placed perpendicular to framing or furring members. Place second layer perpendicular to first layer.

.7 Place corner beads at external corners. Place edge trim where gypsum board abuts dissimilar materials. Fasten with nail attachment, unless specified otherwise.

.8 Provide bulkheads where changes of ceiling or height occur.

.9 Install access panels when and where directed by affected facility service Subcontractors. Refer to Section 08 31 00.

3.5 BOARD FINISHING

.1 Tape, fill, and sand exposed joints, edges, and corners to a smooth surface.

.2 Leave surfaces smooth, even, plumb. and true, ready to receive final finishes specified in other Sections.

.3 Except as specified below, finish gypsum board to GA-214, Level 4.
- .1 Provide Level 1 finish on concealed surfaces, such as in plenum spaces above ceilings, and behind cabinetry.
- .2 Provide Level 2 finish on surfaces designated to receive tile finishes.
- .3 Provide Level 5 finish on glass mat-faced gypsum surfaces designated to receive a painted finish.

3.6 CONTROL JOINTS

.1 Provide control joints where indicated on Drawings, and where:
.1 Ceiling, partition or furring abuts a structural element,
.2 Ceiling, partition or furring abuts dissimilar construction,
.3 Construction changes within plane of the partition or ceiling,
.4 Partition or furring run exceeds 9 000 mm,
.5 Ceiling dimensions exceed 15 000 mm in either direction,
.6 Wings of "L-", "U-" and "T"-shaped ceiling areas are joined, and
.7 Expansion or control joints occur in the structural elements of the building.

.2 Break continuity of gypsum board and framing system at control joints.

.3 Provide continuous control joint profile.

3.7 RELIEF JOINTS

.1 Provide relief joints where indicated on Drawings and where gypsum board assemblies abut dissimilar construction.

.2 Stop gypsum board 6 mm from abutting construction at dissimilar building elements, unless indicated otherwise.

.3 Provide thermal break where gypsum board comes into contact with frames. Adhere self-adhering tape to casing bead and compress during installation of gypsum board.

.4 Provide reveal mouldings where gypsum board ceilings meet curved wall surfaces and where indicated on Drawings.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 04 00 00 - Masonry.

.3 Section 06 10 00 - Rough Carpentry.

.4 Section 07 92 00 - Joint Sealants.

.5 Section 09 21 16 - Gypsum Board Assemblies.

.6 Section 09 65 19 - Resilient Tile Flooring.

.7 Section 09 66 13 - Portland Cement Terrazzo Flooring.

.8 Section 14 24 23.16 - MRL Hydraulic Passenger Elevators.

1.2 REFERENCES

.1 ANSI A108.01:2023: General Requirements: Subsurfaces and Preparations by Other Trades.

.2 ANSI A108.4:2023: Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive.

.3 ANSI A108.5:2023: Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.

.4 ANSI A108.10-1999: Installation of Grout in Tilework (Reaffirmed 2022).

.5 ANSI A108.13-2005: Installation of Load Bearing, Bonded, Waterproof Membrane for Thin-Set Ceramic Tile and Dimension Stone (Reaffirmed 2016).

.6 ANSI A108.17-2005: Installation of Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone (Reaffirmed 2016).

.7 ANSI A118.1:2023: Specifications for Dry-Set Portland Cement Mortar.

.8 ANSI A118.4:2023: Specifications for Modified Dry-Set Cement Mortar.

.9 ANSI A118.7-2010: Specifications for Polymer Modified Cement Grouts for Tile Installation (Reaffirmed 2016).

.10 ANSI A118.10:2023: Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.

.11 ANSI A118.12-2014: Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation (Reaffirmed 2024).

.12 ANSI A136.1-2008: Specifications for Organic Adhesives for Installation of Ceramic Tile (Reaffirmed 2013).

.13 ANSI A137.1-2022: Specifications for Ceramic Tile.

.14 ASTM C144-24: Standard Specification for Aggregate for Masonry Mortar.

.15 ASTM C207-24: Standard Specification for Hydrated Lime for Masonry Purposes.

.16 ASTM C627-18(2024): Standard Test Method for Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester.

.17 ASTM C847-18(2024): Standard Specification for Metal Lath.

.18 ASTM F1869-23: Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

.19 ASTM F3191-23: Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.

.20 CAN/CGSB-25.20-95: Surface Sealer for Floors.

.21 CSA A3001:23: Cementitious Materials for Use in Concrete.

.22 TTMAC Specification Guide 09 30 00 - Tile Installation Manual (2025).

1.3 SAMPLES

.1 Submit samples as specified in Section 01 33 00.

.2 Verification Samples: A 300 x 300 mm size panel, complete with selected grout colours; mounted to 19 mm thick plywood backer.

1.4 CLOSEOUT SUBMITTALS

.1 Submit closeout submittals as specified in Section 01 78 00.

.2 Maintenance Data: Latest edition of TTMAC Hard Surface Maintenance Guide; sufficient quantities for inclusion in operation and maintenance manual.

1.5 EXTRA STOCK MATERIALS

.1 Supply extra stock materials as specified in Section 01 78 00.

.2 Extra Stock Materials: Two percent or 4.0 m^2, whichever is greater, of each type and colour of installed tile; clearly marked to identify:
.1 Manufacturer's name,
.2 Product's name, and
.3 Product colour and pattern.

.3 Package tiles neatly in original containers, to prevent damage.

1.6 QUALIFICATIONS

.1 Installers: Skilled workers trained and experienced in tiling, and members of TTMAC.

1.7 DELIVERY STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Store Products in a dry area, protected from freezing, staining, and damage.

.3 Store cementitious materials on a dry surface.

1.8 AMBIENT CONDITIONS

.1 Do not install tiles at temperatures less than 12 degrees C.

.2 Maintain temperatures at or above 12 degrees C until cementitious materials have fully cured.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers of mortars, grouts, and adhesives having Product considered acceptable for use:
.1 Custom Building Products.
.2 Flextile.
.3 Laticrete.
.4 Mapei.
.5 Proma Adhesives, Inc.
.6 TEC.

.2 Manufacturers of tile-setting accessories having Product considered acceptable for use:
.1 Bengard.
.2 Profilitec.
.3 Schlüter Systems (Canada) Inc.

.3 Substitution Procedures: Refer to Section 01 25 00.

2.2 PERFORMANCE CRITERIA

.1 Traffic Level Performance (ASTM C627): Moderate Class.

2.3 TILE MATERIALS

.1 Porcelain Floor Tile (CT-F): To ANSI A137.1; 305 x 610 mm size porcelain tile; More Collection as distributed by OSI Tile & Stone, or Deluxe Collection as distributed by Savoia Canada Inc., or Vitra-Urbancrete as distributed by Centura Floor and Wall Fashions; colours as selected by Consultant.

.2 Ceramic Wall Tile (CT-W1): To ANSI A137.1; 150 x 150 mm size; 7 mm thick glazed mosaic; bullnose corners, caps and trims as required; colours and finish as selected by Consultant for maximum 8 colours and finishes and as per the following criteria: 60 percent of tile will be selected from Classic Colour Wheel Collection wall tile price group 1 as distributed by Daltile. Remaining 40 percent of tile will be selected from Classic Colour Wheel Collection wall tile price group 3, as distributed by Daltile.

.3 Ceramic Wall Tile (CT-W2): To ANSI A137.1; 75 x 150 mm size; 7 mm thick glazed mosaic; bullnose corners, caps and trims as required; colours and finishes as selected by Consultant, with up to 40 percent selected from price group 3 by Daltile.

.4 Cut Base Tile: 100 mm high, full-length, site-cut from floor tile, and having at least one factory-formed edge along each tile's length; type, size, colour, and texture to match adjacent flooring tile.

2.4 MORTAR AND GROUT MATERIALS

.1 Portland Cement: To CSA A3001, Type GU.

.2 Hydrated Lime: To ASTM C207, Type N-Normal.

.3 Sand: To ASTM C144, passing 16 mesh.

.4 Dry-Set Portland Cement Mortar: To ANSI A118.1.

.5 Latex-Portland Cement Mortar: To ANSI A118.4.

.6 Large-Format Floor and Wall Tile Mortar: To ANSI A118.4, Types H, E, & T; polymer-modified mortar, non-slump and non-sag formula; eg. Large-Format Floor & Wall Tile Mortar by Mapei.

.7 Floor and Wall Tile Cementitious Grout: To ANSI A118.7; rapid setting type, polymer-modified sanded grout; eg. Ultracolor Plus FA by Mapei, colours as selected by Consultant.

2.5 ACCESSORIES

.1 Crack Isolation Membrane: To ANSI A118.12, Standard Performance Rating; loadbearing membrane.

.2 Reinforcing Mesh: 50 x 50 mm size; 1.6 mm thick steel wire mesh; welded fabric, galvanized.

.3 Metal Lath: To ASTM C847; 1.4 kg/m^2 galvanized steel lath.

.4 Tape: 50 mm fibre mesh tape, as recommended by backer board manufacturer.

.5 Organic Adhesive: To ANSI A136.1; Type 1 for wet areas and Type 2 for dry areas.

.6 Latex Additive: Formulated for use in portland cement mortars and grout.

.7 Water: Clean, cold and potable.

.8 Joint Sealant: Interior tiling sealant, SEAL-INT-TILE as specified in Section 07 92 00.

.9 Tile Sealer: To CAN/CGSB-25.20, Type 1 - Penetrating.

2.6 MANUFACTURED COMPONENTS AND ACCESSORIES

.1 Edge and Transition Strips: Roll-formed stainless steel edge strips, 3 mm wide at top edge; with integral perforated anchoring leg for setting strip into setting material; height as required; Brushed finish; eg. SCHIENE-EB by Schlüter Systems (Canada) Inc.

.2 Tapered Transition Strips - To Other Floor Finishes: Roll-formed stainless steel transition strips; profile and height as indicated; with integral perforated anchoring leg for setting strip into setting material; sloped transition and decorative edge strip for transition from tile to lower finish; Brushed finish; eg. RENO-EBU by Schlüter Systems (Canada) Inc.

.3 Decorative Edge Trim: Extruded aluminum decorative edge trim with integral perforated anchoring leg for setting strip into setting material; complete with pre-formed corners; Satin Anodized finish; eg. RONDEC-DB 14 AE by Schlüter Systems (Canada) Inc.

.4 Expansion and Control Joints for Thin-Set Applications: Roll formed stainless steel profiles joined by soft CPE movement joint material, with integral perforated anchoring legs for setting joint into setting bed; height as required to suit application; insert colour as selected by Consultant; eg. DILEX-EKSN by Schlüter Systems (Canada) Inc.

.5 Uncoupling Membrane: To ANSI A118.10; 3 mm thick high density polyethylene membrane with grid structure of 12 x 12 mm square cavities, each cut back in dovetail configuration, and polypropylene anchoring fleece laminated to underside; eg. DITRA by Schlüter Systems (Canada) Inc.

2.7 MIXES

.1 Scratch Coat (by volume): One part Portland cement, 4 parts sand, and latex additive where required by TTMAC Detail. Premixed mortar may be used per manufacturer’s instructions. Adjust water volume depending on moisture content of sand to obtain consistency and workability.

.2 Slurry Bond Coat: Mix Portland cement and water to a creamy paste consistency. Include latex additive where required by TTMAC Detail.

.3 Levelling Coat (by volume): One part Portland cement, 4 parts sand, and latex additive where required by TTMAC Detail. Premixed mortar may be used per manufacturer's instructions.

3 Execution

3.1 EXAMINATION

.1 Refer to Section 01 71 00.

.2 Ensure substrates have been prepared to ANSI A108.01.

.3 Ensure substrate surfaces are clean, dimensionally stable, and properly cured.

.4 Ensure substrate surfaces are free of contaminants such as oil, sealers, and curing compounds.

.5 Ensure concrete has cured for minimum 28 days.

.6 Ensure concrete floors have not been treated with proprietary curing compounds.

.7 Ensure concrete floors are steel trowelled to a fine broom finish.

.8 Ensure concrete slabs have been finished with maximum permissible variation of 3 mm in 3 000 mm from the required plane, and not more than 1.5 mm in 305 mm when measured from high points in surface.

.9 Conduct moisture vapour emission rate tests on concrete slabs-on-fill to ASTM F1869. Do not proceed with installation until tests indicate MVER $\leq$ 1.45 kg per 93 m^2 for 24 hours.

