



# VICTORIA PARK COMMUNITY HOMES

155 Queen St North, Hamilton, ON L8R 2V6

Project Number: 12228  
Specifications Issued for: Tender

## CONSTRUCTION DOCUMENTS PROJECT MANUAL

Volume 1

Architectural and Structural

**Issued for Tender**

[www.dpai.ca](http://www.dpai.ca)

DPAI Architecture Inc.

25 Main Street West Suite 1800  
Hamilton, Ontario L8P 1H1

## 1.1 DOCUMENT RESPONSIBILITY

.1 Refer to *Project Manual*, Section 00 01 10 - Table of Contents, for indication of document responsibility (DR). Abbreviations for entity responsible for document preparation are as follows:

- .1 A - Denotes documents prepared by Architect.
- .2 C - Denotes documents prepared by Civil Engineer (*Site Servicing*).
- .3 E - Denotes documents prepared by Electrical Engineer.
- .4 M - Denotes documents prepared by Mechanical Engineer.
- .5 S - Denotes documents prepared by Structural Engineer.

.2 Professional seals if applied next to company names in the project directory (below) govern only those specification sections and schedules identified by the corresponding document responsibility (DR) abbreviation in Section 00 01 10.

.3 With regard to Section 00 30 00: The architect's seal governs only Section 00 30 00 proper, and not the documents listed therein.

## 1.2 OWNER

.1 Owner:

**Victoria Park Community Housing**

155 Queen St North  
Hamilton, ON L8R 2V6

Primary Contact:

Title: Director, Capital Assets and Infrastructure  
Name: Rizwan Zaeem  
Phone: (905) 527-0221 ext 247

## 1.3 CONSULTANTS

.1 Architect: Design Professional of Record.

**DPAI Architecture Inc.**

25 Main St W Suite 1800  
Hamilton, ON L8P 1H1  
Tel: (905) 522-0220

Primary Contact: All correspondence from the Contractor to the Architect will be through this party.

Name: Sebastian Lubczynski  
Title: Senior Architect  
Email: sebastian@dpai.ca

.2 Structural Engineering Consultant (S):

**MTE Consultants Inc.**

1016 Sutton Drive, Unit A  
Burlington, Ontario  
Tel (905) 639-2552

.3 Mechanical Engineering Consultant (M):

**MCW Consultants Ltd.**

207 Queen's Quay West, #615  
Toronto, ON M5J 1A7  
(416) 598-2920

.4 Electrical Engineering Consultant (E):

**MCW Consultants Ltd.**

207 Queen's Quay West, #615  
Toronto, ON M5J 1A7  
(416) 598-2920

**END OF SECTION**

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## **PART 1 - GENERAL**

### **1.1 GENERAL REQUIREMENTS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

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- .3 1.3 Definitions
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### 1.3 DEFINITIONS

- .1 The following definitions shall apply to the Bid Documents only:
  - .1 **AODA:** means the Accessibility for Ontarians with Disabilities Act, 2005, SO 2005, c. 11
  - .2 **Bid:** means the Bidder's response to this Request for Tender
  - .3 **Bid Documents:** consist of the Instructions to Bidders, Bid Form, Stipulated Price Contract CCDC 2 - 2020, Amendments to Stipulated Price Contract CCDC 2 - 2020, Specifications, Drawings, Addenda, and other documents included in the Request for Tender
  - .4 **Bidder:** means any entity submitting a Bid in response to this Request for Tender and, as the context may suggest, refers to a potential Bidder
  - .5 **Business Day:** means any Day except Saturdays, Sundays and statutory holidays in the Province of Ontario
  - .6 **Closing Time:** means the Bid Closing Date as identified on the Bidding Website
  - .7 **Confidential Information:** means all proprietary, confidential and non-publicly available information provided by or on behalf of the Victoria Park Management to Bidders, whether in oral, written, graphic, schematic or electronic form
  - .8 **Conflict of Interest:** means any situation or circumstance where, in relation to the performance of its obligations under the Contract, the Bidder's other commitments, relationships or financial interests
    - .1 could or could be seen to exercise an improper influence over the objective, unbiased, and impartial exercise of its independent judgement; or
    - .2 could or could be seen to compromise, impair, or
    - .3 be incompatible with the effective performance of its obligations under the Contract.
  - .9 **Contract:** means the contract entered into by the Victoria Park Management and the Contractor as a result of this Request for Tender
  - .10 **Contract Documents:** consist of the executed CCDC 2 Stipulated Price Contract (2020), Amendments to CCDC 2 Stipulated Price Contract (2020), Specifications, Drawings, Addenda, Change Orders and such other documents as are listed in Article A-3 - Contract Documents and Reference Documents including amendments thereto incorporated before the execution of the Contract and subsequent amendments thereto made pursuant to the provisions of the Contract
  - .11 **Contract Time:** means the number of Working Days stipulated in the Agreement Between Owner and Contractor of the Stipulated Price Contract, CCDC-2 2020 for completion of the Work
  - .12 **Contractor:** means the entity with whom the Victoria Park Management enters into the Contract as a result of this Request for Tender
  - .13 **Day:** means a calendar day

- .14 **Drawings:** means all plans, profiles, drawings, sketches or copies thereof, used or prepared for, or in connection with, the Work
- .15 **Estimated Contract Price:** means the Subtotal Contract Amount identified in the Schedule of Prices Summary Table contained in the Bid
- .16 **may** and **should:** as used in the Bid Documents reflect a permissive requirement
- .17 **Plan Taker:** means any entity who has registered for this Request for Tender
- .18 **Request for Tender (RFT)** means the document(s) issued by Victoria Park Management to which Plan Takers are invited to submit Bids
- .19 **shall** and **must** as used in the Bid Documents reflect a mandatory requirement
- .20 **Site:** means the designated site or location of the Work
- .21 **Subcontractor:** means a person, firm or corporation who will have a direct contract with the Contractor to perform a part or parts of the Work
- .22 **Work** means the total construction and related services required by the Contract

#### 1.4 INTENT

- .1 The intent of this call for bids is to obtain a bid in order to perform the Work to complete the renovation and construction of second floor addition for Victoria Park Management office located at 155 Queen St N, Hamilton, ON L8R 2V6 for a CCDC 2 Stipulated Price Contract 2020 in accordance with the *Contract Documents*.

#### 1.5 SCOPE OF WORK

- .1 The scope of the Work includes, but is not limited to, the provision of all labour, materials, Construction Equipment and services required to complete the Works for the renovation and construction of second floor addition for Victoria Park Management office located at 155 Queen St N, Hamilton, ON L8R 2V6 and as required to complete the Project.

#### 1.6 RFT TIME TABLE

- | .1 Description         | Date  |
|------------------------|---|
| Issue Date of RFT      | September 11, 2023                                    |
| Optional Site Visit    | September 18 <sup>th</sup> , 2023 at 11:00am          |
| Deadline for Questions | September 29 <sup>TH</sup> at 12:00pm noon local time |
| Submission Deadline    | October 6 <sup>th</sup> at 3:00pm noon local time     |
- .2 The RFT timetable is tentative only and may be changed by Victoria Park Management at any time.
  - .3 Optional Site Meeting
  - .4 An optional site meeting will be held at 11:00am location time on Monday, September 18<sup>th</sup>, 2023 at 155 Queen Street North, Hamilton Ontario at the main entrance to the building off of Queen Street. Questions should not be asked at the site meeting; they shall be submitted directly through bids and tenders. The bidder must follow the instructions stated within this section of this document.

## **1.7 COVID-19**

- .1 The Contractor will be required to comply with all legislative amendments, controls, regulations, requirements and orders that were or are issued by the Government of Canada, the Province of Ontario, Victoria Park Management or other municipal authority in response to the global pandemic of the virus leading to COVID-19 including any resurgence or mutation thereof.
- .2 In submitting its Bid, the Bidder shall be deemed to have considered all legislative amendments, controls, regulations, requirements and orders that were issued, prior to bid closing, by the Government of Canada, the Province of Ontario, Victoria Park Management or other municipal authority in response to the global pandemic of the virus leading to COVID-19, including any impacts such legislative amendments, controls, regulations, requirements and orders could have on the Bidder's pricing, and the Estimated Contract Price is deemed to include all costs associated with the foregoing.

## **1.8 ELECTRONIC BID SUBMISSION**

- .1 Victoria Park Management will ONLY accept ELECTRONIC BID SUBMISSIONS submitted through Bids and Tenders website at <https://www.bidsandtenders.ca/> (the "Bidding Website"). Hard copy bid submissions will not be accepted.
- .2 Bids shall be submitted on or before the Submission Deadline. Bids submitted after the Submission Deadline will not be accepted. Bidders are advised to make submissions well before the deadline. Bidders making submissions near the deadline do so at their own risk.

## **1.9 CONTACT FOR TECHNICAL ISSUES**

- .1 Bidders that encounter technical issues with the Bidding Website should email [support@bidsandtenders.ca](mailto:support@bidsandtenders.ca) and copy the Purchasing Analyst.

## **1.10 VICTORIA PARK MANAGEMENT PURCHASING ANALYST**

- .1 Victoria Park Management Purchasing Analyst for this RFT is:  
  
Rizwan Zaeem, PEng, PMP, CEM  
Director, Capital Assets and Infrastructure  
E-mail: [capital@vpch.com](mailto:capital@vpch.com)

## **1.11 COSTS INCURRED BY BIDDERS**

- .1 Bidders shall bear all costs incurred in their preparation and submission of Bids to Victoria Park Management. Victoria Park Management will not make any payment for any Bids received, or for any other effort required of, or made by, Bidders prior to the commencement of the Work.

## **1.12 COMMUNICATIONS WITH VICTORIA PARK MANAGEMENT**

- .1 To ensure fair consideration and evaluation of Bids, the Victoria Park Management prohibits ex parte or unsolicited communication initiated by Bidders to, or with, any Victoria Park Management consultants or employees during the tender process, except as provided for in paragraphs 1.8 and 1.11.

## **1.13 QUESTIONS AND CLARIFICATIONS**

- .1 Questions related to this RFT shall be submitted to the Victoria Park Management through the Bidding Website by clicking on the 'Submit a Question' button.

- .2 Bidders shall seek clarification of any matter that they consider unclear before submitting a Bid. Victoria Park Management is not responsible for any misunderstanding of this RFT on the part of the Bidder.
- .3 If a Bidder finds discrepancies or omissions in the Bid Documents, or if a Bidder is in doubt as to their meaning, the Bidder shall submit its question or concern using the 'Submit a Question' feature in the Bidding Website. Victoria Park Management shall make reasonable efforts to provide Bidders with written responses to questions that are submitted during the bidding process, subject to the provisions of this paragraph. Questions and answers will be distributed in the form of an addendum. Victoria Park Management may, in its sole discretion:
  - .1 Edit the question(s) for clarity;
  - .2 Exclude questions that are either unclear, irrelevant or inappropriate;
  - .3 Answer similar questions from various Bidders only once; and
  - .4 Not answer questions received less than 5 Business Days prior to the Closing Time.
- .4 No employee or agent of Victoria Park Management is authorized to amend or waive the requirements of this RFT in any way unless the amendment or waiver is issued in an addendum. Under no circumstances shall Bidders rely upon any information or instructions from Victoria Park Management, its employees, or its agents, unless the information or instructions are provided in writing in the form of an addendum.

#### **1.14 ADDENDA**

- .1 Bidders shall allow for the issuance of addenda during the bidding period.
- .2 Any additional information and/or changes to the Bid Documents will be issued in the form of an addendum. All addenda will be posted to the Bidding Website.
- .3 Victoria Park Management will notify Bidders of the issuance of addenda via e-mail; however, it is the Bidder's responsibility to ensure that it has downloaded all addenda prior to submitting its Bid. Victoria Park Management will not be liable for any misdirected notices of addenda resulting from a Bidders failure to update its contact information in the Bidding Website and/or Bidders failing to check for addenda prior to submitting their Bid.
- .4 Bidders shall acknowledge receipt of all addenda prior to submitting their Bid. Bids that do not contain evidence of receipt of all addenda will be deemed to be "incomplete" and will not be accepted in the Bidding Website.
- .5 In the event that an addendum is issued after a Bidder has submitted its Bid, the Bidding Website will change the status of the Bid to "incomplete" and the Bidder will be required to acknowledge the addendum and resubmit its Bid prior to the Closing Time. Victoria Park Management recommends that after submitting its Bid, the Bidder checks for addenda up until the Closing Time.

#### **1.15 ABILITY AND EXPERIENCE**

- .1 Victoria Park Management reserves the right to not award the Contract to any Bidder who does not furnish evidence, satisfactory to Victoria Park Management, that it has experience in performing the type of work proposed and that it has sufficient capital and equipment to enable it to successfully complete the Work within the Contract Time.



- .2 Bidders must be prepared to present evidence of their experience, ability, service facilities and financial standing necessary to satisfactorily meet the requirements set forth or implied in this RFT if requested by Victoria Park Management.

#### **1.16 IRREVOCABILITY PERIOD**

- .1 All prices submitted in the Bid shall be valid and irrevocable for a period of 90 Days after the Closing Time.

#### **1.17 BID DEPOSIT**

- .1 All Bids shall be accompanied by a bid deposit in the amount of \$50,000.00 to act as security for the execution and delivery of the Contract and the provision of the requisite bonds, proof of insurance and all other documents required to be delivered to the Victoria Park Management upon execution of the Contract. The bid deposit shall be in the form of a digital Bid Bond from a recognized guarantee or surety company acceptable to Victoria Park Management, and authorized by law to do business in the Province of Ontario. The form of Bid Bond acceptable to Victoria Park Management is attached as Schedule A.
- .2 Failure to meet the Victoria Park Management bid deposit requirements shall result in rejection of your bid.

#### **1.18 BONDS**

- .1 Bidders shall submit a digital Undertaking to Bond with their Bid. The form of Undertaking to Bond acceptable to the Victoria Park Management is attached as Schedule B. The Undertaking to Bond shall be from an insurance or surety company licensed under the Insurance Act, RSO 1990, c. I.8, as amended, acceptable to Victoria Park Management.
- .2 The Contractor will be required to provide:
  - .1 A Performance Bond for the due completion of the Work in accordance with the terms and conditions of the Contract, in an amount equal to 50% of the Estimated Contract Price and in a form acceptable to Victoria Park Management; and
  - .2 A Labour and Material Payment Bond in an amount equal to 50% of the Estimated Contract Price and in a form acceptable to Victoria Park Management.
- .3 The form of Performance Bond acceptable to Victoria Park Management is Form 32 – Performance Bond under Section 85.1 of the Construction Act, which can be found at <http://ontariocourtforms.on.ca/en/construction-lien-act-forms/>.
- .4 The form of Labour and Material Payment Bond acceptable to Victoria Park Management is Form 31 – Labour and Material Payment Bond under Section 85.1 of the Construction Act, which can be found at <http://ontariocourtforms.on.ca/en/construction-lien-act-forms/>.
- .5 The bonds shall be issued by the same insurance or surety company that issued the Undertaking to Bond or an alternate insurance or surety company that meets the criteria set out above.
- .6 Failure to meet Victoria Park Management's bonding requirements shall result in the rejection of your Bid.

#### **1.19 EXAMINATION OF THE SITE AND DESIGNATED SUBSTANCES NOTICE**

- .1 Prior to submitting a Bid, Bidders shall thoroughly acquaint themselves with the Bid Documents and carefully examine the Site where the Work will be performed, to fully inform themselves of the

existing conditions and limitations. Access to the Site may be provided during the bidding period when requested.

- .2 Bidders shall not claim, after the submission of their Bid, that there was any misunderstanding of the terms and conditions of the Contract relating to Site conditions.

## **1.20 ERRORS & OMISSIONS**

- .1 Victoria Park Management shall not be held liable for any errors or omissions in any part of this RFT. While Victoria Park Management has used reasonable efforts to ensure an accurate representation of information in this RFT, the information contained in this RFT is supplied solely as a guideline for Bidders. Victoria Park Management does not guarantee or warrant that the information is accurate, comprehensive or exhaustive. Nothing in this RFT is intended to relieve Bidders from forming their own opinions and conclusions with respect to the matters addressed in this RFT. Information provided in this RFT is relied upon or acted upon by Bidders solely and exclusively at their own risk.

## **1.21 BID SUBMISSION PROCESS**

- .1 Bidders must submit their Bids electronically through the Bidding Website. Any Bids which are not received electronically through the Bidding Website will not be accepted by Victoria Park Management and will be returned to the Bidder unopened.
- .2 In the event that a Bidder wishes to revise its Bid after it has been submitted, the Bidder must withdraw its Bid, make the necessary changes, and resubmit its Bid before the Closing Time.
- .3 Victoria Park Management accepts no responsibility for any reason whatsoever, including computer system failures of either the Bidder or Victoria Park Management's service provider, if the Bidder is unable to submit its Bid before the Closing Time, and the Bidder agrees that Victoria Park Management shall have no liability for delays caused by internet/network traffic, degraded operation or failure of any computer system element, including, but not limited to: any computer system, power supply, telephone or data connection or system or software or browser of any type whatsoever.
- .4 It is the sole responsibility of the Bidder to ensure that it can access and exchange data with Victoria Park Management's service provider's computer systems electronically and that it allows sufficient time to successfully access and share data with Victoria Park Management's service provider's computer systems, having regard to the possibility of delays caused by internet/network traffic. Bidders are solely responsible for ensuring that they plan their access to Victoria Park Management's service provider's computer/servers, so that the Bidders can reach Victoria Park Management's service provider's computers/servers, and submit their Bids, before the Closing Time.

## **1.22 CLOSING TIME**

- .1 All Bids must be submitted electronically through the Bidding Website and received by Victoria Park Management not later than the Closing Time.
- .2 The Closing Time shall be determined by the Bidding Website clock and is subject to change via addendum.
- .3 The receipt of Bids can be delayed due to factors such as "internet traffic", file transfer size, transmission speed, etc. Victoria Park Management therefore recommends that Bidders allow sufficient time to upload their Bid submission, including any attachments.

- .4 A Bid will only be considered to have been submitted once it has been received by Victoria Park Management in its Bidding Website, regardless of when the Bid was submitted by the Bidder.
- .5 Bidders will receive a confirmation e-mail from the Bidding Website once they have successfully submitted their Bid. Bidders should not consider their Bid to have been submitted until they have received the confirmation e-mail.

#### **1.23 PROCUREMENT BYLAW**

- .1 Bids will be called, received, evaluated, accepted and processed in accordance with Victoria Park Management's Procurement Bylaw and all applicable protocols (the "Bylaw") as amended or replaced from time to time. By submitting a Bid, the Bidder agrees to be bound by the terms and conditions of the Bylaw.

#### **1.24 SUSPENDED SUPPLIERS**

- .1 Victoria Park Management will not open Bids received from Bidders that have been suspended pursuant to the Supplier Suspension Protocol.

#### **1.25 ACCEPTANCE AND REJECTION OF BIDS**

- .1 Victoria Park Management reserves the right to reject any or all Bids, in whole or in part, including without limitation the lowest Bid, and/or to waive any technical defects, irregularities and omissions if, in so doing, the best interests of Victoria Park Management will be served.
- .2 Victoria Park Management also reserves the right, in its sole discretion, to reject or retain for its consideration Bids which are non-conforming because they do not contain the content or form required by this RFT or fail to comply with the submission process set out in this RFT.
- .3 In the event that Victoria Park Management, in its sole discretion, deems a Bid or any component of it (i.e. the Estimated Contract Price or the price(s) for any item(s), part(s), section(s) or division(s)) to be unbalanced, the Bid may be deemed to be non-compliant and rejected. For the purpose of this provision, "unbalanced" means the price submitted, whether it be the Estimated Contract Price or a price for an item, part, section or division, does not reflect reasonable, anticipated costs for the required labour, equipment and materials, plus a reasonable proportionate share of the Bidder's anticipated overhead and profit, or the Bid creates a reasonable doubt that its acceptance will result in the lowest actual cost to Victoria Park Management.
- .4 If only one compliant Bid is received and the Bid is over budget, Victoria Park Management reserves the right to enter into negotiations with the Bidder for the purpose of awarding a Contract that is within budget, which may include amending the scope of Work.

#### **1.26 INFORMAL BIDS**

- .1 Bids that have not been submitted electronically through the Bidding Website, or are late, incomplete, have no Undertaking to Bond where required, do not contain the required bid deposit in a form acceptable to Victoria Park Management, are restricted or altered in a way that is not acceptable to Victoria Park Management, do not provide evidence of receipt of all addenda, depart in some material way from the Drawings and Specifications contained in the Bid Documents, or otherwise fail to conform to the requirements of the Bid Documents, will be deemed to be informal and will be rejected by Victoria Park Management.
- .2 Victoria Park Management may, in its sole discretion, reject or retain for its consideration Bids which are non-conforming.

#### **1.27 CONFLICTS OF INTEREST**

- .1 Bidders shall declare, in their Bid, all conflicts of interest, or any circumstance that may be reasonably perceived as a conflict of interest, which exists now, or may exist in the future.
- .2 Failure to comply with this requirement will render the Bid non-compliant and will cause the Bid to be rejected.
- .3 Victoria Park Management may, in its sole discretion, waive any and all actual, potential, or perceived conflicts of interest, on such terms and conditions as Victoria Park Management, in its sole discretion, considers to be required to satisfy itself that any actual, potential or perceived conflict of interest has been appropriately managed, mitigated and minimized. In this regard Victoria Park Management may require the Bidder to implement measures or take other steps to manage or mitigate the impact of any actual, potential or perceived conflict of interest.
- .4 Victoria Park Management also reserves the right to disqualify from further consideration Bids which, in Victoria Park Management's opinion, demonstrate a conflict of interest.

#### **1.28 EVALUATION OF BIDS**

- .1 Victoria Park Management will conduct its evaluation of Bids in the following stages:
  - .1 Victoria Park Management will review Bids to determine whether they comply with the technical requirements specified in the Bid Documents including, but not limited to, the following:
    - .1 Confirming the Bidder has submitted an acceptable Bid Bond and Undertaking to Bond
    - .2 Once the compliance review is complete, Victoria Park Management will unseal the pricing for all compliant Bids.

#### **1.29 BLACKOUT PERIOD**

- .1 Bidders shall not initiate communication with any Victoria Park Management official, consultant or employee with respect to this RFT from the Closing Time up to, and including, the date that the Contract has been awarded (the "Blackout Period") or the RFT has been cancelled.
- .2 Communication between Bidders and Victoria Park Management during the Blackout Period may only be undertaken through Victoria Park Management's Purchasing Analyst. Any communication initiated by a Bidder during the Black Out Period to any Victoria Park Management official, consultant or employee other than Victoria Park Management's Purchasing Analyst may be grounds for disqualifying the offending Bidder from consideration for the award of this and/or any future Victoria Park Management procurements.

#### **1.30 LOBBYING PROHIBITED**

- .1 Bidders, including their Subcontractors, consultants, agents, officials and employees shall not engage in any form of political or other lobbying whatsoever with respect to this RFT or seek to influence the outcome of the RFT process. This anti-lobbying clause applies to communications with all members of Victoria Park Management, and their respective staff members or their appointees. If any Bidder or related party is found to be engaging in lobbying, Victoria Park Management will reject the Bidder's Bid without further consideration and terminate that Bidder's right to continue in the RFT process. All correspondence or contact by Bidders with Victoria Park Management with respect to this RFT must be through the 'Submit a Question' feature on the Bidding Website or directly, and only, with Victoria Park Management's Purchasing Analyst.

- .2 The anti-lobbying clause applies from the release date of this RFT until the date and time when the Contract has been awarded or this RFT has been cancelled.
- .3 The anti-lobbying clause shall not be construed as prohibiting any activity which is duly authorized as part of the RFT process, including any public deputations that may be made to a Victoria Park Management in accordance with Victoria Park Management's Procedural Bylaw.