.10 Determine absorptive nature of substrates by conducting porosity tests to ASTM F3191.

3.2 PREPARATION

.1 Protect surrounding work from damage or disfiguration.

.2 Thoroughly clean substrates to remove grease, oil, and dust film.

.3 Prepare substrate as recommended by manufacturer for absorptive conditions determined by porosity test.

.4 Apply latex modified cementitious levelling coat where substrate does not meet specified tolerances for flatness and levelness, and where slight irregularities exist. Limit levelling coat to less than 8 mm thick.

.5 Install crack isolation membrane as required by TTMAC Details, to ANSI A108.17. If membrane is applied over rough surface, apply 6 mm thick sand-bed under membrane.

.6 Install uncoupling membrane as required by TTMAC Details, to ANSI A108.13.

.7 Cover backer board joints with fibre mesh tape set in latex-Portland cement mortar.

3.3 INSTALLATION

.1 Install Products to TTMAC Specification Guide 09 30 00, as scheduled below.

.2 Apply tile using water-resistant organic adhesives to ANSI A108.4.

.3 Apply tile using dry-set Portland cement mortar, latex-Portland cement mortar, or large-format tile mortar, to ANSI A108.5.

.4 Install tiles with straight, uniform joints, to tile manufacturers' recommended joint widths.

.5 Fit tile units around corners, fitments, fixtures, drains, and other built-in objects to maintain uniform joint appearance.

.6 Make cut edges smooth, even, and free from chipping. Do not split tile.

.7 Lay out tiles according to patterns indicated on Drawings. Ensure perimeter and cut tiles are minimum half size.

.8 Set tiles in place while bond coat is wet and tacky, prior to skinning over. Slide tile back and forth to ensure proper bond and level surface. Avoid lippage.

.9 Clean backs of tiles and back butter tiles to ensure 95 percent bond coverage.

.10 Clean excess mortar from surface prior to final set.

.11 Sound tiles after setting materials have cured and replace hollow sounding tile before grouting.

.12 Exterior Surfaces and Wet Areas (Thin Set Method): Notch adhesive in straight lines, backbutter tile, and set on freshly trowelled thin-set mortar. Move tile back and forth perpendicular to notches.

.13 Ungauged Slate, Marble, Stone, and Large Ceramics: Immediately prior to setting, backbutter tile through push box or box screed to achieve uniform thickness of tile and mortar.

.14 Install site-cut tiles with site-cut edges concealed within either grouted joint or metal trim. Visually expose only factory-made edges.

.15 Keep two-thirds the depth of grout joints free of setting material.

3.4 MOVEMENT JOINTS

.1 Install control and expansion joints to TTMAC Detail 301MJ.

.2 Keep control joints and expansion joints free of setting materials.

.3 In addition to guidelines outlined in TTMAC Specification Guide 09 30 00, Provide movement joints over cold joints, saw cuts, at columns, and at wall plane changes.

3.5 TILE-SETTING ACCESSORIES INSTALLATION

.1 Install tile-setting accessories in continuous lengths, to level straight lines by pressing perforated anchoring leg solidly into tile setting material.

.2 Butt ends of units tightly together with hairline joint. Trowel additional layer of tile setting material over anchored leg prior to placement of tiles.

.3 Unless specified otherwise, solidly embed tiles over anchoring leg of installed trim with surface of tile flush with top of tile-setting accessories.

.4 Leave 3 mm joint between tile and tile-setting accessories for filling with grout.

.5 Install pre-formed corners, end-caps and trim at changes in direction and at terminations. Mitered joints will be rejected.

.6 Expansion and Control Joints: Solidly embed tiles over installed edge strips with joint surface either flush with top of joint or 1 mm below top of tile.

3.6 GROUTING

.1 Allow proper setting time prior to grouting.

.2 Preseal tiles requiring protection from grout staining.

.3 Apply grout to ANSI A108.10.

.4 Force grout into joints to ensure dense finish.

.5 Remove excess and polish with clean cloths.

3.7 FIELD QUALITY CONTROL

.1 Inspect completed work and replace broken, cracked, or damaged tile.

3.8 TOLERANCES

.1 Level tiles to conform to a 1 mm tolerance over a 3 mm joint.

3.9 CLEANING

.1 Refer to Section 01 74 00.

.2 Apply tile sealer to floor tiles.

3.10 PROTECTION

.1 Refer to Section 01 76 00.

.2 Protect finished areas from traffic until setting materials have sufficiently cured.

.3 Protect grouted areas from traffic for 24 hours after grouting.

.4 Protect finished areas with temporary protective coverings.

.5 Protect wall tiles and bases from impact, vibration, and heavy hammering on adjacent and opposite walls for at least 14 days after installation.

3.11 SCHEDULE

.1 Tile Installed Over Masonry or Concrete Walls - Thin-Set Method: TTMAC Detail 303W (Interior/Exterior).

.2 Tile Installed Over Gypsum Board - Thin-Set Method: TTMAC Detail 304W.

.3 Tile Installed on Cementitious Backer Unit (CBU) - Thin-Set Method/Walls: TTMAC Detail 305W (A - Interior Wet/Dry Areas and Exterior Use).

.4 Tile Installed on Coated Glass Mat Backer Board: TTMAC Detail 305W (B - Interior Wet/Dry Areas).

.5 Tile Bonded to Concrete Slab - Thin-Set Method: TTMAC Detail 311F (A - Interior/Exterior), (C - Crack Concrete Interior/Exterior - Full Coverage) or (D - Uncoupling Over Green/Young Concrete).

.6 Tile Applied Over Wood Subfloor in Dry Areas - Thin-Set Method: TTMAC Detail 313F (A - Thin-Set on Plywood).

.7 Large Format Tile on Interior Floors: TTMAC Detail 329 LFT.

.8 Large Format Tile on Interior Walls: TTMAC Detail 330 LFTW.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 04 00 00 - Masonry.

.3 Section 09 21 16 - Gypsum Board Assemblies.

.4 Section 09 30 00 - Tiling.

.5 Section 09 65 19 - Resilient Tile Flooring.

.6 Section 09 66 13 - Portland Cement Terrazzo Flooring.

1.2 REFERENCES

.1 ASTM F1861-21: Standard Specification for Resilient Wall Base.

1.3 SAMPLES

.1 Submit samples as specified in Section 01 33 00.

.2 Selection Samples: Duplicate 100 mm long sample sets, illustrating manufacturer's complete line of available colour selections.

1.4 CLOSEOUT SUBMITTALS

.1 Submit closeout submittals as specified in Section 01 78 00.

.2 Maintenance Data: Manufacturer's standard maintenance and cleaning guidelines; sufficient quantity for inclusion in operation and maintenance manual.

1.5 EXTRA STOCK MATERIALS

.1 Supply extra stock materials as specified in Section 01 78 00.

.2 Extra Stock Materials: Three percent or 6 m^2, whichever is greater, of each Product, colour, and pattern; clearly marked to identify:
.1 Manufacturer's name,
.2 Product's name,
.3 Product colour and pattern.

.3 Package Products neatly in original containers, to prevent damage.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Deliver and store Products undamaged in original wrapping or cartons.

.3 Store Products for minimum three days prior to installation in a warm, dry room.

.4 Store Products stacked not more than four boxes high.

1.7 AMBIENT CONDITIONS

.1 Maintain ambient air temperature of 20 degrees C three days prior to, during, and 48 hours after installation of flooring materials.

.2 Maintain ambient air relative humidity between 35 percent and 55 percent RH.

.3 Do not install Products in conditions of high humidity or where exposed to cold drafts.

.4 In hot weather, protect Products from direct sunlight.

.5 Provide adequate ventilation.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers having Product considered acceptable for use:
- .1 Amtico.
- .2 Armstrong World Industries.
- .3 Roppe Corporation.
- .4 Tarkett Johnsonite.

.2 Substitution Procedures: Refer to Section 01 25 00.

2.2 MATERIALS

.1 Resilient Base (RB): To ASTM F1861, Type TP, Group 1, Style B - Cove; 3.2 mm thick thermoplastic rubber, 102 mm high; top set; complete with pre-moulded end stops and external corners; colours as selected by Consultant.

.2 Resilient Transition Strips (RTS): Thermoset vulcanized rubber, smooth, purpose made to accommodate wheeled traffic and prevent tripping; tapered designs to suit nature of transition; colours as selected by Consultant.

.3 Adhesive: Non-flammable, solvent free contact adhesive, neoprene water-based formulation, Off-white colour; eg. Johnsonite #946 Premium Contact Adhesive by Tarkett Johnsonite.

.4 Substrate Filler: Premixed latex filler.

.5 Primers: Acrylic, waterproof type; as recommended by manufacturer.

.6 Sealers and Wax: As recommended by manufacturer.

3 Execution

3.1 EXAMINATION

.1 Refer to Section 01 71 00.

.2 Verify surfaces are dry, true, even, and smooth.

.3 Verify surfaces are free of gaps, holes, and depressions.

.4 Verify surfaces are free of paint, grease, and oil.

3.2 PREPARATION

.1 Clean substrate to remove deleterious matter which would impair adhesion of Products.

.2 Prepare substrate to a smooth and flat surface, as follows:
- .1 Remove ridges and bumps by grinding or other means.
- .2 Fill low spots, cracks, joints, holes, and other defects with substrate filler.
- .3 Apply, trowel, and float substrate filler to leave a smooth, flat, and hard surface.
- .4 Prohibit traffic until substrate filler is cured.
- .5 Vacuum clean substrate.

.3 Prime substrates to ensure proper adhesion of Products.

3.3 INSTALLATION

.1 Install Products on solid backing.

.2 Bond Products tight to surfaces.

.3 Mitre internal corners.

.4 At exposed ends and external corners, use pre-moulded units.

.5 Scribe and fit base to door frames and other interruptions.

3.4 CLEANING

.1 Refer to Section 01 74 00.

.2 Clean, seal, and wax installed Products.

3.5 PROTECTION

.1 Refer to Section 01 76 00.

.2 Protect completed installation with suitable and durable materials.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 09 30 00 - Tiling.

.3 Section 09 65 13 - Resilient Base and Accessories.

.4 Section 09 66 13 - Portland Cement Terrazzo Flooring.

1.2 REFERENCES

.1 ASTM F710-22: Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

.2 ASTM F1066-25: Standard Specification for Vinyl Composition Floor Tile.

.3 ASTM F1869-23: Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

.4 ASTM F2170-19a: Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

.5 ASTM F2678-16(2021): Standard Practice for Preparing Panel Underlayments, Thick Poured Gypsum Concrete Underlayments, Thick Poured Lightweight Cellular Concrete Underlayments, and Concrete Subfloors with Underlayment Patching Compounds to Receive Resilient Flooring.

.6 ASTM F3191-23: Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.

.7 ASTM F3441-24a: Standard Guide for Measurement of pH Involving Resilient Flooring Installations.

1.3 SAMPLES

.1 Submit samples as specified in Section 01 33 00.

.2 Selection Samples: Duplicate 300 x 300 mm size samples of each specified Product, illustrating manufacturer's complete line of available colours and patterns.

1.4 CLOSEOUT SUBMITTALS

.1 Submit closeout submittals as specified in Section 01 78 00.

.2 Maintenance Data: Manufacturer's standard maintenance and cleaning guidelines; sufficient quantity for inclusion in operation and maintenance manual.

1.5 EXTRA STOCK MATERIALS

.1 Supply extra stock materials as specified in Section 01 78 00.

.2 Extra Stock Materials: Three percent or 6 m^2, whichever is greater, of each resilient flooring Product, colour, and pattern; clearly marked to identify:
.1 Manufacturer's name,
.2 Product's name, and
.3 Product colour and pattern.

.3 Package tile products neatly in original containers, to prevent damage.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Deliver and store Products undamaged in original wrapping or cartons.

.3 Store Products for minimum three days prior to installation in a warm, dry room.

.4 Store Products stacked not more than four boxes high.

1.7 AMBIENT CONDITIONS

.1 Maintain ambient air temperature of 20 degrees C three days prior to, during, and 48 hours after installation.

.2 Maintain ambient air relative humidity between 35 percent and 55 percent RH.

.3 Do not lay flooring in conditions of high humidity or where exposed to cold drafts.