#### **1.31 AWARD OF CONTRACT**

- .1 The award of the Contract is subject to the approval of Victoria Park Management or its authorized delegate and the receipt of sufficient funding.
- .2 Bidders will not, under any circumstances, have any claims against Victoria Park Management, including claims for incidental, indirect, special or consequential damages, or any loss of revenue, profit, or business opportunity, which arise out of, or are in any way related to, the tender process, howsoever caused, including, but not limited to, claims arising out of Victoria Park Management's rejection of any Bid, or Victoria Park Management's failure to award the Contract for any reason, including failure to obtain sufficient funding. In the event that Victoria Park Management is found liable for damages to any Bidder, such liability shall be limited to the cost of preparation of that Bidder's Bid. Victoria Park Management does not, by issuing this RFT or by any communication or documentation made or provided in connection with this RFT, incur any duty of care or contractual obligation to any Bidder and expressly disclaims any liability or obligation to any Bidder in connection with this RFT.
- .3 Each Bid shall be submitted with the understanding that the acceptance of the Bid in writing by Victoria Park Management, within the irrevocability period specified in the RFT, shall constitute a Contract between the Bidder and Victoria Park Management, which shall bind the Bidder, on its part, to furnish and deliver the Work at the prices submitted and in accordance with the terms and conditions of the Contract, at the Contract Price.

#### **1.32 EXECUTION OF CONTRACT**

- .1 The party to whom the Contract is awarded shall enter into a formal contract with Victoria Park Management, and forming part of that Contract will be Contract Documents as listed in SC GC 1.1 - Contract Documents and Reference Documents of the Agreement Between Owner and Contractor of the Stipulated Price Contract, CCDC-2 2020.
- .2 Victoria Park Management will deliver the Contract to the party to whom the Contract is awarded, and that party shall execute the Contract and furnish the bonds, proof of insurance and all other documents required to be provided to Victoria Park Management upon the execution of the Contract, not later than 10 Business Days after the date of delivery.

#### **1.33 NON-EXCLUSIVE**

- .1 Any Contract awarded as a result of this RFT will be non-exclusive. Victoria Park Management may at its sole discretion, purchase the same or similar services from other sources during the term of the Contract.

#### **1.34 NON-DISCLOSURE AGREEMENT**

- .1 Victoria Park Management reserves the right to require the Bidder to enter into a non-disclosure agreement satisfactory to Victoria Park Management regarding any information that Victoria Park Management deems to be confidential.

**1.35 GOVERNING LAW**

- .1 This RFT will be construed, and the contractual relationship between Victoria Park Management and a Bidder will be determined, in accordance with the laws of the Province of Ontario. The courts of the Province of Ontario shall have exclusive jurisdiction with respect to all matters relating to, or arising out of, this RFT.

**1.36 CANCELLATION OF PROCESS**

- .1 Victoria Park Management reserves the right, in its sole discretion, to cancel this RFT, to re-issue this RFT, to issue or implement any other procurement process, or take any steps or actions, to procure the same or similar services at any time and from time to time.

**PART 2- PRODUCTS**

Not applicable.

**PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

**BID BOND**

BOND NO. \_\_\_\_\_ \$50,000.00

**KNOW THEREFORE ALL MEN BY THESE PRESENTS** that \_\_\_\_\_  
(hereinafter called the "Principal") and \_\_\_\_\_ a corporation  
created and existing under the laws of \_\_\_\_\_ and duly authorized  
to transact the business of Suretyship in \_\_\_\_\_, (hereinafter called  
the "Surety") are held and firmly bound unto Victoria Park Management (hereinafter called the  
"Obligee"), in the amount of \$50,000.00 lawful money of Canada, for the payment of which sum, well and  
truly to be made, the Principal and the Surety bind themselves and their respective heirs, executors,  
administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS the Principal has submitted a written tender or proposal to the Obligee for Contract No.  
RFT-2023-01 for the construction of Ground Floor Renovation and Second Floor Construction at 155  
Queen Street North, Hamilton, Ontario.

NOW THEREFORE, the condition of the foregoing obligation is such that, if the Principal shall have the  
tender or proposal accepted within the period of irrevocability of the tender, as may be amended by  
addenda issued by the Obligee, the said Principal will, within the time required, enter into a formal  
contract with the Obligee in a form satisfactory to the Obligee, (hereinafter called the "Contract"), and give  
the specified security to secure the performance of the terms and conditions of the Contract, then this  
obligation shall be void; otherwise the Principal and the Surety will pay unto the Obligee the difference in  
money between the amount of the bid of the said Principal and the amount for which the Obligee legally  
contracts with another party to perform the work if the latter amount be in excess of the former.

The Surety shall not be liable for a greater sum than the specified penalty of this Bond. Any suit under this  
Bond must be instituted before the expiration of six months from the date of this Bond.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto affixed their corporate seals and  
caused their presents to be signed by their duly authorized officers.

**DATED THIS** \_\_\_\_\_ day of \_\_\_\_\_ .

\_\_\_\_\_  
Name – Surety

Signature of Authorized Person Signing for Surety

(Place Surety corporate seal above)

I have authority to bind the Corporation

\_\_\_\_\_  
Name – Principal

Signature of Authorized Person Signing for Principal

(Place Principal corporate seal above)

I have authority to bind the Corporation

## **UNDERTAKING TO BOND**

**CONTRACT NO.**            RFT-2023-01

**TO:**                        Victoria Park Management

**AND TO:**                \_\_\_\_\_(the "Contractor")

We, the undersigned, hereby undertake and agree to become bound as Surety for the Contractor in:

(a) a Performance Bond in an amount equal to 50% of the Estimated Contract Price and conforming to Form 32 - Performance Bond under Section 85.1 of the Construction Act; and

(b) a Labour and Material Payment Bond in an amount equal to 50% of the Estimated Contract Price and conforming to Form 31 - Labour and Material Payment Bond under Section 85.1 of the Construction Act, if the bid for the construction of Ground Floor Renovation and Second Floor Construction at 155 Queen Street North, Hamilton, Ontario.

If the above-mentioned bid is accepted, the undersigned will execute the bonds within 10 Business Days of notification of acceptance of the Bid.



The Standard Construction Document CCDC 2 – 2020 Stipulated Price Contract, consisting of the AGREEMENT BETWEEN OWNER AND CONTRACTOR, DEFINITIONS, and GENERAL CONDITIONS OF THE STIPULATED PRICE CONTRACT made part of the *Contract Documents*, with the following amendments, additions and modifications:

## **AGREEMENT BETWEEN OWNER AND CONTRACTOR**

1. ARTICLE A-1– THE WORK
2. ARTICLE A-4 – CONTRACT PRICE
3. ARTICLE A-5 – PAYMENT
4. ARTICLE A-9 – TIME OF THE ESSENCE

## **DEFINITIONS**

### **PART 1 – GENERAL PROVISIONS**

- 1.1 GC 1.1 – CONTRACT DOCUMENTS

### **PART 2 – ADMINISTRATION OF THE CONTRACT**

- 2.1 GC 2.3 – REVIEW AND INSPECTION OF WORK

### **PART 3 – EXECUTION OF THE WORK**

- 3.1 GC 3.1 – CONTROL OF THE WORK
- 3.2 GC 3.4 – CONSTRUCTION SCHEDULE
- 3.3 GC 3.5 – SUPERVISION
- 3.4 GC 3.6 – SUB-CONTRACTORS
- 3.5 GC 3.7 – LABOUR AND PRODUCTS
- 3.6 GC 3.8 – SHOP DRAWINGS
- 3.7 GC 3.9 – USE OF WORK
- 3.8 GC 3.10 – CLEANUP
- 3.9 GC 3.11 – DOCUMENTS AT THE SITE
- 3.10 GC 3.12 – STANDARD OF CARE
- 3.11 GC 3.13 – USE OF SITE

### **PART 4 – ALLOWANCES**

- 4.1 GC 4.1 – CASH ALLOWANCES

**PART 5 – PAYMENT**

- 5.1 GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER
- 5.2 GC 5.2 – APPLICATIONS FOR PROGRESS PAYMENT
- 5.3 GC 5.3 – PROGRESS PAYMENT
- 5.4 GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK
- 5.5 GC 5.5 – FINAL PAYMENT
- 5.6 GC 5.6 – DEFERRED WORK

**PART 6 – CHANGES IN THE WORK**

- 6.1 GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES
- 6.2 GC 6.2 – CHANGE ORDER
- 6.3 GC 6.3 – CHANGE DIRECTIVES
- 6.4 GC 6.5 – DELAYS
- 6.5 GC 6.6 – CLAIMS FOR CHANGE IN CONTRACT PRICE

**PART 7 – DEFAULT NOTICE**

- 7.1 GC 7.1 – OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK OR TERMINATE THE CONTRACT
- 7.2 GC 7.2 – CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT

**PART 9 – PROTECTION OF PERSONS AND PROPERTY**

- 9.1 GC 9.1 – PROTECTION OF WORK AND PROPERTY
- 9.2 GC 9.4 – CONSTRUCTION SAFETY

**PART 10 – GOVERNING REGULATIONS**

- 10.1 GC 10.1 – TAXES AND DUTIES
- 10.2 GC 10.2 – LAWS, NOTICES, PERMITS, FEES

**PART 11 – INSURANCE**

- 11.1 GC 11.1 – INSURANCE

**PART 12: OWNER TAKEOVER**

- 12.1 GC 12.2 – EARLY OCCUPANCY BY THE OWNER
- 12.2 GC 12.3 – WARRANTY

**PART 13: INDEMNIFICATION AND WAIVER**

- 13.1 GC 13.1 – INDEMNIFICATION**
- 13.2 GC 13.2 – WAIVER OF CLAIMS**

**PART 14: OTHER PROVISIONS**

- 14.1 GC 14.1 – OWNERSHIP OF MATERIALS**
- 14.2 GC 14.2 – CONSTRUCTION LIENS**
- 14.3 GC 14.3 – CONTRACTOR DISCHARGE OF LIABILITIES**
- 14.4 GC 14.4 – SET OFF**

The Standard Construction Document for Stipulated Price Contract, 2020 English version consists of the Agreement between *Owner* and *Contractor*, Definitions and General Conditions of the Stipulated Price Contract, Parts 1 to 14 inclusive governing same is hereby made part of these *Contract Documents*, with the following amendments, additions and modifications specifically reference a change to the Agreement, Definitions or General Conditions, these amendments, additions and modifications shall govern.

Supplementary Conditions include amendments to the General Conditions and shall be read in conjunction with, and in the case of conflict take precedence over General Conditions. Where any of the General Conditions are supplemented or amended hereinafter, the unaffected provisions of such General Conditions shall be considered as added thereto.

## **AGREEMENT BETWEEN OWNER AND CONTRACTOR**

### **1. ARTICLE A-1 – THE WORK**

- .1 Delete Article 1.3 and replace it with the following:

1.3 Attain:

.1 Substantial Performance of the Contract within 240 Calendar Days

.2 Total Performance of the Contract within 270 Calendar Days

From the commencement date specified in the Owner's written notice to commence the Work (the "Commencement Date")., subject to potential adjustment pursuant to Part 6 Changes in the Work; and

- .2 Add new Article 1.4:

1.4 provide all labour, materials, equipment, machinery, Products and work including, without limitation, all commissioning services required by the Contract Documents to fully complete and construct the Work in accordance with, and to the satisfaction of, all applicable federal, provincial, municipal and local laws, regulations, rules, bylaws, guidelines, standards, permits, statutes, ordinances, and codes including, without limitation, those relating to occupational health and safety and any and all obligations, responsibilities and duties required by or set out in any site plan agreement or approval, attributable to the Place of the Work and/or the proposed development therein, and furnish efficient business and construction administration and superintendence consistent with the interests of the Owner.

### **2. ARTICLE A-4 – CONTRACT PRICE**

- .1 Add the following to the end of Article 4.4:

4.4 Notwithstanding the foregoing, the Contractor shall not be entitled to any increases in the Contract Price, or to the prices for any individual items, for any reason whatsoever including, but not limited to, increases in prices due to inflation or the escalation of labour or material costs.