.4 In hot weather, protect flooring from direct sunlight.

.5 Provide adequate ventilation.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers of vinyl composition tile having Product considered acceptable for use:
.1 Armstrong World Industries.
.2 Mannington.
.3 Tarkett Johnsonite.

.2 Substitution Procedures: Refer to Section 01 25 00.

2.2 MATERIALS

.1 Vinyl Composition Tile (VCT): To ASTM F1066, Composition 1, Class 2; reinforced resilient vinyl tile, as follows:
.1 Thickness: 3.2 mm.
.2 Tile Size: 305 x 305 mm.
.3 Colours: As selected by Consultant.
.4 Manufacturer and Product Name: eg. Standard Excelon - Imperial Texture by Armstrong World Industries.

.2 Adhesive: Water-based / latex resin adhesive, Clear colour; eg. S-515 Tile Strong Adhesive by Armstrong World Industries.

.3 Cementitious Underlayment Patching Compound: Self-drying, hydraulic cement-based underlayment, having a trowel-applied consistency; mould- and mildew-resistant; capable of achieving a true feather edge; zero VOC content; eg. Feather Finish by Ardex Americas.

.4 Primers: Acrylic, waterproof type; as recommended by flooring manufacturer.

.5 Sealers and Wax: As recommended by flooring manufacturer.

3 Execution

3.1 EXAMINATION

.1 Refer to Section 01 71 00.

.2 Verify substrates are dry, true, even, and smooth.

.3 Verify substrates are free of gaps, holes, and depressions.

.4 Verify substrates are free of paint, grease, and oil.

.5 Verify concrete slabs have cured for minimum 28 days.

.6 Verify concrete slabs have pH level between 7 and 9, as determined through ASTM F3441.

.7 Conduct moisture vapour emission rate tests on concrete slabs-on-fill to ASTM F1869. Do not proceed with installation until tests indicate MVER $\leq$ 3.17 kg per 93 m^2 for 24 hours.

.8 Conduct relative humidity tests on concrete slabs to ASTM F2170. Do not proceed with installation until tests indicate RH $\leq$ 75 percent.

.9 Determine absorptive nature of substrates by conducting porosity tests to ASTM F3191.

3.2 PREPARATION

.1 Prepare substrate as recommended by manufacturer for absorptive conditions determined by porosity test. Conform to ASTM F710.

.2 Prepare underlayment patching compounds and surrounding slab surface to ASTM F2678.

.3 Clean substrate to remove deleterious matter that would impair subsequent installation.

.4 Prime substrates to ensure proper adhesion of Products.

3.3 INSTALLATION

.1 Install Products with joints and seams parallel to building lines to produce symmetrical tile patterns.

.2 Spread only enough adhesive to permit installation of Products before initial set.

.3 Set Products in place, press with heavy roller to attain full adhesion.

.4 Provide perimeter tile of similar size within any given area.

.5 Provide accent tiles, feature strips, and inserts where indicated on Drawings.

.6 Lay flooring continuously from wall to wall in each area, including beneath casework.

.7 Where adjacent floor finish is dissimilar, terminate resilient tile flooring at centre line of door openings.

.8 Provide transition strip along junction of dissimilar flooring materials.

.9 Scribe flooring to walls, columns, floor outlets, and other appurtenances to produce tight joints.

3.4 CLEANING

.1 Refer to Section 01 74 00.

.2 Clean, seal, and wax installed Products.

3.5 PROTECTION

.1 Refer to Section 01 76 00.

.2 Protect completed installation with suitable and durable protective coverings, or by keeping traffic off floor.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-In-Place Concrete.

.2 Section 07 92 00 - Joint Sealants.

.3 Section 09 30 00 - Tiling.

.4 Section 09 65 19 - Resilient Tile Flooring.

1.2 REFERENCES

.1 ASTM A1064/A1064M-22: Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

.2 CSA A3001:23: Cementitious Materials for Use in Concrete.

.3 TTMAC 09 66 00 Terrazzo Specification Guide - 2007.

1.3 PRODUCT DATA

.1 Submit Product data as specified in Section 01 33 00.

.2 Product Data: Manufacturer's standard data sheets, indicating divider strips, control joint strips, expansion joints, and termination strips.

1.4 SHOP DRAWINGS

.1 Submit Shop Drawings as specified in Section 01 33 00.

.2 Shop Drawings: Project-specific drawings, illustrating divider strip, control joint and expansion joint layouts, details of adjacent components, and special details.

1.5 SAMPLES

.1 Submit samples as specified in Section 01 33 00.

.2 Selection Samples: Duplicate 300 x 300 mm size samples, illustrating colour, chip size and variation, mortar colour, and ground top surface of divider strip.

1.6 CLOSEOUT SUBMITTALS

.1 Submit closeout submittals as specified in Section 01 78 00.

.2 Maintenance Data: TTMAC Hard Surface Maintenance Guide; sufficient quantities for inclusion in operation and maintenance manual.

1.7 QUALIFICATIONS

.1 Applicator: A firm specializing in applying terrazzo flooring, having minimum 5 years documented experience, and a member of TTMAC.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Deliver, store, and handle Products in a manner to avoid damage.

.3 Store Products in a clean, dry, heated location.

.4 Condition Products to ambient temperatures for minimum 24 hours prior to installation.

1.9 AMBIENT CONDITIONS

.1 Do not install wet mixed terrazzo when temperature is below 10 degrees C or above 32 degrees C.

2 Products

2.1 MATERIALS

.1 Portland Cement: To CSA A3001, Type GU; white colour for topping mix, grey colour for underbed, modified to obtain a higher compressive strength of 19.3 MPa, obtained from single source.

.2 Colour Pigments For Topping: Non-fading mineral type.

.3 Sand: Sharp, coarse, clean, screened, and free of deleterious material.

.4 Water: Potable.

.5 Surface Aggregate: Crushed marble, granite, or quartz chips, sizes and colours to match existing terrazzo flooring.

2.2 ACCESSORIES

.1 Welded Wire Reinforcement: To ASTM A1064/A1064M, flat sheets; 51 x 51 mm mesh size, 1.5 mm thick galvanized wire.

.2 Divider Strips: 1.9 mm thick brass top strip, zinc coated steel bottom strip, depth to match existing.

.3 Control Joint Strips: Brass top strips, zinc coated steel bottom strip, with neoprene filler strip between vertical strips; sizes to match existing.

.4 Base Caps, Base Divider Strips, and Separator Strips: To match divider strips.

.5 Foam Filler: Closed cell urethane foam, capable of compression to 50 percent of its thickness with full recovery.

.6 Slip Sheet: 0.15 mm thick polyethylene sheet.

.7 Subfloor Filler: Latex type.

2.3 MIXES

.1 Underbed: One part Portland cement to 4-1/2 parts sand by volume. Add water to produce low slump mix.

.2 Floor and Base: Matrix and aggregate mix to match existing adjacent terrazzo flooring.

3 Execution

3.1 PREPARATION

.1 Remove loose and unsound materials, and clean substrate thoroughly.

.2 Apply appropriate bonding agent to substrate.

3.2 INSTALLATION

.1 Install divider and control joint strips straight and level, in locations indicated.

.2 Place terrazzo underbed and topping mixes over prepared substrate to thicknesses required to match existing adjacent terrazzo flooring. Conform to appropriate TTMAC Detail.

.3 Allow terrazzo to cure.

.4 After curing, grind patches using 80 grit or finer stones until area has similar finish to surrounding floor surface.

3.3 CLEANING

.1 Refer to Section 01 74 00.

.2 Scrub and clean terrazzo surfaces with recommended cleaner. Let dry.

.3 Immediately when dry, apply sealer, wax, and polish terrazzo surfaces.

3.4 SCHEDULE

.1 Portland Cement Terrazzo Bonded to Concrete Slab - Interior Only: TTMAC Detail 410F.

.2 Portland Cement Terrazzo Base Poured in Place Cove Base: TTMAC Detail 416B.

END OF SECTION

1 General

1.1 PRODUCTS FURNISHED OR INSTALLED UNDER OTHER SECTIONS

.1 Carefully examine scope of the Work as indicated on Drawings, and include all finishing, whether specifically mentioned or not, except as specifically excluded below:
- .1 Section 04 00 00 - Masonry: Integral finish of clay masonry units.
- .2 Section 05 12 00 - Structural Steel Framing: Shop priming.
- .3 Section 05 50 00 - Metal Fabrications: Shop priming.
- .4 Section 07 62 00 - Sheet Metal Flashing and Trim: Shop finishing.
- .5 Section 07 84 00 - Firestopping: Integral colour.
- .6 Section 07 92 00 - Joint Sealants: Integral colour.
- .7 Section 07 95 13 - Expansion Joint Cover Assemblies: Shop finishing.
- .8 Section 08 12 13 - Hollow Metal Frames: Galvannealed coating.
- .9 Section 08 13 13 - Hollow Metal Doors: Galvannealed coating.
- .10 Section 08 31 00 - Access Doors and Panels: Shop priming.
- .11 Section 08 51 13 - Aluminum Windows: Anodized coating.
- .12 Section 08 71 00 - Door Hardware: Shop finishing.
- .13 Section 09 30 00 - Tiling: Integral finish.
- .14 Section 09 51 23 - Acoustical Tile Ceilings: Shop finishing.
- .15 Section 09 66 13 - Portland Cement Terrazzo Flooring: Integral colour.
- .16 Section 10 14 00 - Signage: Shop finishing.
- .17 Section 14 24 23.16 - MRL Hydraulic Passenger Elevators: Shop finishing.
- .18 Do not paint glass surfaces.
- .19 Do not paint plastic components.
- .20 Do not paint plated, polished, or anodized metal components.
- .21 Do not paint stainless steel components.

1.2 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 04 00 00 - Masonry.

.3 Section 05 12 00 - Structural Steel Framing.

.4 Section 05 30 00 - Metal Decking.

.5 Section 05 50 00 - Metal Fabrications.

.6 Section 06 10 00 - Rough Carpentry.

.7 Section 06 20 00 - Finish Carpentry.

.8 Section 08 12 13 - Hollow Metal Frames.

.9 Section 08 13 13 - Hollow Metal Doors.

.10 Section 08 31 00 - Access Doors and Panels.

.11 Section 09 21 16 - Gypsum Board Assemblies.

1.3 REFERENCES

.1 MPI Architectural Painting Specification Manual.

.2 MPI Maintenance Repainting Manual.

.3 SSPC Painting Manual, Volume 2 - Systems and Specifications.

1.4 SCHEDULING

.1 Schedule painting operations to prevent disruption to the Work.

.2 Schedule painting and coating operations in occupied facilities to prevent disruption of occupants at existing facility. Conduct painting and coating after facility working hours or on weekends in accordance with Owner's operating requirements.

.3 Schedule work such that finished surfaces have dried before existing facility occupants are affected.

.4 Schedule site finishing of doors and frames prior to door, glass, and hardware installation.

.5 Obtain written authorization from Consultant for changes in work schedule.

1.5 PRODUCT DATA

.1 Submit Product data as specified in Section 01 33 00.

.2 Product Data: Manufacturers' standard data sheets for each finishing Product being used, indicating relevant MPI finish system, volatile organic compound (VOC) content and volume solids (VOL SOL) content.

1.6 SAMPLES

.1 Submit samples as specified in Section 01 33 00.

.2 Selection Samples: A full range of colour selector samples for each type of coating required.

.3 Verification Samples: If requested by Consultant, prepare 1 000 x 1 000 mm size sample panels. Apply finish to actual substrate material or to an acceptable alternate material if required to be portable.

1.7 EXTRA STOCK MATERIALS

.1 Supply extra stock materials as specified in Section 01 78 00.

.2 Extra Stock Materials: Minimum 4 L of each Product, colour and sheen used.

.3 Supply extra stock materials in unopened, new containers, clearly labelled as to manufacturer, Product, colour, and sheen.

1.8 QUALIFICATIONS

.1 Applicators: A firm specializing in commercial painting and finishing of buildings in accordance with MPI Architectural Painting Specification Manual and MPI Maintenance Repainting Manual, having minimum 10 years documented experience.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 60 00.

.2 Deliver Products in original containers with unbroken seals, and labelled to indicate name of manufacturer, brand, colour, and quality of contents.