### **3. ARTICLE A-5 – PAYMENT**

- .1 Delete paragraph 5.1.2 in its entirety and substitute new paragraph 5.1.2:

5.1.2 upon *Substantial Performance of the Work*, as certified by the *Consultant*, and at least 61 days after the publication of the certificate of *Substantial Performance of the Work*, there being no claims for lien registered against the title to the *Place of the Work* and the conditions described in GC 5.5 having been satisfied, pay the

*Contractor* the unpaid balance of the holdback together with such *Value Added Taxes* as may be applicable to such payment.

#### 4. ARTICLE A-9 – TIME OF THE ESSENCE

.1 Add the following article in its entirety:

##### ARTICLE A-9 TIME OF THE ESSENCE

- 9.1 It is agreed that in selecting the *Contractor for the Work*, the *Owner* has relied and is entitled to rely upon the *Contractor's* covenant, representation and warranty that it will attain *Substantial Performance of the Work* within the *Contract Time*, or any subsequent construction schedules approved in writing by the *Owner*.
- 9.2 The *Contractor* acknowledges and agrees that it is responsible to marshal its resources and those of the *Subcontractors* and *Suppliers* in a manner which will permit timely attainment of the *Substantial Performance of the Work*. The *Contractor* agrees that time is of the essence of this *Contract*.

#### DEFINITIONS

Add the following to previously defined terms:

8. **Contract Time**

**Add** 'All time limits stated in the *Contract Documents* are of the essence of the *Contract*.'

25. **Work**

Delete the period at the end of the definition of item 25. *Work* and add the following:

'including all work that can reasonably be inferred from or is incidental to same based on the judgement of a good, competent, and experienced *Contractor*.'

Add the following definitions:

27. **Estimated Quantity**

*Estimated Quantity* means the quantity of a unit price item that is initially assumed in calculating the *Contract Price*.

28. **Inspector**

*Inspector* is the individual or firm appointed by Victoria Park Management to carry out inspections of work performed.

29. **Lump Sum Item**

*Lump Sum Item* means pay item included in the schedule of *Contract Prices* that stipulates a fixed price to be paid when the *Work* is completed.

30. **Pay Quantity**

*Pay Quantity* means the actual quantity of the unit price item that was required to be completed as part of the *Work*.

31. **Project Manager**

*Project Manager* is the individual responsible to act as the point of contact on behalf of *Victoria Park Management* in regards to the Design, Engineering and Construction for VPCH properties.

32. **Schedule of Stipulated Unit Prices**

*Schedule of Stipulated Unit Prices* means the itemized breakdown of Lump Sum, Unit Prices and Estimated Quantities used to calculate the *Contract Price* and to determine payment.

33. **Statutory Declaration**

*Statutory Declaration* is submitted by the *Contractor* to the *Consultant* on a copyright sealed form CCDC Document 9A-2001 to declare that all payments for wages and salaries, payments due to Subcontractors, payments for materials furnished on-site and all other accounts have received the latest progress payment.

**34. Unit Price Measurement**

*Unit Price Measurement* means the units or dimensions necessary to calculate the *pay quantity*.

**35. Victoria Park Management**

*Victoria Park Management (VPM)* refers to a limited registered company who is the Owner's Property Management firm and responsible for all Victoria Park Community Homes Inc. (VPCHI) properties and Victoria Park Affordable Housing Corp. (VPAHC), decisions and associated Design, Engineering and Construction Contracts.

**36. WSIB**

*WSIB* means Workplace Safety and Insurance Board (Ontario)

**37. OHSA**

*OHSA* means the Occupational Health and Safety Act (Ontario).

## **PART 1 – GENERAL PROVISIONS**

### **1.1. GC 1.1 – CONTRACT DOCUMENTS**

.1 Amend paragraph 1.1.4 by adding the following at the end of the paragraph: "If the Contractor finds discrepancies in or omissions from the Contract Documents or has any doubt as to the meaning or intent of any part thereof, the Contractor shall immediately notify the Consultant, who will provide written instructions or explanations. Neither the Owner nor the Consultant will be responsible for oral instructions."

.2 Delete paragraph 1.1.5 in its entirety and substitute new paragraph 1.1.5:

The order of priority of documents, from highest to lowest, shall be:

- The Supplementary Conditions,
- The Agreement between the Owner and the Contractor,
- The Award Letter signed by Owner and the Contractor,
- The Definitions,
- The General Conditions,
- Division 01 of the Specifications,
- The Technical Specifications,
- The Material and Finishing Schedules,
- The Drawings,
- The Bid Form,
- The Bid submitted by the Contractor

.3 Delete paragraph 1.1.11. in its entirety and substitute new paragraph 1.1.11:

- 1.1.11 The Owner shall provide the Contractor without charge one (1) digital copy via email of the Contract Documents to perform the Work.

.4 Add the following paragraphs in their entirety:

- 1.1.12 The *Contract Documents* shall be signed and initialed in duplicate by the *Owner* and the *Contractor*.

- 1.1.13 The *Contract Documents* are to be interpreted as a whole although they are arranged in divisions for convenience and clarity. The *Contractor* is responsible for all the Work, regardless of the division of the Work in the *Contract Documents*, and such division does not impose any obligations of the *Consultant*, *Project Manager* or upon the *Owner* as arbitrators to establish limits or responsibility between the *Contractor* and *Subcontractors*.

**.5 GC 1.4: ASSIGNMENT**

- .1 Delete paragraph 1.4 and replace with new paragraph as follows:

- 1.4.1 "The Contractor shall not assign the Contract, either in whole or in part, without the written consent of the Owner."

**PART 2 – ADMINISTRATION OF THE CONTRACT**

**GC 2.3 – REVIEW AND INSPECTION OF WORK**

- .1 Add the following paragraphs in their entirety:

- 2.3.8 Where standards of performance are specified and any part of the Work does not comply with the performance specified or implied the Contractor shall correct such deficiency as directed by the Consultant.

- 2.3.9 Any *Work* that proves faulty howsoever arising whether by negligence, breach of *Contract* or poor workmanship must be made right by the *Contractor* who remains solely responsible. The Contractor shall do any subsequent testing (including re-testing by Owner) to verify performance at the Contractor's own expense.

**GC 2.4 – DEFECTIVE WORK**

- .1 Delete Paragraph 2.4.1 and replace with the below:

- 2.4.1 The Contractor shall promptly correct defective work in a manner acceptable to the Owner and the Consultant, all defective Work, and deficiencies throughout the Work, whether or not they are specifically identified by the Consultant.

- .2 Add New Paragraph:

- 2.4.4 The Contractor shall prioritize the correction of any defective Work which, in the sole discretion of the Owner, adversely affects the day to day operations of the Owner."

**PART 3 – EXECUTION OF THE WORK****3.1 GC 3.1 – CONTROL OF WORK**

.1 Add the following paragraphs in their entirety:

3.1.3 Prior to commencing individual procurement, fabrication and construction activities, the *Contractor* shall verify, at the *Place of Work*, all 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 the *Contract Documents*. Where dimensions are not included or contradictions exist or exact locations are not apparent, the *Contractor* shall immediately notify the *Consultant* and/or *Owner* in writing and obtain written instruction from the *Consultant* before proceeding with any part of the affected *Work*.

3.1.4 If the *Contractor* becomes aware of any cause, event, occurrence, circumstance, matter, omission, error or anything else of any nature whatsoever that it reasonably believes will, or is likely to, significantly or materially delay or restrict the performance of the *Work*, or any part thereof, or necessitate any significant or material change to the anticipated date of *Substantial Performance of the Work*, the *Contractor* shall provide *Notice in Writing* to the *Owner* and the *Consultant* within four (4) Working Days after the *Contractor* first becomes aware of the same.

**3.2 GC 3.4 – CONSTRUCTION SCHEDULE**

.1 Delete in GC 3.4 its entirety and replace it with the following:

3.4.1 The Contractor shall:

- .1 prior to commencement of construction, prepare and submit to the Owner and the Consultant for their review and acceptance a construction schedule indicating the critical path for the Project, using "Microsoft Project" or equivalent, demonstrating that the Work will be performed in conformity with the Contract Time, and shall conform to the phasing and sequencing requirements for the Work as set out in the Contract Documents or as otherwise required by the Consultant or the Owner including, without limitation, a Products delivery schedule with respect to the Products whose delivery is critical to the schedule of the Work. The Contractor shall provide the schedule information required by this paragraph 3.4.1.1 in both electronic format and hard copy. Once approved by the Owner and the Consultant, the construction schedule submitted by the Contractor under this paragraph 3.4.1.1, as updated by the Contractor and approved by the Owner, shall become the "Construction Schedule";
- .2 monitor the progress of the Work on a weekly basis relative to the Construction Schedule and update the Construction Schedule on a monthly basis;
- .3 perform the Work in accordance with the Construction Schedule;
- .4 advise the Consultant of any revisions required to the Construction Schedule as a result of extension of the Contract Time in accordance with Part 6 – Changes in the Work; and



- .5 identify potential variances between scheduling and scheduled completion dates and implement necessary adjustments in the Construction Schedule in order to meet the Substantial Performance Date.

- 3.4.2 On request of the Consultant the Contractor shall provide information regarding the progress of the Work or any part of it, or copies, schedules and orders covering materials, components and services. The Contractor shall cooperate fully with the Consultant and shall ensure that all Subcontractors and Suppliers and anyone for whom the Subcontractors and Suppliers may be responsible also cooperate and make available on request the same documents.
- 3.4.3 Without limiting the other obligations of the Contractor under GC 3.4 – CONSTRUCTION SCHEDULE, the Contractor shall not amend the Construction Schedule (including, without limitation, any changes to the critical path) without the prior written approval of the Owner.
- 3.4.4 If, at any time, the Owner or the Consultant advise the Contractor that it appears that the actual progress of the Work is behind schedule or is likely to become behind schedule, or if the Contractor has given notice of such to the Owner or the Consultant, the Contractor shall take appropriate steps to cause the actual progress of the Work to conform to the schedule or minimize the resulting delay and shall produce and present to the Owner and the Consultant a recovery plan demonstrating how the Contractor will achieve the recovery of the schedule. If the Contractor intends to apply for a change in the Contract Price or claim compensation for delay in relation to a schedule recovery plan, then the Contractor shall proceed in accordance with GC 6.5 – DELAYS

### 3.3 GC 3.5 – SUPERVISION

- .1 Amend 3.5.1 by adding, after “competent representative”, “who shall be a competent person, as the term is defined in the OHSA” and delete and replace the last line with the following: “The Contractor shall not be entitled to change the Competent Person without the prior written authorization of the Owner, which shall not be unreasonably withheld.”
- .2 Add the following paragraph in its entirety:
  - 3.5.3 If the appointed supervisor must be replaced, the supervisor shall have equal or greater experience and expertise and shall be approved by the *Owner* and *Consultant*.

### 3.4 GC 3.6 – SUB-CONTRACTORS

- .1 Delete GC 3.6.2 and replace with the following paragraph:

The Contractor shall provide the Owner with the complete list of Subcontractors and Suppliers retained to carry out the Work. The list shall be provided at least one week prior to the pre-construction meeting or, in the absence of such a meeting, at least one week prior to the commencement of work, and shall include the scope of work being undertaken by each Subcontractor or Supplier. Should the Owner object to any of the Subcontractors or Suppliers, the Contractor shall make best efforts to locate alternate Subcontractors or Suppliers to carry out the Work. The Contractor may not amend the list of Subcontractors without giving prior written notice to the Owner.

### 3.5 GC 3.7 – LABOUR AND PRODUCTS

.1 Add the following paragraphs in their entirety:

3.7.4 *Product* specified by their proprietary names or by part and/or catalogue numbers shall form the basis for the *Specifications* and *Contract*. No substitutes for these *Products* may be used without the Consultant's approval with notice in writing. Substitutes will be considered only when submitted in sufficient time to permit proper review by the *Consultant*. In applying for permission to substitute, the *Contractor* shall prove that the substitution is equal to or better than the specified *Product* to the *Consultant's* satisfaction. Each application shall be accompanied by a list of properties of the specified *Products* and the proposed substitution and the benefit to the *Owner*. No application to use substitutes will be considered unless submitted as described.