.3 Store thinners, loose soaked rags, and similar combustible materials in closed containers. Remove from Place of the Work or store in an assigned area.

.4 Provide adequate safe-guards against spontaneous combustion of finishing materials.

.5 Arrange for properly enclosed and heated space, satisfactory to Consultant, to be used as paint shop. Store Products at minimum 10 degrees C.

1.10 AMBIENT CONDITIONS

.1 Conform to MPI Architectural Painting Specification Manual.

.2 Apply water-based paints only when temperature of surfaces to be finished and surrounding air temperatures are between 10 degrees C and 30 degrees C.

.3 Apply solvent-thinned paints only when temperature of surfaces to be finished and surrounding air temperatures are between 6 degrees C and 32 degrees C.

.4 Do not apply finishes in snow, rain, fog or mist.

.5 Do not apply finishes when relative humidity exceeds 85 percent RH; or at temperatures less than 2 degrees C above dew point; or to damp or wet surfaces.

2 Products

2.1 MANUFACTURERS

.1 Manufacturer: Use only Products from manufacturers listed in MPI Architectural Painting Specification Manual for specified paint and finish system.

.2 Single-Source Responsibility: Provide primers and undercoats from same manufacturer as finish coats.

2.2 DESCRIPTION

.1 Gloss Ratings: Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following gloss level categories, as defined in MPI Architectural Painting Specification Manual:
.1 Gloss Level G1: Matte or Flat finish.
.2 Gloss Level G2: Velvet finish.
.3 Gloss Level G3: Eggshell finish.
.4 Gloss Level G4: Satin finish.
.5 Gloss Level G5: Semi-Gloss finish.
.6 Gloss Level G6: Gloss finish.
.7 Gloss Level G7: High-Gloss finish.

.2 Colours: A maximum of 5 exterior colours and 20 interior colours may be required. There may be more than two colours used in each room or space.

2.3 PERFORMANCE CRITERIA

.1 Volatile Organic Compound Content (VOC): Use only paints and coatings having a volatile organic compound (VOC) content as follows:
.1 Gloss Level G1: < 50 g/L.
.2 Gloss Levels G2-G7: < 150 g/L.

.2 Volume Solids Content (VOL SOL): Use only paints and coatings having a volume solids (VOL SOL) content as follows:
.1 Alkyd Paints and Coatings: $\geq$ 45 percent.
.2 Latex Paints and Coatings: $\geq$ 40 percent.

2.4 MATERIALS

.1 Paints and Coatings: Use only Products meeting specified performance criteria and listed in most current Approved Products List included in MPI Architectural Painting Specification Manual, for each specified paint and finish system.

.2 Paint Accessory Materials: Linseed oil, shellac, turpentine, and other materials of commercial quality.

2.5 MIXING

.1 Pigments shall be fully ground and shall maintain a soft paste consistency in the vehicle during storage, that can and will be dispersed readily and uniformly by paddle to a complete, homogeneous mixture.

.2 Carefully mix and prepare paint materials according to manufacturer's directions.

.3 Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

.4 Stir material before application to produce a mixture of uniform density. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

.5 Use only thinners approved by paint manufacturer, and only within recommended limits.

.6 Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of same material are applied. Tint undercoats to match colour of finish coat, but with sufficient differences in shade of undercoats to distinguish each separate coat.

3 Execution

3.1 EXAMINATION

.1 Refer to Section 01 71 00.

.2 Measure moisture content of surfaces using an electronic moisture metre. Do not apply finishes unless moisture content of surfaces are below recommended maximum values.

3.2 PREPARATION

.1 Prepare surfaces to MPI Architectural Painting Specification Manual.

.2 Prepare existing, previously finished surfaces designated for re-finishing to MPI Maintenance Repainting Manual.

.3 Mask out surrounding surfaces not to receive paint, to protect from overspray or overbrushing.

.4 Remove hardware and accessories, plates, machined surfaces, lighting fixtures, and similar items already installed but not intended to be painted.

.5 Remove mildew, efflorescence, and foreign materials from surfaces using appropriate methods.

.6 Correct minor defects and deficiencies in surfaces which affect application of paints and coatings.

.7 Clean and prepare surfaces to be painted according to manufacturers' instructions for each particular substrate condition and finish system.

.8 Provide barrier coats over incompatible primers.

.9 Clean ungalvanized ferrous metal surfaces designated to receive site finish. Use solvent or mechanical cleaning methods to SSPC Painting Manual, Volume 2 - Systems and Specifications.

.10 Clean galvanized surfaces with non-petroleum-based solvents. Surface to be free of oil and surface contaminants. Remove pretreatment from galvanized steel metal fabricated from coil stock by mechanical methods.

3.3 APPLICATION

.1 Apply Products to MPI Architectural Painting Specification Manual.

.2 Protect adjacent surfaces and areas, including equipment, labels, and signage from damage during painting operations. Use drop cloths, shields, masking templates, or other suitable protective means.

.3 Make Good damage caused by failure to protect surfaces.

.4 Erect barriers or screens and post signs to warn of or limit or direct traffic away or around work areas as required.

.5 Use methods best suited for substrate and type of material being applied.

.6 Do not use compressed air or aerosol methods of application without prior written approval of Consultant.

.7 Spread finishes evenly and flow on smoothly without runs or sags.

.8 Apply Products no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of entire system as recommended by manufacturer.

.9 Apply Products under adequate illumination.

.10 Sand lightly between coats to achieve required finish.

.11 Where clear finishes are required, tint fillers to match wood. Work fillers into grain before set. Wipe excess from surface.

.12 Back prime interior wood work with enamel primer sealer paint.

.13 Back prime exterior wood work with exterior primer paint.

.14 Pigmented (Opaque) Finishes: Completely cover substrate to a smooth, opaque surface of uniform finish, colour, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be accepted.

.15 Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, colour irregularity, runs, brush marks, orange peel, nail holes or other surface imperfections.

.16 Match approved samples for colour, texture, and coverage. Remove, refinish, or repaint work not complying with specified requirements.

3.4 FACILITY SERVICES

.1 Unless otherwise specified or noted, paint "unfinished" conduits, piping, hangers, ductwork, and other mechanical and electrical equipment with colour and texture to match adjacent surfaces, in the following areas:
  .1 Where exposed-to-view in exterior and interior areas.
  .2 In high humidity interior areas.
  .3 In mechanical and electrical rooms.

.2 Remove finished louvres, grilles, covers, and access panels on facility service components from location and paint separately. Finish paint primed equipment to colour selected by Consultant.

.3 Paint inside of air ducts, convection and baseboard heating cabinets where visible behind louvers, grilles, and diffusers for minimum 460 mm or beyond sight line, whichever is greater with primer and one coat of matt black (non-reflecting) paint.

.4 Paint inside of light valances gloss white.

.5 Paint disconnect switches for fire alarm system and exit light systems in red enamel.

.6 Paint red or band fire protection piping and sprinkler lines. Keep sprinkler heads free of paint.

.7 Paint yellow or band natural gas piping.

.8 Backprime and paint face and edges of plywood service panels a semi-gloss, gray colour before installation of telephone and electrical equipment. Leave equipment in original finish except for touch-up as required. Paint conduits, mounting accessories, and other unfinished items.

.9 Colour code equipment, piping, conduit, and exposed ductwork in accordance with colour schedule. Colour band and identify with flow arrows, names, and numbering.

.10 In unfinished areas, leave exposed conduits, piping, hangers, ductwork, and other facility service components in original finish. Touch-up scratches and marks.

.11 Touch-up scratches and marks on factory painted finishes and equipment with paint as supplied by equipment manufacturer.

.12 Do not paint over nameplates.

3.5 FIELD QUALITY CONTROL

.1 Inspect surfaces, preparation and paint applications.

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

.3 Painted surfaces will be rejected 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 1 000 mm.
- .2 Visible defects are evident on horizontal surfaces when viewed at normal veiwing angles from distance of not less than 1 000 mm.
- .3 Visible defects are evident on ceiling, soffit, and other overhead surfaces when viewed at normal viewing angles.
- .4 When final coat on any surface exhibits a lack of uniformity of colour, sheen, texture, and hiding across full surface area.

.4 Make Good rejected surfaces. Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted. Runs, sags, or damaged paint shall be removed by scraper, or by sanding prior to application of paint.

3.6 ADJUSTING

.1 Following completion of painting and finishing operations, reinstall removed items.

.2 Remove protective covers and masking from protected surfaces.

.3 Repaint damaged surfaces to satisfaction of Consultant.

3.7 CLEANING

.1 Refer to Section 01 74 00.

.2 Remove paint where spilled, splashed, splattered, or sprayed using means and materials that are not detrimental to affected surfaces.

.3 Keep work area free from unnecessary accumulation of tools, equipment, surplus materials, and debris.

.4 Remove combustible rubbish materials and empty paint cans each day, and safely dispose of in accordance with authorities having jurisdiction.

.5 Clean equipment and dispose of wash water / solvents as well as other cleaning and protective materials, paints, thinners, paint removers, and strippers in accordance with authorities having jurisdiction.

.6 Leave the Work clean, and free from dirt and debris.

3.8 WASTE MANAGEMENT

.1 Paint, stain, wood preservative finishes, and related materials (thinner, solvents, etc.) are regarded as hazardous products, and are subject to regulations for disposal. Obtain information on these controls from authorities having jurisdiction.

.2 Separate and recycle waste materials. Where paint recycling is available, collect waste paint by type and deliver to recycling or collection facility. Materials that cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.3 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.4 To reduce the amount of contaminants entering waterways, sanitary sewers, storm sewers, or into the ground strictly adhere to the following procedures:
- .1 Retain cleaning water for water-based materials to allow sediments to be filtered out. Do not clean equipment 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 applicable regulatory requirements dealing with hazardous waste.
- .5 Empty paint cans are to be dry prior to disposal or recycling.
- .6 Close and tightly seal partly used cans of materials, including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

.5 Set aside and protect surplus and uncontaminated finish materials not required by Owner and deliver or arrange collection of verifiable re-use or re-manufacturing.

3.9 PROTECTION

.1 Refer to Section 01 76 00.

.2 Protect other surfaces from paint or damage.

.3 Repair damage.

3.10 FINISH SCHEDULE

.1 Provide indicated paint and finish systems for identified substrates to MPI Architectural Painting Specification Manual.

.2 Refinishing Existing, Previously Finished Surfaces:
- .1 Refer to MPI Maintenance Repainting Manual Section for refinishing existing finishes.
- .2 Use finish coat of respective new surface finish system for minor repair of existing finishes.
- .3 Use system primer where existing finishes are damaged down to bare surface.

.3 Exterior Painting and Finishing Schedule
- .1 Concrete Vertical Surfaces
  - .1 Opaque Painted Finish: EXT. 3.1C - W.B. LIGHT INDUSTRIAL COATING (over w.b. alkali resistant primer), Premium Grade; Gloss Level G3.
- .2 Structural Steel
  - .1 Corrosion-Resistant Opaque Painted Finish: EXT. 5.1B - W.B. LIGHT INDUSTRIAL COATING (over inorganic zinc), Premium Grade; Gloss Level G5.
- .3 Metal Fabrications
  - .1 Opaque Painted Finish: EXT. 5.1D - ALKYD (over alkyd metal primer), Premium Grade; Gloss Level G5.
- .4 Galvanized and Galvannealed Metal
  - .1 Opaque Painted Finish: EXT. 5.3B - ALKYD (over cementitious primer), Premium Grade; Gloss Level G6.
- .5 Aluminum (Not Anodized)
  - .1 Opaque Painted Finish: EXT. 5.4H - LATEX (over q.d. metal primer), Premium Grade, Gloss Level G6.
- .6 Dimension Lumber and Panels
  - .1 Opaque Painted Finish: EXT 6.2A - LATEX (over alkyd/oil primer), Premium Grade; Gloss Level G5.
- .7 Dressed Lumber and Panels
  - .1 Opaque Painted Finish: EXT. 6.3A - LATEX (over alkyd/oil primer), Premium Grade; Gloss Level G5.

.4 Interior Painting and Finishing Schedule
- .1 Concrete Surfaces (except floors)
  - .1 Epoxy Finish: INT. 3.1G - EPOXY-MODIFIED LATEX (for smooth concrete), Premium Grade; Gloss Level G6.
  - .2 Opaque Painted Finish: INT. 3.1M - INSTITUTIONAL LOW ODOR / VOC, Premium Grade; Gloss Level G4.
- .2 Concrete Masonry Units
  - .1 Opaque Painted Finish: INT. 4.2E - INSTITUTIONAL LOW ODOR / VOC (over latex block filler), Premium Grade; Gloss Level G4.
  - .2 Epoxy Finish: INT. 4.2J - EPOXY-MODIFIED LATEX (over latex block filler) FOR DRY ENVIRONMENTS, Premium Grade; Gloss Level G6.
- .3 Structural Steel, Steel Deck, and Metal Fabrications
  - .1 Opaque Painted Finish - Overhead Applications: INT. 5.1C - W.B. DRY FALL (over q. d. alkyd primer), Budget Grade; Gloss Level G5.
  - .2 Opaque Painted Finish: INT. 5.1E - ALKYD (over q.d. alkyd primer), Premium Grade; Gloss Level G5.
  - .3 Epoxy Finish: INT. 5.1K - EPOXY-MODIFIED LATEX (over w.b. rust-inhibitive primer), Premium Grade; Gloss Level G6.
- .4 Galvanized and Galvannealed Metal
  - .1 Opaque Painted Finish: INT. 5.3N - INSTITUTIONAL LOW ODOR / VOC (over w. b. galvanized primer), Premium Grade; Gloss Level G5.

.5 Dimension Lumber and Panels
  .1 Opaque Painted Finish: INT. 6.2L - INSTITUTIONAL LOW ODOR / VOC (over latex primer), Premium Grade; Gloss Level G5.
.6 Dressed Lumber, Panels, and Veneers
  .1 Semi-Transparent Stained Finish: INT. 6.3EE - POLYURETHANE VARNISH (over w.b. stain), Premium Grade; Gloss Level G4.
  .2 Semi-Transparent Stained Fire Retardant Finish: INT. 6.3RR - FIRE RETARDANT, PIGMENTED, W.B., Gloss Level G4.
  .3 Opaque Painted Finish: INT. 6.3V - INSTITUTIONAL LOW ODOR / VOC (over latex primer), Premium Grade; Gloss Level G5.
.7 Plaster and Gypsum Board
  .1 Epoxy Finish: INT. 9.2F - EPOXY-MODIFIED LATEX (over latex primer/sealer), Premium Grade; Gloss Level G6.
  .2 Opaque Painted Finish: INT. 9.2M - INSTITUTIONAL LOW ODOR / VOC (over latex primer/sealer), Premium Grade; Gloss Levels as follows:
    .1 Ceiling Applications: G1.
    .2 Other Applications: G3.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 04 00 00 - Masonry.

.2 Section 05 50 00 - Metal Fabrications.

.3 Section 08 13 13 - Hollow Metal Doors.

.4 Section 09 21 16 - Gypsum Board Assemblies.

1.2 ALLOWANCES

.1 Contract Price includes a stipulated sum cash Allowance as specified in Section 01 21 00.

.2 Cash Allowance: Cost for supply and installation of:
.1 Interior door signage, and
.2 Interior wayfinding signage and directories.

1.3 REFERENCES

.1 AAMA 611-20: Voluntary Specification for Anodized Architectural Aluminum.

.2 AAMA 2605-22: Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (With Coil Coating Appendix).

.3 ASTM A123/A123M-24: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.4 ASTM A153/A153M-23: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.5 ASTM A240/A240M-22b: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

.6 ASTM A276/A276M-17: Standard Specification for Stainless Steel Bars and Shapes.

.7 ASTM A307-21: Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

.8 ASTM A563/A563M-24: Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric).

.9 ASTM A653/A653M-23: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.10 ASTM A1008/A1008M-23e1: Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.

.11 ASTM B85/B85M-18e1: Standard Specification for Aluminum-Alloy Die Castings.

.12 ASTM B209/B209M-21a: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.13 ASTM B221M-21: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

.14 ASTM B456-17(2022): Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

.15 ASTM D3363-20: Standard Test Method for Film Hardness by Pencil Test.

.16 ASTM F436/F436M-24: Standard Specification for Hardened Steel Washers Inch and Metric Dimensions.

.17 ASTM F844-19(2024): Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.

.18 CSA/ASC B651:23: Accessible Design for the Built Environment.

1.4 SHOP DRAWINGS

.1 Submit Shop Drawings as specified in Section 01 33 00.

.2 Shop Drawings: Project-specific drawings, illustrating materials, dimensions, thicknesses, design style, font styles, font sizes, finishes, methods of attachment, and special details.

1.5 SAMPLES

.1 Submit samples as specified in Section 01 33 00.

.2 Verification Samples: One full size sample of each sign type, illustrating size, thickness, method of attachment, font style, font size, and factory-applied finishes.

1.6 CLOSEOUT SUBMITTALS

.1 Submit closeout submittals as specified in Section 01 78 00.

.2 Maintenance Data: Manufacturer's standard care, maintenance and cleaning guidelines; sufficient quantity for inclusion in operation and maintenance manual.

1.7 QUALIFICATIONS

.1 Manufacturer: A firm specializing in manufacturing signage, having minimum 5 years documented experience.

2 Products

2.1 DESCRIPTION

.1 Braille and Tactile Characters: To CSA/ASC B651; raised surface type, and incorporating international symbols of access.

2.2 MATERIALS

.1 Stainless Steel Sheet and Plate: To ASTM A240/A240M, Type 316.

.2 Stainless Steel Bar and Shapes: To ASTM A276/A276M, Type 316.

.3 Sheet Steel: To ASTM A1008/A1008M, Commercial Steel (CS) Types A, B, and C; cold-rolled sheet steel.

.4 Galvanized Sheet Steel: To ASTM A653/A653M, Commercial Steel (CS) Types A, B, and C; cold-rolled sheet steel; galvanized.

.5 Extruded Aluminum: To ASTM B221M, 6061 alloy, T6 temper.

.6 Cast Aluminum: To ASTM B85/B85M, 6063 alloy, T5 temper.

.7 Sheet Aluminum: To ASTM B209/B209M, 5005-H32 alloy.

.8 Fasteners: Countersunk screw-type with tamperproof heads, complete with plastic wall plugs when required for securement to wall surfaces; suitable sizes for intended application. Do not use through-fastening types.

.9 Nuts: To ASTM A563/A563M, Grade A, Hex Style; carbon and alloy steel, galvanized.

.10 Washers:
- .1 Hardened Washers: To ASTM F436/F436M, Type 1; hardened steel; circular, bevelled, and clipped types as required.
- .2 Unhardened Washers: To ASTM F844; punched from cold-rolled steel, plain (flat) type; diameter to suit bolt size; galvanized.

.11 Adhesive: As recommended by sign manufacturer.

2.3 MANUFACTURED UNITS

.1 Text Door Sign Plates: Surface engraved type; 2.0 mm thick dual-layered acrylic with 30 degree bevelled edges; as follows:
- .1 Length: As required to fit text, minimum 300 mm;
- .2 Height: 57.2 mm high;
- .3 Text: 25 mm high Helvetica upper and lower case letters;
- .4 Fastening: Pre-drilled 5 mm OD holes to accommodate countersunk fasteners, centered along left and right edges;
- .5 Colours: As selected by Consultant from manufacturer's complete colour selection;
- .6 Text: As determined by Owner.

.2 Pictogram Door Sign Plates: 3.2 mm thick plexiglass, square edged, hot stamped or silk screened image on rear face, 150 mm high; pre-drilled 5 mm OD holes to accommodate countersunk fasteners, centered along left and right edges; sizes, colours, and graphic symbols as selected by Consultant.

2.4 FABRICATION

.1 Fabricate sign plates with letters and numbers centered within sign plate's length and height.

.2 Provide countersunk holes for screw fasteners.

2.5 FINISHES

.1 Stainless Steel: To AISI No. 6 - Matte.

.2 Chrome/Nickel Plating on Metal Components: To ASTM B456, Type SC 2; electrodeposited nickel plus chromium coating; Polished.

.3 Anodized Coating on Aluminum: To AAMA 611, AA-M10C21A41, Class I Clear Anodic Oxide coating (No. 14 - Clear).

.4 Monochromatic Paint Coating on Aluminum: To AAMA 2605; three-coat thermosetting fluoropolymer PVDF liquid extrusion and coil coating, factory-applied to 0.04 mm dry film thickness; eg. Duranar XL by PPG Industries, Inc., colour as selected by Consultant.

.5 Metallic Paint Coating on Aluminum: To AAMA 2605; four-coat thermosetting fluoropolymer PVDF liquid extrusion and coil coating, complete with metal flakes incorporated in colour coat; factory-applied to 0.05 mm dry film thickness; eg. Duranar XL by PPG Industries, Inc., colour as selected by Consultant.

.6 Powder Coated Finish on Metal Components: To AAMA 2605; electrostatically sprayed polymer powder, factory-applied to 0.075 mm dry film thickness, with 4H Hardness rating to ASTM D3363; colour as selected by Consultant.

.7 Galvanized Coating on Steel Components: To ASTM A123/A123M, Coating Grade 55; hot dipped zinc alloy coating.

.8 Galvanized Coating on Steel Hardware: To ASTM A153/A153M, Classes B3, C or D; hot dipped zinc alloy coating.

.9 Galvanized Coating on Sheet Steel: To ASTM A653/A653M, Coating Designation Z275; hot dipped zinc alloy coating.

3 Execution

3.1 INSTALLATION

.1 Install signs straight, plumb, and level.

.2 Secure signs to substrate in a manner to prevent distortion or displacement.

.3 Finished work shall be free of defects, warping, open seams, and rattles.

.4 Provide double-sided foam tape adhesive on rear face of sign plates prior to securing with mechanical fasteners.

.5 Provide routing or mortising for items required to be mortised, rebated, or otherwise housed within material.

.6 Replace Products that are bent, scratched, or damaged.

.7 Provide fasteners to full required complement, properly tightened.

.8 Exposed fasteners shall be neatly executed, and shall match adjacent surfaces.

.9 Install braille and tactile character signage adjacent to sign plates.

.10 Do not fasten signage through acoustically-rated or fire-rated doors.

3.2 PROTECTION

.1 Refer to Section 01 76 00.

.2 Protect installed Products with temporary removable film.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-In-Place Concrete.

.2 Section 04 00 00 - Masonry.

.3 Section 05 12 00 - Structural Steel Framing.

.4 Section 05 50 00 - Metal Fabrications.

.5 Section 09 30 00 - Tiling.

1.2 REFERENCES

.1 ASTM A123/A123M-24: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM A139/A139M-22: Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over).

.3 ASTM A153/A153M-23: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.4 ASTM A240/A240M-22b: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

.5 ASTM A276/A276M-17: Standard Specification for Stainless Steel Bars and Shapes.

.6 ASTM A653/A653M-23: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.7 ASTM B221M-21: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

.8 ASTM E84-26a: Standard Test Method for Surface Burning Characteristics of Building Materials.

.9 CSA B44:25: Safety Code for Elevators and Escalators.

.10 CSA G40.20-13 (R2023): General Requirements for Rolled or Welded Structural Quality Steel.

.11 CSA G40.21-13 (R2023): Structural Quality Steel.

.12 CSA O121:17 (R2022): Douglas Fir Plywood.

.13 CSA W47.1:19: Certification of Companies for Fusion Welding of Steel.

.14 CSA W55.3-08 (R2023): Certification of Companies for Resistance Welding of Steel and Aluminum.

.15 CSA W59:24: Welded Steel Construction.

.16 ANSI/NEMA LD 3-2005: High Pressure Decorative Laminates.

.17 CAN/ULC-S104-15 (R2020): Standard Method for Fire Tests of Door Assemblies.

1.3 PRODUCT DATA

.1 Submit Product data as specified in Section 01 33 00.

.2 Product Data: Manufacturer's standard data sheets, indicating:
.1 Signal and operating fixtures, operating panels, and indicators.
.2 Cab design and components.
.3 Doors and frame details.

1.4 SHOP DRAWINGS

.1 Submit Shop Drawings as specified in Section 01 33 00.

.2 Shop Drawings: Project-specific drawings, illustrating:
.1 Motor and hydraulic pump, valves, controller, and other component locations.
.2 Location of circuit breaker, switchboard panel or disconnect switch, light switch, and feeder extension points.
.3 Locations in hoistway of travelling cables and connections for car light and telephone.
.4 Loads on hoisting beams and location of trolley beams.
.5 Elevator control functions and operational description.