3.7.5 The *Contractor* shall ensure all *Products* are delivered on-site in original containers and packages with label and seals intact. *Products* shall be stored to avoid dangerous conditions or contamination, protect from the elements and be visible for inspection by the *Consultant*.

### 3.6 GC 3.8 – SHOP DRAWINGS

.1 Add the following sentence to the end of paragraph 3.8.7:

Unless otherwise agreed to, the schedule for the *Consultant* to review and return *Shop Drawings* shall not be less than ten (10) working days.

## ADD NEW GENERAL CONDITIONS AS FOLLOWS:

### 3.7 GC 3.9 – USE OF WORK

.1 Add the following paragraphs in their entirety:

3.9.1 The *Owner* and/or *Consultant* may direct the *Contractor* to suspend *Work* that causes excessive disruption to the tenants pending development and implementation of acceptable solutions that allow the *Work* to proceed.

3.9.2 The residents/tenants shall occupy the premises during the entire *Contract Time*. It is the *Contractor's* responsibility to maintain all services to the entire building and site at all times unless specific agreement is made otherwise. The occupants of the building and site must be able to continue to use the premises in a safe and efficient manner.

### 3.8 GC 3.10 – CLEANUP

.1 Add the following paragraphs in their entirety:

3.10.1 The *Contractor* shall maintain the *Work* in a safe and tidy condition and free from the accumulation of waste products and debris.

3.10.2 If the *Contractor* fails after reasonable notification to clean up as provided in the *Contract Documents*, the *Owner* may arrange for other forces to complete the cleanup and the costs thereof shall be charged to the *Contractor*. The *Owner's* cost for such cleanup will include a fifteen percent (15%) mark-up for administration.

**3.9 GC 3.11 – DOCUMENTS AT THE SITE**

.1 Add the following paragraph in its entirety:

- 3.11.1 The Contractor shall keep one (1) copy of Contract Documents, submittals, reports and Shop Drawings approved by authorities having jurisdiction on-site for access by building officials or other parties.

**3.10 GC 3.12 – STANDARD OF CARE**

.1 Add the following paragraph in its entirety:

- 3.12.1 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 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 may be recommended by the Owner.

- 3.10.2 The Contractor further represents, covenants and warrants to the Owner that there are no pending, threatened or anticipated claims that would have a material effect on the financial ability of the Contractor to perform its Work under the Contract.

**3.11 GC 3.13 – USE OF SITE**

.1 Add the following paragraph in its entirety:

- 3.13.1 It is the responsibility of the Contractor, and not the Owner, to secure transportation to the Place of the Work and parking near the Place of the Work for its employees, Subcontractors or Suppliers.

**PART 4 – ALLOWANCES****4.1. GC 4.1 – CASH ALLOWANCES**

.1 Delete GC 4.1 in its entirety and replace it with the following:

**GC 4.1 Cash Allowances**

- 4.1.1 The Contract Price includes the cash allowances, if any, stated in the Contract Documents. The scope of work or costs included in such cash allowances shall be as described in the Contract Documents.
- 4.1.2 The Contract Price, and not the cash allowances, includes the Contractor's overhead and profit in connection with such cash allowances.
- 4.1.3 Expenditures under cash allowances shall be authorized by the Owner in writing.
- 4.1.4 Where the actual cost of the Work under any cash allowance exceeds the amount of the allowance, any unexpended amounts from other cash allowances shall be reallocated, at the Consultant's direction, to cover the shortfall, and, in that case,

there shall be no additional amount added to the Contract Price for overhead and profit. Only where the actual cost of the Work under all cash allowances exceeds the total amount of all cash allowances shall the Contractor be compensated for the excess incurred and substantiated, plus an amount for overhead and profit on the excess only, as set out in the Contract Documents. The maximum mark up on the authorized overrun on cash allowances shall be 5%."

- 4.1.5 The Contractor shall have no claim on any unused portion of any cash allowance item. The net amount of any unexpended cash allowances, after providing for any reallocations as contemplated in paragraph 4.1.4, shall be deducted from the Contract Price by Change Order without any adjustment for the Contractor's overhead and profit on such amount.
- 4.1.6 The value of the work performed under a cash allowance is eligible to be included in progress payments. The Contractor shall submit, with its application for payment, documentation showing the date of purchase, the vendor from which the purchase was made, the date of delivery of the Product or service, and the price, including delivery to the Site and all applicable taxes. Cash allowance payments will only be made with the written authorization of the Owner and shall not include any markups whatsoever.
- 4.1.7 The Contractor shall consult with the Owner and/or the Consultant in the selection of the Products, services and/or vendors required to carry out the work under the cash allowance, and shall obtain the Owner's approval for the selection of Products, services and/or vendor(s) in relation to the cash allowance.
- 4.1.8 The Contractor shall obtain competitive bids from a minimum of three vendors for portions of the Work to be paid for out of cash allowances unless otherwise directed by the Owner. The Contractor shall submit the bids received to the Owner and/or the Consultant for approval.
- 4.1.9 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 and items that are specified to be Owner purchased and Contractor installed or hooked up are required at the site to avoid delaying the progress of the Work.

## **PART 5 – PAYMENT**

### **5.1 GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER**

- .1 Delete GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER and all paragraphs thereunder in their entirety, as well as all references to GC 5.1 throughout the *Contract*.

### **5.2 GC 5.2 – APPLICATIONS FOR PROGRESS PAYMENT**

- .1 Delete GC 5.2 in its entirety and replace with the below:
  - 5.2.1 A "proper invoice" (as defined in the *Construction Act*) shall be delivered to the Owner and the Consultant by the 25<sup>th</sup> day of every month for the previous month's work. Subject the terms of the Contract Documents, including the holdback provisions of the Contract Documents and the *Construction Act*, and subject to any notice of non-payment delivered by the Owner under the *Construction Act*, the

Owner shall pay the amount approved and certified by the Consultant as payable under a proper invoice no later than 28 days after receiving the invoice from the Contractor.

- 5.2.2 The copy of the proper invoice delivered to the Owner shall be provided by email to: [finance@vpch.com] along with a hard copy to: 155 Queen St N, Hamilton.
- 5.2.3 No less than 7 days prior to the delivery of a proper invoice, the Contractor shall submit to the Owner and the Consultant a payment certificate (in a form prescribed by the Consultant) and all necessary supporting documentation, a WSIB clearance certificate and a Statutory Declaration of Progress Payment Distribution. For clarity, no proper invoice shall be submitted earlier than 7 days following submission of a duly completed payment certificate.
- 5.2.4 Notice of non-payment may be made by email to the Contractor. For greater clarity, this provision constitutes the consent of the Contractor to service of the notice of non-payment in this manner.
- 5.2.5 The Contractor shall, within 10 days of signing the Contract, and prior to the first claim for payment, submit to the Owner, if requested by Owner, a detailed breakdown of the lump sum tender price for the purpose of establishing monthly expenses. The Owner, acting reasonably, reserves the right to modify costs allocated to the various breakdown items to prevent unbalancing.
- 5.2.6 Payment for mobilizing and setting up plant, temporary buildings and services, premiums and other disbursements, shall be prorated based on the value of the Work performed during a billable period.
- 5.2.7 Payment for bonds and insurance will be paid 100 percent on the first progress payment, provided that respective invoices are submitted as proof of payment.
- 5.2.8 Prior to the first progress draw, the Contractor shall submit a monthly projected payment schedule based on the detailed construction schedule for the duration of the Contract.

### 5.3 GC 5.3 – PROGRESS PAYMENT

- .1 Add the following paragraph in its entirety:
  - 5.3.1.3 The *Owner* shall make payments to the *Contractor* as provided in article A-5 of the Agreement – PAYMENT on or before 28 calendar days after receipt of the *Consultant* certificate for payment.
- .2 Add the following paragraph in its entirety:
  - 5.3.2 If the *Contractor* fails to provide the statutory declaration as required under GC 5.2.3 or evidence of compliance with worker's compensation legislation as required by GC 10.4 – WORKER'S COMPENSATION, the *Owner* shall not be required to make any payment to the *Contractor* until such time as the *Contractor* remedies such failure.

### 5.4 GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 Delete paragraph 5.4.2 in its entirety.

- .2 Delete paragraph 5.4.3 in its entirety (including bulleted points) and substitute new paragraph 5.4.3:

5.4.3 Immediately prior to the issuance of the certificate of Substantial Performance of the Work, the Contractor, in consultation with the Consultant, shall establish a schedule for completion of the Work and correcting deficient Work, and the construction schedule shall be deemed to be amended to include the completion schedule.”

The holdback amount authorized by the certificate for payment of the holdback amount issued by the consultant, pursuant to GC 5.5.2, is due and payable on the 61<sup>st</sup> calendar day following the publication of the certificate of substantial performance of the work referred to in GC 5.4.4. The Owner may retain out of the holdback amount any sums required by law to satisfy any liens against the Work or, if permitted by the lien legislation applicable to the Place of the Work, other third party monetary claims against the Contractor which are enforceable against the Owner.

- .3 Delete 5.4.4 in its entirety and replace with:

Prior to submitting its written application for Substantial Performance of Work, the Contractor shall submit to the Consultant all:

- .1 guarantees;
- .2 warranties;
- .3 certificates;
- .4 testing and balancing reports;
- .5 distributing system diagrams;
- .6 spare parts;
- .7 maintenance/operation manuals;
- .8 training manuals;
- .9 samples;
- .10 reports and correspondence from authorities having jurisdiction in the Place of the Work;
- .11 Shop Drawings, and marked up Drawings;
- .12 completed as-built drawings in an electronic format acceptable to the Consultant;
- .13 inspection certificates

and any other materials or documentation required to be submitted under the Contract or otherwise reasonably requested by the Consultant, together with written proof of acceptance to the Owner and the Consultant that the Work has been substantially performed in conformance with the requirement of the municipal, government and utility authorities having jurisdiction in the Place of the Work

- .4 Delete 5.4.5 in its entirety and replace with:

Where the Contractor is unable to deliver the documents and materials described in paragraph 5.4.4, then, provided that none of the missing documents and materials interferes with the use and occupancy of the Project in a material way, and except as described herein, the failure to deliver shall not be grounds for the Consultant to refuse to certify the Substantial Performance of the Work. However, certification of the Substantial Performance of the Work may be withheld if the Contractor fails to deliver maintenance manuals or completed as-built drawings.

- .5 Add the following paragraph in its entirety:

5.4.6 The *Contractor* shall publish, in a construction trade newspaper in the area of the location of the *Work*, a copy of the certificate of *Substantial Performance of the Work* referred to in GC 5.4.2.2 within seven (7) days of receiving a copy of the certificate signed by the *Consultant*, and the *Contractor* shall provide suitable evidence of the publication to the *Consultant* and the *Owner*. If the *Contractor* fails to publish such notice, the *Owner* shall be at liberty to publish said certificate and back-charge the *Contractor* its reasonable costs for doing so, plus an administrative fee of fifteen percent (15%).

## 5.5 GC 5.5 – FINAL PAYMENT

- .1 Amend 5.5.1 to add to the end of the paragraph: “The Contractor’s application for final payment shall be accompanied by any documents or materials not yet delivered pursuant to paragraph 5.4.4, together with proof that all permits in respect of the Work have been closed. The Work shall be deemed not to be complete until all of the aforementioned materials have been delivered, and the Owner may withhold payment in respect of the delivery of any documents in an amount determined by the Consultant.”
- .2 Amend paragraph 5.5.4 by deleting the number “5” and replacing it with “61”.

## 5.6 GC 5.6 – DEFERRED WORK

- .1 Revise paragraph 5.6.1; delete ‘only’ and add the words ‘together with any amounts withheld pursuant to 5.8.2’ after ‘such remaining work’.
- .2 Add the following paragraph in its entirety:
- 5.6.2 In the event of deficiencies or delays in the work that the contractor fails or refuses to address upon receiving Notice in Writing of same in accordance with the requirements of the contract, then the owner may, without limiting the remedies available to it under this contract, retain and set off as against any payments that would otherwise be owing to the contractor, the reasonable costs of rectifying such deficiencies or delays as determined by the consultant.