.3 Submit TSSA stamped and approved registered design submission prior to installation. This must include entire submission, including electrical drawings.

1.5 SAMPLES

.1 Submit samples as specified in Section 01 33 00.

.2 Samples: Duplicate 300 x 300 mm size, illustrating cab interior, cab ceiling, cab door and frame, and hoistway door and frame finishes.

1.6 CLOSEOUT SUBMITTALS

.1 Submit closeout submittals as specified in Section 01 78 00.

.2 Operation and Maintenance Data: Manufacturer's standard operating instructions and maintenance guidelines; sufficient quantity for inclusion in operation and maintenance manual; and including the following:
.1 Complete description of elevator system's method of operation and control including motor control system, door operation, signals, fire fighter's service, emergency power operation, and special or non-standard features provided.
.2 Parts catalogues with complete list of equipment replacement parts with equipment description and identifying numbers,
.3 Legible schematic wiring diagrams,
.4 Master schematic and lubrication chart, and
.5 TSSA registered design submission.

.3 Spare Parts and Tools: Three sets of restricted access activation devices or keys, and one set of proprietary tools or equipment if required for maintenance purposes.

1.7 QUALIFICATIONS

.1 Manufacturer: A firm specializing in manufacturing elevator equipment, having minimum 10 years documented experience.

.2 Installer: Elevator manufacturer with employees and supervisor on payroll.

.3 Welders: Workers certified by CWB to CSA W47.1 and CSA W55.3.

1.8 TESTS BY REGULATORY AGENCIES

.1 Provide inspection and testing of elevator system as specified in Section 01 40 00.

.2 Obtain required permits to perform tests.

.3 Perform tests required by regulatory agencies.

.4 Schedule tests with representatives of Owner, Contractor, Consultant, and authority having jurisdiction present.

.5 Perform integrated system testing as specified in Section 01 91 13.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers having Product considered acceptable for use:
.1 TK Elevator (Canada) Limited.

.2 Substitution Procedures: Refer to Section 01 25 00.

2.2 REGULATORY REQUIREMENTS

.1 Conform to CSA B44.

.2 Test door and frame assemblies to CAN/ULC-S104.

.3 Seismic Requirements: Provide seismic restraint as required by applicable regulatory requirements.

2.3 DESIGN CRITERIA

.1 Design elevators to ensure that maintenance may be performed by any reputable service company, without the use of proprietary software, access codes, tools, information or equipment.
.1 If a site-specific service tool or on-board diagnostic tool is required to render control equipment non-proprietary, it must be supplied with elevating device.
.2 Diagnostic tool must allow full access to fault codes and maintenance related parameters and must allow complete and thorough maintenance service to be performed by any properly licensed and qualified elevator contractor.
.3 Include user's manual for diagnostic tool that defines and explains error codes, including required fixes.
.4 Service tool and operating manual become property of Owner.

.2 Do not incorporate any counters or timers that would cause equipment to shut down or alter its operation in any way.

.3 Hydraulic Elevators: Single-cab hydraulic passenger elevator system; twin post, single-stage above ground cylinder; complete with battery-lowering operation, and pump, motor, and controllers located within hoistway; Endura MRL by TK Elevator (Canada) Limited.

2.4 PERFORMANCE CRITERIA

.1 Characteristics of Elevator Cab:
.1 Rated Net Capacity: 1 134 kg.
.2 Rated Up Speed: 0.51 m/s.
.3 Travel Distance: As indicated on Drawings.
.4 No. of Stops: Two.
.5 No. of Openings: Two front.
.6 Clear Inside Cab Dimensions: 2 032 mm wide, 1 308 mm deep.
.7 Clear Inside Cab Height: 2 235 mm.
.8 Hoistway and Cab Frame Sizes: 1 067 mm wide, 2 134 mm high.
.9 Door Type: Single leaf.
.10 Door Operation: Side opening.
.11 Door Speed: Single speed.

2.5 OPERATION CONTROLS

.1 Provide Two Stop Automatic Operation.

.2 Firefighter's Emergency Operation: To CSA B44, Phase I and Phase II Firefighter's Emergency Operation; initiated by building's fire alarm initiating devices.

2.6 RESTRICTED SERVICE

.1 Program down travelling cars automatically after stopping at first floor landing to designated lower dispatching terminal.

.2 Do not stop down travelling car with car button call in registration for landing below lower dispatching terminal, unless call in that car for, or down button call at lower dispatching terminal, is in registration.

2.7 SYSTEM POWER REQUIREMENTS

.1 Elevator Motor and Pump Unit Power: 208V AC, 3 phase, 200 amp fused disconnect, complete with 200 amp one time Type D fuses and auxiliary contacts.

.2 Lighting Power: 120V AC, single-phase, 60 Hz, 30 amp / disc to elevator car lights.

.3 Emergency Power: Battery backup unit.

2.8 MATERIALS

.1 Rolled Steel Sections, Shapes, Rods: To CSA G40.20 and CSA G40.21.

.2 Casing: To ASTM A139/A139M, Grade A; steel.

.3 Sheet Steel: To ASTM A653/A653M, Commercial Steel (CS) Type B; cold-rolled sheet steel, galvanized.

.4 Stainless Steel Sheet or Plate: To ASTM A240/A240M, Type 304.

.5 Stainless Steel Bars and Profiles: To ASTM A276/A276M, Type 304.

.6 Extruded Aluminum: To ASTM B221M, 6063 alloy with T6 temper, mill finish.

.7 Plywood: To CSA O121, Douglas Fir plywood, exterior grade.

.8 Decorative Laminate: To ANSI/NEMA LD 3, Grades VGF and BKL, minimum 0.7 mm thick; colours, textures, and patterns as selected by Consultant.

.9 Finish Paint for Metal Surfaces: Alkyd enamel, semi-gloss, colour as selected.

.10 Finish Paint for Wood Surfaces: Alkyd enamel, semi-gloss, colour as selected.

2.9 EQUIPMENT

.1 Motors, Pumps, Valves, Regulators, Fluid Tank, Hydraulic Fluid, Rigid PVC lined cylinder, Controller, Controls, Buttons, Wiring and Devices, Indicators: CSA approved. Provide reduced voltage starting (RVS).

.2 Pump Housing: Sheet steel, acoustically insulated, removable.

2.10 ELECTRICAL COMPONENTS

.1 Fittings: Steel compression type for electrical metallic tubing. Fittings with set screws are acceptable only when a separate grounding conductor is also installed across the joint.

.2 Spare Conductors: Include 10 percent extra conductors and two pairs of shielded audio cables in travelling cables.

2.11 LUBRICATION

.1 Grease Fittings: For lubricating bearings requiring periodic lubrication.

.2 Grease Cups: Automatic feed compression type.

.3 Lubrication Points: Visible and easily accessible.

2.12 CAR FABRICATION

.1 Frame: Rigid rolled steel sections, braced; mounted on resilient isolators.

.2 Enclosure: Sheet steel panels attached to steel frame, sheet plywood inner liner.

2.13 CAB FABRICATION

.1 Walls and Ceiling: 1.52 mm thick steel, baked enamel finish.

.2 Subfloor: 19 mm plywood, fire retardant treated surfaces and edges.

.3 Finished Flooring: Porcelain floor tile, as specified in Section 09 30 00.

.4 Wall Panels: Removable type; decorative laminate on 15 mm thick plywood panels; complete with laminate faced edges, sizes to manufacturer's standards.

.5 Base and Reveals: Stainless steel, recessed.

.6 Finished Ceiling: Stainless steel; with concealed access door.

.7 Light Fixtures: LED pot lights.

.8 Ventilation Fan: Manufacturer's standard.

.9 Emergency Lighting: Emergency Power Operated, manufacturer's standard.

.10 Emergency Communicator: To CSA B44; audio-video two-way communication system complete with text response capability and automatic dialling feature; installed with necessary wiring beyond hoistway to machine room terminal block for connection to communication service.

.11 Control Panel and Face Plate: Stainless steel with illuminating call buttons.

.12 Indicator Panel: Above control panel with illuminating position indicators.

.13 Car Riding Lanterns: Illuminated UP and DOWN arrows, mounted in cab and visible at all times.

.14 Car Station Braille Tags: Manufacturer's standard braille tags, mounted at AODA recommended height.

.15 Hand Rail: 6 mm thick, 65 mm wide stainless steel flat bar, spaced from wall, mounted on three sides of cab.

.16 Pad Hooks: Stainless steel type, mounted at 2 210 mm high.

.17 Wall Pads: Canvas covered, cotton wadding filled wall pads; fire-retardant; sizes necessary to completely cover cab walls; one set required.

.18 Licence Frame and Glass: Manufacturer's standard, attached with tamper proof screws.

2.14 CAB DOORS AND FRAMES

.1 Cab Door and Frame Construction: ULC rated, with applicable fire rating; as follows:
  .1 Cab Doors: 32 mm thick insulated sandwich panel construction, fabricated from 1.5 mm thick stainless steel sheet, flush design, rolled profiles, rigid construction.
  .2 Cab Door Frames: 1.5 mm thick stainless steel sheet, rolled profiles, welded corner design with smooth invisible joints.
  .3 Thresholds: Extruded aluminum.

2.15 HOISTWAY DOORS AND FRAMES

.1 Hoistway Door and Frame Construction: ULC rated, with applicable fire rating; as follows:
  .1 Hoistway Doors: 32 mm thick insulated sandwich panel construction, fabricated from 1.5 mm thick stainless steel sheet, flush design, rolled profiles, rigid construction.
  .2 Hoistway Frames: 1.5 mm thick stainless steel sheet, rolled profiles, welded corner design with smooth invisible joints.
  .3 Door Jamb Braille Tags: Manufacturer's standard braille tags, mounted on each hoistway frame at AODA recommended height.

2.16 FINISHES

.1 Structural Metal Surfaces: Two coats shop-applied primer.

.2 Stainless Steel: To AISI No. 4 - Brushed.

.3 Galvanized Coating on Steel Components: To ASTM A123/A123M, Coating Grade 55; hot dipped zinc alloy coating.

.4 Galvanized Coating on Steel Hardware: To ASTM A153/A153M, Classes B3, C or D; hot dipped zinc alloy coating.

.5 Galvanized Coating on Sheet Steel: To ASTM A653/A653M, Coating Designation Z275; hot dipped zinc alloy coating.

.6 Machine Room Components: One coat shop-applied primer, then two coats enamel.

.7 Clean galvanized surfaces with neutralizing solvent and then apply one coat primer.

.8 Wood Surfaces not Exposed to Public View: One coat shop-applied primer; one coat shop-applied enamel.

.9 Baked Enamel Coating on Steel Components: Clean and degrease metal surface; apply one coat of zinc oxide primer sprayed and baked; two coats of semi-gloss enamel sprayed and baked; colour as selected.

2.17 CAR OPERATING PANEL

.1 Provide one flush mounted operating panel per car; face plate integral with front return panels containing illuminated call buttons corresponding to floors served, emergency stop switch, alarm button, "DOOR OPEN" button, and "DOOR CLOSE" button; including tactile international symbols or Braille indications.

.2 Include matching service cabinet integral with front return panel with hinged door and lock in car, containing:
  .1 Independent service switch.
  .2 Inspection switch.
  .3 Fan or blower switch.
  .4 Light switch.
  .5 Necessary additional operating switches.

2.18 HALL CONTROLS

.1 Hall Buttons: Illuminating, metal tactile push buttons, complete with cover plates; one push button for originating UP and DOWN calls at each landing.

.2 Hall Lanterns and Position Indicators: LED illuminated direction arrows with audible and visible call acknowledgement; one set located on Ground Floor situated immediately above hoistway door frame.

.3 Hoistway Access Switch: Keyed switch at lowest floor, located in hoistway entrance frame jamb.

.4 Firefighter's Phase 1 Service: Keyed switch in brushed stainless steel cover plate.

.5 Restricted Access: Provide key switch or similar electronic sensing device at hall station on each landing to restrict access to calling elevator. Coordinate with building security system Subcontractor.

2.19 DOOR OPERATORS AND SENSORS

.1 Door Operator: Closed loop VVVF high performance door operator with frequency controlled drive.