## **PART 6 – CHANGES IN THE WORK**

### **6.1 GC 6.1– OWNER’S RIGHT TO MAKE CHANGES**

- .1 Revise paragraph 6.1.2; add the words to the end of paragraph 6.1.2:

This requirement is of the essence and it is the express intention of the parties that any claims by the contractor for a change in the contract price and/or Contract Time shall be barred unless there has been strict compliance with PART 6 – CHANGES IN THE WORK.

No course of conduct, including any express, or implied acceptance of alterations or additions to the Work shall qualify for a change in Contract Price or Contract Time unless there has

been strict compliance with PART 6 – CHANGES IN THE WORK, irrespective of whether there is a claim for unjust enrichment.

## **6.2 GC 6.2– CHANGE ORDER**

.1 Add the following paragraph in its entirety:

6.2.3 The Contractor shall observe the following procedure when submitting a claim for a change in the Contract Price and if applicable, a change in the Contract Time:

- .1 The claim must set out the increase in cost and time caused by the proposed changes referred to in the notice of contemplated change in sufficient detail for a proper assessment to be made including breakdowns of labour and materials for the Contractor and each sub-Contractor. The valuations must indicate that additional Sums for overhead and profit are included as set out herein.
- .2 The claim must indicate that the total increase in cost and time caused by the proposed changes referred to in the notice of contemplated change is the product of the quantity of work involved and of the applicable unit price as set out in the Schedule of Contract Unit Prices or such other unit price as may be agreed upon. Unit prices include all additional sums for overhead and profit. No additional markups are permitted for valuations submitted under this method.
- .3 The claim must set out the increase in cost and time caused by the proposed changes referred to in the notice of contemplated change and be accompanied by the signed time sheets, invoices and vouchers to enable to proper assessment to be made. The valuation must indicate that additional sums for overhead and profit are included as set out herein.

.2 Add the following paragraph in its entirety:

6.2.4 Where changes in the work are to be established by cost and a percentage fee or overhead and profit, the following percentages shall apply:

- .1 The Contractor shall be entitled to a markup for a combined overhead and profit of 10% on work he performs.
- .2 Subcontractors shall be entitled to a markup for combined overhead and profit of 10% on work he performs.
- .3 The Contractor shall be entitled to a markup for combined overhead and profit of 5% on work performed by subcontractors.

.3 Add the following paragraphs in their entirety:

6.2.5 The mark-ups provided for in paragraphs 6.2.3 and 6.2.4. shall constitute the only compensation the Contractor shall be entitled to for any and all overhead, profit, incidental and administrative costs whatsoever related to the change, including but not limited to: costs related to superintendence and supervision, shop drawing production, estimating, site office and home office expenses, workers tools, temporary facilities and controls, and coordination of any and all Work-related activities.

6.2.6 No claim whatsoever for a change in the Contract Time, delay, prolongation charges, remobilization or otherwise shall be permitted with respect to a change, unless authorized by the Consultant and approved by the Consultant and set out in the Change Order or Change Directive, as the case may be, by the *Owner*.



- 6.2.7 No compensation for any change in the Work shall be allowed unless such change is first ordered in writing by the Consultant and authorized by the Owner.

### **GC 6.3 CHANGE DIRECTIVES**

- .1 Delete paragraph 6.3.7.1 in its entirety and replace it with the following:
- .1 salaries, wages and benefits paid to personnel in the direct employ of the Contractor, applying the labour rates set out in the wages schedule in the Contract Documents or as otherwise agreed between the Owner and the Contractor for personnel,
- (1) carrying out the Work, including necessary supervisory services;
- (2) engaged in expediting the production or transportation of material or equipment, at shops or on the road;
- or (3) engaged in the preparation of Shop Drawings, fabrication drawings, coordination drawings and Contract as-built drawings.
- .2 Delete paragraph 6.3.7.17 in its entirety.
- .3 Add new paragraph 6.3.14 as follows:
- 6.3.14 For greater certainty, and without limitation, the cost of performing the Work attributable to the Change Directive does not include, and no payment shall be made for:
- .1 head office salaries and benefits and all other overhead or general expenses, except only for wages, benefits, compensation, contributions, assessments, or taxes described in paragraph 6.3.7.1;
- .2 capital expenses and interest on capital;
- .3 general clean-up, except where the performance of the Work in the Change Directive causes specific additional and extraordinary clean-up requirements;
- .4 wages paid for project managers, superintendents, assistants, watch persons and administrative personnel, provided the Change Directive does not result in extension of Contract Time;
- .5 wages, salaries, rentals, or other expenses that exceed the rates that are standard in the locality of the Place of the Work, that are otherwise deemed unreasonable by the Consultant;
- .6 any costs or expenses attributable to the negligence, improper Work, deficiencies, or breaches of Contract by the Contractor or Subcontractor; or
- .7 any increase to the cost of materials, services, or labor from what has been agreed upon in this Contract.

### **6.4 GC 6.5 – DELAYS**

- .1 Revise paragraph 6.5.1; delete 'reasonable costs incurred by the Contractor as a result of such delay' and add the words 'reasonable direct costs directly flowing from the delay, but excluding any consequential, indirect or special damages (including, without limitation, loss of profits, loss of opportunity, or loss of productivity)'.
- .2 Revise paragraph 6.5.2; delete 'reasonable costs incurred by the Contractor as a result of such delay' and add the words 'reasonable direct costs directly flowing from the delay, but

excluding any consequential, indirect or special damages (including, without limitation, loss of profits, loss of opportunity, or loss of productivity)'.

- .3 Revise paragraph 6.5.3; delete 'unless such delays results from actions by the Owner, Consultant, or anyone employed or engaged by them directly or indirectly'

- .4 Add the following paragraphs in their entirety:

6.5.6 If the Contractor is delayed in the performance of the Work by an act or omission of the Contractor or anyone directly or indirectly employed or engaged by the Contractor, or by any cause within the contractor's control, then the Contract Time may be extended for such reasonable time as the Owner may decide in consultation with the Consultant and the Contractor. The Owner shall be reimbursed by the Contractor for all reasonable costs incurred by the Owner as a result of such delay, including, but not limited to, the cost of all additional services required by the Owner from the Consultant or any subconsultants, project managers, or others employed or engaged by the Owner, and in particular, the costs of the Consultant's services during the period between the date of Substantial Performance of the Work stated in Article A-1 herein, as the same may be extended through the provision of these General Conditions, and any later or actual date of Substantial Performance of the Work achieved by the Contractor.

6.5.7 No claim for delay shall be made by the Contractor and the Contract Time shall not be extended due the following:

- .1 any labour disputes, strikes or lock-outs affecting the Work or the Project.
- .2 fire or unusual delay by common carriers,
- .3 abnormally adverse weather conditions, or
- .4 any other cause which could not be reasonably anticipated to occur during the course of a construction project, which the Owner deems to be beyond the Contractor's (including any Subcontractors) reasonable control (other than financial incapacity) other than one resulting from a default or breach of Contract by the Contractor. For the purpose of this provision, delays in the supply and/or delivery of materials, Products and/or equipment, or arising from the breakdown of equipment, do not constitute causes which are beyond the Contractor's control.

then the Contract Time shall be extended for such reasonable time as the Consultant may recommend in consultation with the Contractor. The extension of time shall not be less than the time lost as the result of the event causing the delay, unless the Contractor agrees to a shorter extension. The Contractor shall not be entitled to payment for costs incurred by such delays, unless such delays result from the actions of the Owner, Consultant or anyone employed or engaged by them directly or indirectly. Notwithstanding the foregoing, the Contractor shall use its best efforts to minimize the impact of such event upon the performance of the Work and Contract Time.

6.5.8 Without limiting the obligations of the Contractor described in GC 3.2 – CONSTRUCTION BY OWNER OR OTHER CONTRACTORS and GC 9.4 – CONSTRUCTION SAFETY, the Owner may, by Notice in Writing, direct the Contractor to stop the Work where the Owner determines that there is an imminent risk to the safety of the persons or property at the Place of the Work. In the event that the Contractor receives such notice, it shall immediately stop the Work and

secure the Project site. The Contractor shall not be entitled to an extension of the Contract Time or to an increase in the Contract Price unless the resulting delay, if any, would entitle the Contractor to an extension of the Contract Time or reimbursement of the Contractor's costs as provided in paragraphs 6.5.1, 6.5.2 or 6.5.3.

- 6.5.9 In addition to the amount set out in paragraph 6.5.6, the Contractor recognizes and agrees that the Owner will suffer a financial loss if the Work is not completed within the time prescribed by the Contract. The Contractor also recognizes the delays, expenses and difficulties involved in proving the actual loss suffered by the Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, the Contractor agrees that as liquidated damages for delay (but not as penalty) the Contractor shall pay the Owner 0.1% for each and every day's delay, and up to no more than 10% of project value, from the specified time for Ready-for-Takeover until the actual date of Ready-for-Takeover, and it is further expressly acknowledge and agreed by the Contractor that: (a) this amount is a reasonable estimate of the actual damages that will be incurred by the Owner due to any failure to attain Ready-for-Takeover within the time required by this Contract; (b) the Owner may deduct the amount due under this section from any monies that may be due or payable to the Contractor, whether under the Contract or any other agreement; and, (c) the liquidated damages provided for in this section shall be without prejudice to any other remedy to which the Owner is entitled at law or in equity.
- 6.5.10 In the event that paragraph 6.5.9 is held by a court of competent jurisdiction to be invalid, unenforceable or void, the Contractor shall be held responsible for the payment of the Owner's actual costs associated with the delay in achieving Ready-for-Takeover. The Owner's costs will include, but are not limited to, the amounts relating to the items set out in paragraph 6.5.6 and all other costs directly or indirectly associated with the delay in the completion of the Work by the Contractor. The amounts payable pursuant to paragraph 6.5.10 are in addition to the amounts payable by the Contractor to the Owner pursuant to paragraph 6.5.6."
- 6.5.11 No compensation for delay shall be paid to the Contractor, and no extension shall be made for delay unless Notice in Writing of the cause of delay is given to the Consultant and Owner not later than 10 Working Days after the commencement of the delay. In the case of a continuing cause of delay only one Notice in Writing shall be necessary. Without limiting the generality of the foregoing, the following shall also apply to the event of delay dealt with by paragraphs noted above.
- .1 the notice provided by the Contractor shall include, without limitation, sufficient and adequate information and documentation to allow the Consultant and Owner to properly consider the claim of the Contractor.
  - .2 the Contractor shall take all reasonable steps to minimize the impact of the delay event upon the performance of the Work, the Contract Time and the Contract Price, resume performance of all its obligations under the Contract affected by the delay as soon as practicable and use all reasonable endeavors to remedy any failure to perform.

Failure to adhere strictly to these notice provisions shall constitute a waiver and release of any obligation of the Owner to extend the Contract Time as a result of such delay and of any claim by the Contractor for costs as a result of such delay.

**6.5 GC 6.6 CLAIMS FOR CHANGE IN CONTRACT PRICE**

- .1 Delete “timely” and add to the end of the sentence: “within 7 Working Days of the commencement of the Work giving rise to the claim.”

**PART 7 – DEFAULT NOTICE****7.1 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 Revise paragraph 7.1.2; add the words ‘including failure of the Contractor to pay its Subcontractors, Suppliers, or employees on a timely basis’ after ‘substantial degree’.
- .2 Add the following paragraph in its entirety:
- 7.1.7 The Owner may terminate this contract at any time for any or no reason. In such event, the Owner shall pay for the Work performed up to the effective date of termination, including demobilization costs, and for such additional costs, if any, directly flowing from and which are a reasonable consequence of the termination, but excluding any consequential, indirect or special damages, and any claims for loss of profit or opportunity. The Owner shall not be liable to the Contractor for any other claims, costs or damages from the Contractor arising from such termination of the Contract.

**7.2 GC 7.2 – CONTRACTOR’S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT**

- .1 Delete paragraph 7.2.3.1 in its entirety.
- .2 Revise paragraph 7.2.4; delete the period at the end of paragraph and replace it with ‘10 working days’.
- .3 Revise paragraph 7.2.5; delete the period at the end of paragraph and replace it with ‘but excluding any consequential, indirect or special damages and any claims for loss of opportunity.’

**PART 9 – PROTECTION OF PERSONS AND PROPERTY****9.1 GC 9.1 – PROTECTION OF WORK AND PROPERTY**

- .1 Delete paragraph 9.1.1.1 and replace with:
- 9.1.1.1: errors in the Contract Documents which the Contractor could not have discovered applying the standard of care described in GC 3.14 – STANDARD OF CARE.”
- .2 Amend 9.1.1.2 to include “negligent” prior to “acts and omissions”.
- .3 Add the following paragraphs in their entirety:
- 9.1.5 No comments, suggestions or instructions from the *Consultant* and/or *Owner* are to be relied upon or assumed to reduce or replace the *Contractor’s* responsibility for the construction safety.
- 9.1.6 The *Contractor* shall indemnify and hold harmless the *Consultant* and *Owner*, their agents and employees from and against claims, demands, losses, costs, damages,

action suits or proceedings by third parties that arise out of, or are attributed, to the *Contractor's* safety performance.

- 9.1.7 The Contractor shall neither undertake to repair and/or replace any damage whatsoever to the Work of other Contractors, or to adjoining property, nor acknowledge the same was caused or occasioned by the Contractor, without first consulting the Owner and receiving written instructions as to the course of action to be followed from either the Owner or the Consultant. However, where there is danger to life or public safety, the Contractor shall take such emergency action as it deems necessary to remove the danger.

## **9.2 GC 9.4 – CONSTRUCTION SAFETY**

- .1 Delete 9.4.1 in its entirety and replace with:

9.4.1 The Contractor shall be solely responsible for construction safety at the Place of the Work and for compliance with the rules, regulations and practices required by the applicable construction health and safety legislation and shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Work.

- .2 Add the following paragraphs in their entirety:

9.4.6 Prior to the commencement of the Work, the Contractor shall submit to the Owner:

- .1 a current WSIB clearance certificate;
- .2 documentation of the Contractor's in-house safety-related programs; and,
- .3 a copy of the Notice of Project filed with the Ministry of Labour naming itself as "constructor" under the OHSA.

9.4.7 The Contractor shall indemnify and save harmless the Owner, its agents, officers, directors, employees, consultants, successors and assigns from and against the consequences of any and all safety infractions committed by the Contractor or Subcontractors under the OHSA, including the payment of legal fees and disbursements on a full indemnity basis.

## **PART 10- GOVERNING REGULATIONS**

### **10.1 GC 10.1 – TAXES AND DUTIES**

- .1 Delete 10.1.2 and replace as follows:

10.1.2 Any increase or decrease in costs to the Contractor due to changes in such included taxes and duties at the time of the bid closing shall increase or decrease the Contract Price accordingly. For greater certainty, the Contractor shall not be entitled to any mark-up for overhead or profit on any increase in such taxes and duties.

- .2 Add the following paragraphs in their entirety:

10.1.3 Any refund of taxes, including, without limitation, any government sales tax, customs duty, excise tax or Value Added Tax, whether or not paid, which if found to be inapplicable or for which exemption may be obtained, is the sole and exclusive property of the Owner. The Contractor agrees to cooperate with the Owner and to obtain from all Subcontractors and Suppliers cooperation with the

Owner in the application for any refund of any taxes, which cooperation shall include but not be limited to, making or concurring in the making of an application for any such refund or exemption and providing to the Owner copies, or where required, originals of records, invoices, purchase orders and other documentation necessary to support such applications for exemptions or refunds. All such refunds shall either be paid to the Owner, or shall be a credit to the Owner against the Contract Price, in the Owner's discretion. The Contractor agrees to enable, assist with and submit to any reasonable audit requested by the Owner with respect to the potential refunds under this paragraph.

- 10.1.4 Custom duties, penalties, or any other penalty, fine or assessment levied against the Contractor, shall not be treated as a tax or customs duty for the purpose of this GC 10.1.

## **10.2 GC10.2 – LAWS, NOTICES, PERMITS, FEES**

Add the following paragraph in its entirety:

- 10.2.6 If the Contractor fails to notify the Owner and the Consultant in writing, fails to obtain direction required in paragraph 10.2.5, or performs work that contravenes any laws, ordinances, guidelines, standards, permits, statutes, by-laws, rules, regulations, or codes, the Contractor shall be responsible for and shall correct the violations thereof, and shall bear the costs, expenses, and damages attributable to the failure to comply with the provisions of such laws, ordinances, guidelines, standards, permits, statutes, by-laws, rules, regulations, or codes and, notwithstanding any limitation described in Part 13, shall indemnify and hold harmless the Owner and the Consultant from and against any claims, demands, losses, costs, damages, actions, suits or proceeding resulting from failure or breach of law.

## **PART 12 – OWNER TAKEOVER**

### **12.1 GC 12.2 – EARLY OCCUPANCY BY THE OWNER**

- .1 Delete all of 12.2.2 in its entirety and substitute "intentionally left blank."
- .2 Delete all of 12.2.3 in its entirety and substitute "intentionally left blank."
- .3 Delete all of 12.2.4 in its entirety and substitute "intentionally left blank."

### **12.2 GC 12.3 – WARRANTY**

- .1 Revise paragraph 12.3.1; delete 'one year' and replace with 'two years'.
- .2 Revise paragraph 12.3.3; delete 'one year' and replace with 'two years'.
- .3 Revise paragraph 12.3.4; delete 'one year' and replace with 'two years'.
- .4 Revise paragraph 12.3.6; delete 'one year' and replace with 'two years'.
- .5 Add the following paragraphs in their entirety:
  - 12.3.7 Nothing in these warranty provisions shall be deemed to alter, in any matter whatsoever, the warranty rights to which the *Owner* would otherwise be entitled by statute, elsewhere in the *Contract Documents*, or otherwise. Further, nothing in

these warranty provisions shall deprive the Owner of any action, right or remedy otherwise available to the Owner for the Contractor's failure to fulfill its obligations or responsibilities under the Contract and shall not be construed as a waiver of claims in favour of the Contractor or as limitation on the time in which the Owner may pursue such other action, right to remedy. The warranties set out in the Contract are supplemental to and do not limit or preclude the application of any other conditions and warranties, express or implied, by law or trade usage.

- 12.3.8 Any Product, or equipment requiring excessive servicing during the warranty period (or free maintenance period, if applicable) shall be considered defective and the warranty (or free maintenance period) shall be deemed to take effect from the time that the defect has been corrected so as to cause excessive servicing to terminate.
- 12.3.9 Following Substantial Performance of the Work, and without limiting the Contractor's warranty under GC 12.3, the Contractor shall assign to the Owner, to the extent assignable, the benefit of all warranties and guarantees relating to the Work. The assignment shall expressly reserve the rights of the Contractor to make any claims under such warranty and guarantees and such assignment shall in no way prejudice any rights of or benefits accruing to the Contractor pursuant to such warranties and guarantees.

### **PART 13: INDEMNIFICATION AND WAIVER**

#### **13.1 GC 13.1 – INDEMNIFICATION**

- .1 Delete paragraph 13.1.2 in its entirety, including all subparagraphs thereunder.
- .2 Delete paragraph 13.1.5 in its entirety, including all subparagraphs thereunder.

#### **13.2 GC 13.2 – WAIVER OF CLAIMS**

- .1 Delete paragraph 13.2.2.3 in its entirety.
- .2 Delete paragraph 13.2.4 in its entirety.
- .3 Delete paragraph 13.2.5 in its entirety, together with all references to the Deleted Waiver Provisions. For clarity, all provisions of the Contract that reference the Deleted Waiver Provisions otherwise remain in full force and effect.

ADD new section as follows:

### **PART 14 – OTHER PROVISIONS**

#### **14.1 GC 14.1 – OWNERSHIP OF MATERIALS**

- .1 The Contractor shall remove all surplus or rejected materials from the Work site as its property when notified in writing to do so by the Consultant.

#### **14.2 GC 14.2 – CONSTRUCTION LIENS**

- .1 In the event that a construction lien is registered or is delivered to the Owner in respect of the Project, or written notice of lien is delivered to the Owner, the Contractor, at its own expense and within ten (10) days, shall ensure that such lien or notice of lien is vacated, discharged or withdrawn.

- .2 In the event that the Contractor fails to comply with the requirements of 14.2.1, the Owner may set off and deduct from any amount owing to the Contractor, all costs and associated expenses, including legal fees and disbursements incurred to vacate or discharge the lien, including costs of obtaining and posting a lien bond or other security. The Contractor shall reimburse the Owner for all of the said cost and associated expenses.
- .3 Notwithstanding any other provision of the Contract, the Owner shall not be obligated to pay any amount otherwise owing to the Contractor until any liens are vacated or discharged.

#### **14.3 GC 14.3 – CONTRACTOR DISCHARGE OF LIABILITIES**

- .1 In addition to the obligation assumed by the Contractor pursuant to GC 3.6 and 3.7, the Contractor agrees to discharge all liabilities incurred by it for labour, materials, services, Subcontractors and Products used or reasonably required for use in the performance of the Work, except for amounts withheld by reason of legitimate dispute and which have been identified to the party or parties, from whom payment has been withheld.

#### **14.4 GC 14.4 – SET OFF**

- .1 In addition to and without limiting any other rights the Owner may have under the Contract and at law, the Owner may retain from monies owing to the Contractor under the Contract an amount sufficient to cover any outstanding or disputed liabilities including the cost to remedy deficiencies, the reduction in value of substantial portion of the Work, claims for damages by third parties, and any assessment due to the WSIB.



## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Language of the Contract
- .4 1.4 The Contract Documents
- .5 1.5 Laws, Notices, References, Standards and Regulations
- .6 1.6 Permits, Deposits and Responsibilities
- .7 1.7 Project Coordination and Responsibility
- .8 1.8 Examination of the Place of the Work, Documents, Surfaces and Conditions
- .9 1.9 Quantity of Items
- .10 1.10 Standards and Codes
- .11 1.11 Schedule of Values
- .12 1.12 Discrepancies and Clarifications
- .13 1.13 Setting out the Work and Field Engineering
- .14 1.14 Protection and Damages of Property and Work
- .15 1.15 Fires and Smoking
- .16 1.16 Documents at the Place of the Work
- .17 1.17 Concealed Services
- .18 1.18 Trademark and Labels
- .19 1.19 Waste Audits/Plans for Waste Reduction
- .20 1.20 Interferences
- .21 1.21 Not In Contract Items and Items Supplied by Owner
- .22 1.22 Electronic Files

### **1.3 LANGUAGE OF THE CONTRACT**

- .1 The use of the words "include" or "including", or variations thereof, within the *Contract Documents* is not limiting.

### **1.4 THE CONTRACT DOCUMENTS**

- .1 The *Contract Documents* have been arranged into various divisions, sections, drawings, and schedules for the purpose of presenting the *Work* in a logical and organized form and to enable ease of reference and interpretation, and are not intended to be an arrangement of precise and independent *Subcontractors*, or jurisdiction of responsibility for the various parts of the *Work*. The *Contractor* shall be solely responsible for coordinating the execution of the *Work* of this *Contract* in accordance with the requirements of the *Contract Documents*.

- .2 As a result, the *Consultant* shall not be required to decide on questions arising with regard to agreements or contracts between the *Contractor* and *Subcontractors* or *Suppliers*, nor to the extent of the parts of the *Work* assigned thereto.
- .3 Further, no extra will be allowed as a result of the failure to coordinate and allocate the *Work* such that the *Work* is Provided in accordance with the *Contract Documents*.
- .4 The *Contract Documents* may specify, indicate, or schedule requirements that exceed the requirements of the Ontario Building Code, other applicable codes, requirements of *Authorities Having Jurisdiction*, and standards cited in the *Contract Documents*. In such cases, the requirements specified, indicated, or scheduled in the *Contract Documents* shall govern.
- .5 This section coordinates, relates, and governs the *Work* of other sections of the specifications.