.2 Door control to open doors automatically when car arrives at a landing in response to a normal hall or car call.

.3 Provide programmable systems for determining the amount of time doors remain open at a given landing.

.4 Primary Door Protection: Three-dimensional multi-beam infrared sensor system in accordance with CSA B44.

.5 Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.

3 Execution

3.1 EXAMINATION

.1 Refer to Section 01 71 00.

.2 Verify power supply is available and of correct characteristics.

3.2 INSTALLATION

.1 Install Products to CSA B44.

.2 Install hoistway components.

.3 Connect equipment to building utilities at controller.

.4 Install piping between plunger and pump unit.

.5 Provide necessary conduit, boxes, wiring, and accessories.

.6 Mount motor and pump unit on vibration and acoustic isolators, on bed plate and concrete pad. Place units on structural supports and bearing plates. Securely fasten to building supports. Prevent lateral displacement.

.7 Set entrances in vertical alignment with car openings, and aligned with plumb hoistway lines.

.8 Install hoistway door sills, frames, and headers in hoistway walls.

.9 Grout sills in place.

.10 Securely mount licence and frame as required by applicable regulatory requirement, readily visible, and at proper mounting height to accommodate easy inspection.

.11 Apply joint sealants as specified in Section 07 92 00.

3.3 TOLERANCES

.1 Guide Rail Alignment: Plumb and parallel to one another, to CSA B44.

3.4 FIELD QUALITY CONTROL

.1 Perform field inspection and testing as specified in Section 01 40 00.

.2 Perform and meet tests required by CSA B44.

3.5 ADJUSTING

.1 Adjust machinery and equipment for smooth and quiet operation.

.2 Adjust equipment for smooth cab acceleration and deceleration to avoid passenger discomfort.

.3 Adjust doors to start opening in advance of stop at floor level such that doors are at least three-quarters open when car is stopped level with floor.

.4 Adjust automatic floor levelling feature at each floor to achieve 6 mm from flush.

3.6 DEMONSTRATION

.1 Refer to Section 01 79 00.

.2 Demonstrate operation of elevators and machinery equipment.

3.7 MAINTENANCE

.1 Furnish complete service and maintenance of elevator system and components during Contract, including time of temporary use, and for duration of Project warranty period.

.2 Examine monthly to CSA B44.

.3 Clean, adjust, and lubricate equipment.

.4 Include 24 hour emergency call back service during maintenance period, with maximum one hour response time.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 31 22 13 - Rough Grading.

.2 Section 31 23 16 - Excavation.

.3 Section 31 23 33 - Trenching and Backfilling.

1.2 EXISTING CONDITIONS

.1 Protect trees, shrubs, lawns, and other features remaining as part of completed Project.

.2 Protect bench marks, existing structures, fences, roads, sidewalks, paving, and curbs.

2 Products

2.1 REGULATORY REQUIREMENTS

.1 Conduct chemical analyses of top soil and subsoil being exported from Place of the Work to determine disposal site requirements, as required by authorities having jurisdiction.

3 Execution

3.1 PREPARATION

.1 Identify required lines, levels, contours, and datum.

.2 Identify known below grade utility services. Stake and flag locations.

.3 Notify utility company to remove and relocate affected utility services.

3.2 TOPSOIL STRIPPING

.1 Strip topsoil from designated areas at Place of the Work.

.2 Stockpile topsoil in area designated at Place of the Work, to depth not exceeding 2 500 mm.

.3 Do not bury excess topsoil.

.4 Remove excess topsoil from Place of the Work and dispose of in accordance with authority having jurisdiction.

3.3 SUBSOIL STRIPPING

.1 Strip subsoil from areas to be re-landscaped or regraded.

.2 Stockpile subsoil in area designated at Place of the Work, to depth not exceeding 2 500 mm.

.3 Remove excess subsoil from Place of the Work and dispose of in accordance with authority having jurisdiction.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 31 14 00 - Earth Stripping and Stockpiling.

.2 Section 31 23 16 - Excavation.

.3 Section 31 23 23 - Fill.

.4 Section 32 11 23 - Aggregate Base Courses.

1.2 REFERENCES

.1 ASTM D6461/D6461M-22: Standard Specification for Silt Fence Materials.

.2 OPSS.MUNI 206 (April 2019): Construction Specifications for Grading.

.3 OPSS.MUNI 805 (Nov. 2021): Construction Specification for Temporary Erosion and Sediment Control Measures.

1.3 EXISTING CONDITIONS

.1 Protect trees, shrubs, lawns, and other features remaining as portion of final landscaping.

.2 Protect bench marks, existing structures, fences, roads, sidewalks, paving, and curbs.

2 Products

2.1 MATERIALS

.1 Subsoil: Native stripped and excavated soil, or similar imported soil; graded free of lumps larger than 150 mm OD, rocks larger than 75 mm OD, and debris.

.2 Erosion Control Blanket: To OPSS.MUNI 805.

.3 Silt and Sediment Fence: To ASTM D6461/D6461M; 915 mm high, woven polypropylene fibre geotextile fabric secured to support posts; having 67 percent filter efficiency; eg. Terrafence by Terrafix Geosynthetics Inc.

3 Execution

3.1 PREPARATION

.1 Identify required lines, levels, contours, and datum.

.2 Provide temporary erosion and sediment control measures to OPSS.MUNI 805.

.3 Provide silt and sediment fencing as indicated on Drawings. Space support posts at 2 440 mm OC.

3.2 ROUGH GRADING

.1 Conform to OPSS.MUNI 206.

.2 Cut and fill to levels required.

.3 Establish and maintain line and grade stakes for duration of grading operations.

.4 Conform to grades indicated on Drawings.

.5 Unless otherwise noted, uniformly slope grades between elevations indicated.

.6 Do not exceed slopes of 4:1, unless indicated otherwise on Drawings.

.7 Contour lines indicated on Drawings are approximate only and may require minor adjustments at Place of the Work.

.8 Smoothly contour tops and toes of slopes and banks.

.9 Establish contours parallel to finished grades.

.10 Shape contours to ensure adequate drainage.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 31 22 13 - Rough Grading.

.2 Section 31 23 23 - Fill.

.3 Section 31 23 33 - Trenching and Backfilling.

1.2 DEFINITIONS

.1 Rock: Defined as a solid rock formation, wherever found, that can be removed only by drilling and blasting; is more than one cubic metre in volume; and does not include glacial till, hardpan, or layered rock in its original location that, in Consultant's opinion, can be ripped by a single rear-mounted tooth on D-8 crawler type tractor or similar equipment.

1.3 REFERENCES

.1 ASTM D698-12(2021): Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.2 Geotechnical Investigation Report: As described in Section 00 31 00.

1.4 FIELD QUALITY CONTROL SUBMITTALS

.1 Submit field quality control reports as specified in Section 01 40 00.

.2 Field Quality Control Reports: Soil bearing capacity test reports, indicating specified and actual results for compaction, moisture content, suitability, and other required standards for sub-surface material.

1.5 EXISTING CONDITIONS

.1 For excavation purposes, determine classification of existing soils as defined by Occupational Health and Safety Regulations for Construction Projects.

2 Products

2.1 REGULATORY REQUIREMENTS

.1 Conduct chemical analyses of subsoil being exported from Place of the Work to determine disposal site requirements, as required by authorities having jurisdiction.

3 Execution

3.1 PREPARATION

.1 Identify required lines, levels, contours, and datum.

3.2 EXCAVATION

.1 Excavate to lines, grades, elevations, and dimensions indicated on Drawings, or in absence of such information, in accordance with recommendations of geotechnical investigation report.

.2 Remove concrete, masonry, paving, walks, demolished foundations, lumped subsoil, boulders, rubble, and other obstructions encountered during excavation.

.3 In the event Rock is encountered within limits of excavation, notify Consultant and await instructions before proceeding with its removal.

.4 Existing field drains from previous farming operations may be encountered during excavation. Notify Consultant if drains are encountered.

.5 Machine slope banks to angle of repose or less until shored. Refer to geotechnical investigation report for recommended slope of excavations.

.6 Excavation cut not to interfere with normal 45 degree bearing splay of foundation.

.7 Stockpile excavated material in area designated at Place of the Work. Remove and dispose of surplus and unsuitable excavated material.

.8 Do not obstruct flow of surface drainage or natural watercourses.

.9 Hand trim, make firm, and remove loose material and debris from excavations.

.10 Ensure bottoms of excavations are undisturbed soil, level, free from loose, soft, and organic matter.

.11 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with lean concrete as specified in Section 31 23 23.

.12 Grade top perimeter of excavation to prevent surface water from draining into excavation.

.13 Correct areas over excavated by error. Refer to Section 31 23 23.

3.3 TRENCHING

.1 Do not excavate more than 30 metres of trench in advance of installation operations.

.2 Do not leave open more than 15 metres of trench at end of each Working Day.

.3 Remove unsuitable material from trench bottom to extent and depth as directed by Consultant.

3.4 ABANDONED EXISTING ITEMS

.1 Cut off and cap abandoned piping.

.2 Cut off and seal ends of tree roots encountered during excavation.

.3 Fill in old drains, wells, and cisterns encountered and not affecting the bearing of any footing. Use only clean earth from excavation, well tamped, and consolidated.

3.5 UNDERPINNING

.1 Excavation for underpinning or any other excavation likely to undermine existing footings is to be carried out with caution.

.2 Install adequate shoring prior to such excavation.

.3 Use tapes or similar devices to monitor any movement in existing walls.

.4 Excavate in sections not exceeding 1 830 mm in length.

.5 Do not use heavy equipment for underpinning.

3.6 PUMPING AND DE-WATERING

.1 Refer to Section 01 57 00.

.2 Keep excavations free from accumulation of water.

.3 Conduct de-watering when required so as to avoid damage to the Work and adjacent property. Prevent weakening of bearing soil and stability of embankments and slopes.

3.7 UNSUITABLE SUBSURFACE CONDITIONS

.1 Where unsuitable subsurface conditions are encountered and confirmed by third-party testing, excavate to additional depth as necessary to achieve suitable conditions.

.2 Arrange for representative of testing and inspection company to be present and oversee additional excavation.

.3 Minimize additional excavation to that recommended by testing and inspection representative.

.4 Request testing and inspection company to confirm and document revised founding elevation.

.5 Requests for additional payment resulting from additional excavation caused by unsuitable conditions shall include verification documentation from testing and inspection company.

3.8 FIELD QUALITY CONTROL

.1 Notify Consultant when bottom of excavation is reached. Obtain Consultant review of completed excavation.

.2 Conduct field inspection and testing as specified in Section 01 40 00.
- .1 Confirm suitable subsurface conditions when acceptable founding elevations are achieved.
- .2 Document site information necessary for verification of additional costs resulting from additional work required by unsuitable conditions.
- .3 Inspect, analyse and confirm soil bearing capacities using either static cone penetrometer, or by hand probing and visual observation.

3.9 PROTECTION

.1 Refer to Section 01 76 00.

.2 Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.

.3 Protect bottom of excavations and soil adjacent to and beneath foundation from frost, freezing, softening, and other disturbances.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-In-Place Concrete.

.2 Section 07 13 26 - Self-Adhering Sheet Waterproofing.

.3 Section 07 21 00 - Thermal Insulation.

.4 Section 31 23 16 - Excavation.

.5 Section 32 11 23 - Aggregate Base Courses.

.6 Section 33 41 16 - Subdrainage Piping.

1.2 REFERENCES

.1 ASTM D698-12(2021): Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.2 OPSS.MUNI 501 (Nov. 2017): Construction Specification for Compacting.

.3 OPSS.MUNI 1010 (Apr. 2025): Material Specification for Aggregates - Base, Subbase, Select Subgrade, Granular Surface, Shouldering, Bedding and Backfill Material.

.4 OPSS.MUNI 1860 (Nov. 2018): Material Specification for Geotextiles.

.5 Geotechnical Investigation Report: As described in Section 00 31 00.

1.3 SAMPLES

.1 Submit samples as specified in Section 01 40 00.

.2 Verification Samples: A 4.5 kg sample of each type of fill material, delivered to testing laboratory in air-tight containers.

1.4 SOURCE QUALITY CONTROL SUBMITTALS

.1 Submit source quality control reports as specified in Section 01 40 00.

.2 Source Quality Control Reports: Include moisture content, suitability, and other required standards for fill materials.

1.5 FIELD QUALITY CONTROL SUBMITTALS

.1 Submit field quality control reports as specified in Section 01 40 00.

.2 Field Quality Control Reports: Include specified and actual results for compaction, moisture content, and other required standards for fill.

2 Products

2.1 MATERIALS

.1 Fine Granular Fill: To OPSS.MUNI 1010, Granular A; moisture content within plus or minus two percent of optimum moisture content as determined through ASTM D698.

.2 Coarse Granular Fill: To OPSS.MUNI 1010, Granular B, Type II; moisture content within plus or minus two percent of optimum moisture content as determined through ASTM D698.

.3 Sand: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.

.4 Pea Gravel: Natural stone; washed; free of clay, shale, and organic matter; graded as follows:
.1 Minimum Size: 6 mm.
.2 Maximum Size: 16 mm.

.5 Clear Crushed Stone Fill: Pit run, washed natural stone; free of shale, clay, friable material, sand, and debris; graded as follows:
.1 Minimum Size: 16 mm.
.2 Maximum Size: 19 mm.

.6 Engineered Structural Fill: Clean granular compactable material, approved for use by geotechnical engineer.

.7 Subsoil: Re-used or imported subsoil, free of gravel larger than 75 mm OD in size, and debris.

.8 Concrete: Lean concrete, with minimum compressive strength of 7 MPa at 28 days.

2.2 ACCESSORIES

.1 Geotextile Fabric: To OPSS.MUNI 1860, non-woven type.

.2 Below-Slab Vapour Retarder: As specified in Section 07 26 16.

.3 Below-Grade Thermal Insulation: Extruded polystyrene rigid board, Type INS-RB-1 as specified in Section 07 21 00.

2.3 SOURCE QUALITY CONTROL

.1 Inspect and test proposed backfill materials as specified in Section 01 40 00.

.2 Conduct tests on submitted verification samples described above.

.3 Do not proceed with backfill operations until verification samples have been accepted.

3 Execution

3.1 EXAMINATION

.1 Refer to Section 01 71 00.

.2 Verify foundation perimeter drainage installation has been inspected.

3.2 PREPARATION

.1 Generally, compact subgrade to density requirements for subsequent backfill materials.

.2 Cut out soft areas of subgrade not capable of insitu compaction and compact.

.3 Install below-grade insulation in locations indicated on Drawings.

.4 Proof roll subgrade prior to placement of backfill in presence of Owner's geotechnical engineer.

.5 Correct soft areas and obtain geotechnical engineer's acceptance of existing conditions prior to placing backfill.

3.3 BACKFILL

.1 Backfill to contours and elevations as indicated on Drawings, or in the absence of such information, in accordance with recommendations of geotechnical investigation report.

.2 Do not use frozen material.

.3 Systematically backfill to allow maximum time for natural settlement.

.4 Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

.5 Place geotextile fabric where indicated on Drawings prior to placing next lift of fill.

.6 Granular Fill: Place and compact materials in continuous layers not exceeding 150 mm compacted depth.

.7 Native Soil Fill: Place and compact material in continuous layers not exceeding 200 mm compacted depth.

.8 Employ placement method that does not disturb or damage adjacent construction.

.9 Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

.10 Slope grade away from building minimum 150 mm in 3 000 mm, unless noted otherwise.

.11 Make grade changes gradual. Blend slope into level areas.

3.4 ENGINEERED STRUCTURAL FILL

.1 Provide engineered structural fill to raise founding elevations below building footings, foundations and slabs-on fill to levels indicated on Drawings, or in the absence of such information, in accordance with recommendations of geotechnical investigation report.

.2 Place and compact materials in continuous layers not exceeding 250 mm loose lift thickness.

.3 Unless indicated otherwise on Drawings, extend area of engineered fill horizontally 1 000 mm beyond outside edge of exterior footings and extend downward at 1:1 slope to sound bedrock or stiff, compact native soil surface.

3.5 COMPACTING

.1 Compact fill to OPSS.MUNI 501.

.2 Do not use heavy equipment within 1 830 mm of basement walls. Compact with hand controlled equipment in such areas.

3.6 FIELD QUALITY CONTROL

.1 Perform field inspection and testing as specified in Section 01 40 00.

.2 Conduct tests and analysis of fill to ASTM D698.

.3 If tests indicate completed installation does not meet specified requirements, remove non-compliant fill, replace with new compacted fill, and re-test at no additional cost to Owner.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 31 23 16 - Excavation.

.3 Section 31 23 23 - Fill.

1.2 REFERENCES

.1 ASTM D698-12(2021): Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.2 OPSS.MUNI 501 (Nov. 2017): Construction Specification for Compacting.

.3 OPSS.MUNI 1004 (Nov. 2021): Material Specification for Aggregates - Miscellaneous.

.4 OPSS.MUNI 1010 (Apr. 2025): Material Specification for Aggregates - Base, Subbase, Select Subgrade, Granular Surface, Shouldering, Bedding and Backfill Material.

.5 Geotechnical Investigation Report: As described in Section 00 31 00.

1.3 SAMPLES

.1 Submit samples as specified in Section 01 40 00.

.2 Verification Samples: A 4.5 kg sample of each type of fill, delivered to testing laboratory in air-tight containers.

1.4 SOURCE QUALITY CONTROL SUBMITTALS

.1 Submit source quality control reports as specified in Section 01 40 00.

.2 Source Quality Control Reports: Include moisture content, suitability, and other required standards for aggregates.

1.5 FIELD QUALITY CONTROL SUBMITTALS

.1 Submit field quality control reports as specified in Section 01 40 00.

.2 Field Quality Control Reports: Include specified and actual results for compaction, moisture content, and other required standards for aggregate base courses.

2 Products

2.1 MATERIALS

.1 Fine Aggregate Fill: To OPSS.MUNI 1010, Granular A; moisture content within plus or minus two percent of optimum moisture content as determined through ASTM D698.

.2 Fine Crushed Stone Fill: To OPSS.MUNI 1004, Open Graded 19.0 mm Crushed Rock.

.3 Coarse Aggregate Fill: To OPSS.MUNI 1010, Granular B, Type II; moisture content within plus or minus two percent of optimum moisture content as determined through ASTM D698.

.4 Coarse Crushed Stone Fill: Pit run, washed natural limestone; free of shale, clay, friable material, sand, and debris; graded as follows:
.1 Minimum Size: 38 mm.
.2 Maximum Size: 50 mm.

.5 Sand: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.

.6 Pea Gravel: Natural stone; washed, free of clay, shale, and organic matter; graded as follows:
.1 Minimum Size: 6 mm.
.2 Maximum Size: 16 mm.

3 Execution

3.1 PREPARATION

.1 Generally, compact subgrade to density requirements for subsequent backfill materials.

.2 Cut out soft areas of subgrade not capable of insitu compaction and compact.

.3 Proof roll subgrade prior to placement of backfill in presence of Owner's geotechnical engineer.

.4 Correct soft areas and obtain geotechnical engineer's acceptance of existing conditions prior to placing aggregate base courses.

3.2 PLACEMENT

.1 Provide aggregate sub-base and base courses to compacted thicknesses and in locations as indicated on Drawings.

.2 Where sub-base and base course thicknesses are not identified on Drawings, conform to recommendations of geotechnical investigation report.

.3 Backfill areas to contours and elevations with unfrozen materials.

.4 Systematically backfill to allow maximum time for natural settlement.

.5 Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

.6 Place and compact materials in continuous layers not exceeding 150 mm compacted depth.

.7 Employ placement method that does not disturb or damage adjacent Work.

.8 Make grade changes gradual. Blend slope into level areas.

.9 Compact aggregate sub-base and base courses to OPSS.MUNI 501; at compaction rates recommended by geotechnical investigation report.

3.3 FIELD QUALITY CONTROL

.1 Perform field inspection and testing as specified in Section 01 40 00.

.2 Conduct tests and analysis of fill to ASTM D698.

.3 If tests indicate completed installation does not meet specified requirements, remove non-compliant fill, replace with new compacted fill, and re-test at no additional cost to Owner.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 07 13 26 - Self-Adhering Sheet Waterproofing.

.2 Section 15153 - Drainage.

.3 Section 31 23 16 - Excavation.

.4 Section 31 23 23 - Fill.

.5 Section 32 11 23 - Aggregate Base Courses.

1.2 REFERENCES

.1 OPSS.MUNI 405 (Nov. 2017): Construction Specification for Pipe Subdrains.

.2 OPSS.MUNI 1004 (Nov. 2021): Material Specification for Aggregates - Miscellaneous.

.3 OPSS.MUNI 1840 (Nov. 2019): Material Specification for Non-Pressure Polyethylene (PE) Plastic Pipe Products.

1.3 SEQUENCING

.1 Schedule installation to ensure optimum conditions for paving and landscaping.

1.4 PRODUCT DATA

.1 Submit Product data as specified in Section 01 33 00.

.2 Product Data: Manufacturer's standard data sheets, describing weeping tile pipe and fittings, filter fabric, and accessories.

1.5 CLOSEOUT SUBMITTALS

.1 Submit closeout submittals as specified in Section 01 78 00.

.2 Record Documents: Accurately record location of pipe runs, connections, cleanouts, and invert elevations.

2 Products

2.1 MATERIALS

.1 Pipe and Fittings: To OPSS.MUNI 1840; 150 mm ID corrugated high density polyethylene (PE) pipe, having a pipe stiffness of 210 kPa at 5 percent deflection; non-perforated for discharge lines, perforated for collector lines.

.2 Filter Fabric: Needle-punched, non-woven polypropylene fabric, 0.12 kg/m^2 weight; eg. Mirafi 135N by TenCate Geosynthetics Americas.

.3 Filter Aggregate: Clean, well graded, crushed stone; free of shale, clay, organic materials, and debris; with not more than 10 percent passing a 4 mm sieve.

.4 Bedding Sand: To OPSS.MUNI 1004; natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.

.5 Cleanout: Cast iron with threaded removable brass cover to suit floor finish, as specified in Section 15153.

3 Execution

3.1 EXAMINATION

.1 Refer to Section 01 71 00.

.2 Verify excavations, dimensions, and elevations are correct.

3.2 PREPARATION

.1 Hand trim excavations to required elevations.

.2 Correct over excavation with fill material of fine aggregate.

.3 Remove large stones or other hard matter which could damage drainage tile or impede consistent backfilling or compaction.

.4 Install bedding sand to depths indicated, and tamp lightly.

3.3 INSTALLATION

.1 Install subdrains to OPSS.MUNI 405.

.2 Ensure pipe interior and coupling surfaces are clean before placement.

.3 Lay perforated pipe directly over filter cloth with perforations face down. Mechanically join pipe ends.

.4 Protect sub-drains against flotation during installation.

.5 Continuously wrap filter cloth around entire length of pipe, ensuring adequate laps at filter cloth joints.

.6 Do not allow water to flow through pipe during installation.

.7 Plug open upstream ends of pipes with watertight concrete, steel, or wood bulkheads.

.8 Lay pipe with maximum variation from true slope of 3 mm in 3 000 mm. Do not use concrete, masonry, stones, wood, or any type of shim to establish pipe slope.

.9 Install filter aggregate at sides, over joint covers and top of pipe. Provide top cover compacted thickness of 150 mm.

.10 Increase compaction of each successive lift. Refer to Section 31 23 23 and 32 11 23 for compaction requirements. Do not displace or damage pipe when compacting.

.11 Connect to drainage system with non-perforated pipe, as directed by Consultant.

.12 Where collector lines are inside building, install interior type cleanouts in floor at ends of each collector line, spaced at maximum 8 000 mm OC. Coordinate exact locations with Consultant.

.13 Install plugs at ends of underfloor collector lines.

.14 Terminate filter aggregate cover for underslab drainage at underside of aggregate base course below slab-on-fill.

3.4 FIELD QUALITY CONTROL

.1 Perform field testing and inspection as specified in Section 01 40 00.

.2 Request inspection by Consultant immediately before placing filter aggregate cover over pipe.

.3 Arrange for inspection by authority having jurisdiction at appropriate time.

3.5 PROTECTION

.1 Refer to Section 01 76 00.

.2 Protect completed installation from damage or displacement until backfilling commences.

END OF SECTION