## 1.5 LAWS, NOTICES, REFERENCES, STANDARDS AND REGULATIONS

- .1 The Ontario Building Code - Ontario Regulation 332/12, including amendments, shall govern the *Work*.
- .2 Comply with codes, by-laws, and regulations of *Authorities Having Jurisdiction* over the *Place of the Work*. Codes and regulations form an integral part of the *Contract Documents*.
- .3 It shall be the responsibility of the *Contractor* to give the required notices and comply with the laws, bylaws, ordinances, rules, regulations, codes, and orders of all *Authorities Having Jurisdiction*, which are or become in force during the performance of the *Work*, and which relate to:
  - .1 The *Work*.
  - .2 The preservation of the public health;
  - .3 Environmental protection; and/or,
  - .4 Construction safety.
- .4 *Contractor* shall arrange for inspection, testing and acceptance of the *Work* required by the *Authorities Having Jurisdiction*. Be responsible for necessary preparations, provisions and pay costs.
- .5 It is the responsibility of the *Contractor* to schedule notifications and inspections required by *Authorities Having Jurisdiction* such that notifications can be properly received and that inspections can be properly undertaken without causing a delay in the *Work*. The *Contractor*, at no additional cost to the *Owner*, shall be solely responsible for any delay in the *Work* caused by failure to properly schedule required notifications and inspections.
- .6 The *Contractor* shall *Provide* to the chief building official or the registered code agency, where a registered code agency is appointed under the Ontario Building Code Act in respect of the construction to which the notice relates, the required notices set out in Division C - Part 1 Sentence 1.3.5.1(2) and Sentence 1.3.5.2 of the Ontario Building Code, O. Reg. 332/12 as amended. The *Contractor* shall be present at each site inspection by an inspector or registered code agency as applicable under Division C - Part 1 Sentence 1.3.5.2 of the Ontario Building Code.
  - .1 It is the responsibility of the *Contractor* to schedule notifications to the chief building official or the registered code agency such that the inspection pertaining to the notifications can be made within the time frame as required under Division C – Part 1 Sentence 1.3.5.3 of the

Ontario Building Code, O. Reg. 332/12 as amended, without causing a delay in the *Work*.  
The *Contractor*, at no additional cost to the *Owner*, shall be solely responsible for any delay in the *Work* caused by failure to properly schedule required notifications and inspections.

- .7 Without limiting the foregoing, wherever bylaws, codes, or standards are quoted in the *Contract Documents*, they shall be taken to mean the latest edition, including all revisions, amendments, or supplements, at the time of the *Contract*, unless an earlier edition is specifically quoted. If more than one bylaw, code, or standard is quoted for a given *Product*, material or method, the latest edition of the most stringent shall govern.
- .8 Wherever reference is made to “manufacturer’s instructions” or “manufacturer’s recommendations”, it shall mean printed instructions or recommendations, received directly from the referenced manufacturer. It shall also be taken to mean the latest edition of such instructions or recommendations.
- .9 The *Contractor* shall be responsible for any delay in the progress of the *Work* due to a violation of any legislated requirements, and shall take the necessary steps to avoid delay in the final completion of the work, and such steps will not be considered or approved as changes in the *Work*.

#### 1.6 PERMITS, DEPOSITS AND RESPONSIBILITIES

- .1 *Owner* shall apply and pay for the Building Permit.
- .2 All permits, licenses, certificates, and the like, other than the Building Permit, where required for the *Work*, shall be applied for, paid for, and obtained by the *Contractor*.
- .3 *Contractor* shall obtain all permits required to execute *Work* on municipal rights of way. Obtain damage deposits for sidewalks, roads and services.
- .4 The *Contractor* shall pay for any deposit for clean-up of mud-tracking onto roadways, and for the repair of any damage to roadways adjacent to the *Place of the Work* as may be required by the *Authorities Having Jurisdiction*.

#### 1.7 PROJECT COORDINATION AND RESPONSIBILITY

- .1 The *Contractor* shall coordinate the progress of the *Work*, mobilization areas of the *Place of the Work*, progress schedules, submittals, access to and use of the *Place of the Work* and facilities subject to any restrictions and conditions in accordance with the *Contract Documents*, reports and records, and any other processes, events, work, approvals, inspections and testing as may be required for the complete, proper and seamless execution of the *Work*.
- .2 The *Contractor* shall be solely responsible for ensuring that the complete *Contract Documents* are distributed to, or otherwise made available for review by, all *Subcontractors* and suppliers as required for the complete and proper and informed coordination and execution of the *Work*. Failure in this regard will be the sole responsibility of the *Contractor* and will not be accepted as a justification for a change in the *Work* and no change in the *Work* will be approved therefore.
- .3 The *Contractor* is required to employ a competent supervisor and necessary assistants who shall be in attendance at the *Place of the Work* at all times throughout the progress of the *Work* when work is being performed. The *Contractor*, through the supervisor, shall maintain good order and discipline among the *Contractor's* employees engaged on the *Work*, and among any *Subcontractors* engaged on the *Work*.

- .4 The responsibility as to which *Subcontractor* provides the required materials or articles, and/or builds-in articles, rests solely with the *Contractor* unless otherwise explicitly stated in the *Contract Documents* or directed by the *Consultant*.
- .5 The *Contractor* shall ensure that *Subcontractors* shall give the *Contractor*, in writing, instructions and information regarding their requirements as related to other parts of the *Work*.
- .6 There shall be cooperation at all times between *Subcontractors* as required for the proper execution of the *Work*. The *Contractor* shall ensure that *Subcontractors* supply others with the necessary accessories for building-in where required.
- .7 There shall be cooperation at all times with any representatives of any Inspection and Testing Companies (as may be retained by the *Owner*) during the performance of their duties.
- .8 The *Contractor* shall ensure that each *Subcontractor* shall report to the *Consultant* and the *Contractor*, in writing, any defects of surface or work, prepared by other *Subcontractors*, that adversely affects the work of their trade. Commencement of work shall imply acceptance of the prepared work otherwise.
- .9 The *Contractor* shall ensure that each *Subcontractor*, upon completion of their work, removes any equipment, surplus materials, and debris resulting from their work. Each *Subcontractor* shall also, and at its own expense, make good any damage to the work of another *Subcontractor* as a result of its own work. The definition of what constitutes "damage" shall be at the sole discretion of the *Consultant*.

#### **1.8 EXAMINATION OF THE PLACE OF THE WORK, DOCUMENTS, SURFACES AND CONDITIONS**

- .1 Examine the *Place of the Work* and investigate matters relating to the nature of the *Work*, means of access and egress, obstacles, rights and interests of other parties which may be interfered with during the execution of the *Work*, conditions and limitations including obstructions, existing structures or facilities, local conditions, actual levels, character and nature of the *Work*, documents related to existing building or buildings, as applicable and when available, and other consideration which may affect performance of the *Work*.
- .2 Examine the extent of *Work* to be performed and matters which are referred to in the *Contract Documents* prior to start of the *Work*.
- .3 Examine *Work* to which *Work* is to be applied, anchored or connected, and relevant as- built conditions.
- .4 Each *Work* operation following on a previous *Work* operation of a differing *Subcontractor*, as in the case of finishing and surfacing *Work*, shall include a thorough examination of the condition of the previous *Work*. Conditions found unacceptable, either for the commencement of the new *Work* or its satisfactory completion, shall be reported in writing to the *Consultant*.
- .5 Do not commence *Work* until unsatisfactory conditions are corrected. Commencement of *Work* implies acceptance of surfaces, tolerances, and conditions and existing conditions will not be accepted as a contributing factor to subsequent failure or acceptability of the *Work*.

#### **1.9 QUANTITY OF ITEMS**

- .1 Where a component, device, item or part of materials or equipment is referred to in the singular number, such reference shall require the provision of as many components, devices, items or parts of material or equipment necessary to complete the *Work*.

## **1.10 STANDARDS AND CODES**

- .1 *Contract* forms, codes, specifications, standards, manuals and installation, application and maintenance instructions referred to in these specifications, unless otherwise specified, amended or date suffixed, shall be latest published editions at *Contract* date.

## **1.11 SCHEDULE OF VALUES**

- .1 The schedule of values specified under GC 5.2 shall include line items identifying full costs for the following:
  - .1 Preparation and submission of closeout submittals in accordance with the requirements of Section 01 77 00.

## **1.12 DISCREPANCIES AND CLARIFICATIONS**

- .1 Advise *Consultant* of discrepancies discovered in requirements of the *Contract Documents* and request clarification in written form.
- .2 Advise *Consultant* when clarifications are required pertaining to meaning or intent of requirements of *Contract Documents* and request clarification from *Consultant* in written form.
- .3 Do not proceed with related *Work* until written clarification is provided by *Consultant*.
- .4 Failure to notify *Consultant* shall result in *Contractor* incurring responsibility for resulting deficiencies and expense at no additional cost to the *Owner*.
- .5 Written instructions issued by *Consultant* for the purpose of clarification, implicitly supersede applicable and relevant aspects of the *Contract Documents* irrespective of whether or not these documents are explicitly or specifically cited in clarification requests or clarification instructions.

## **1.13 SETTING OUT THE WORK AND FIELD ENGINEERING**

- .1 The *Contractor* shall assume full responsibility for and execute complete layout of the *Work* to required locations, lines and elevations.
- .2 Verify all grades, lines, levels, and dimensions as indicated or otherwise provided, and report errors or inconsistencies to the *Consultant* before commencing work, or as soon as discovered.
- .3 Upon completion of foundation work, *Provide* an accurate survey showing the location of the foundations on the *Site*, the foundation wall dimensions, and the gross floor area of the Foundation Plan. The survey shall be prepared by a surveyor who is a Registered Ontario Land Surveyor acceptable to the *Owner* and the *Consultant*. The cost of the survey shall be part of the *Contract Price*.
- .4 Surveys and Survey Requirements:
  - .1 Surveyor shall be an Ontario Land Surveyor, acceptable to the *Owner* and the *Consultant*.
  - .2 Locate, confirm, and protect control points prior to starting *Work*. Preserve permanent reference points throughout the *Work*.
  - .3 Establish two permanent benchmarks on *Site*, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in the Project Record Documents described under Section 01 77 00 Project Closeout.
  - .4 Establish lines and levels, locate and lay out by instrumentation.

- .5 The *Contractor* shall *Provide* all *Subcontractors* with, and be responsible for, all levels and dimensions they require. The *Contractor* to notify all *Subcontractors* that such levels and dimensions must be obtained from the *Contractor* only.
- .6 The *Contractor* shall maintain a complete and accurate log of control and survey work as it progresses.
- .7 Upon completion of foundations and major site improvements, have prepared a certified survey showing dimensions, locations, angles, and elevations of the work completed.
- .8 As the work progresses, the *Contractor* shall be responsible for laying-out the exact locations of walls as a guide to the *Subcontractors*.
- .9 The *Contractor* to ensure that all pipes, service lines and ducts are concealed. Any exceptions to this should be noted on the drawings. Advise the *Consultant* in advance of the installation or fabrication of items where conditions are such that the installation or fabrication will be exposed.

#### **1.14 PROTECTION AND DAMAGES OF PROPERTY AND WORK**

- .1 The *Contractor* shall ensure provision of adequate protection of materials, property, and work from damage and staining and to ensure protection of adjacent materials and work of *Subcontractors* to prevent damage. Any party responsible for damage to the work of another, shall make good such damage to the satisfaction of the *Consultant* at no additional cost to the *Owner*. The cost for such making good will not be considered or approved as a change in the *Work*.
- .2 Maintain access and surrounding areas to the *Place of the Work* free from soiling and debris resulting from the *Work*. Make good any soiling and remove any and all debris caused as a result of the *Work* to the satisfaction of the *Owner* and the *Consultant*.
- .3 All damage to existing sidewalks, fences, structures, curbs, services, roadways, parking and asphalt areas, grounds, sodding, trees, or other items on, or adjacent to, the *Place of the Work*, including mud tracks, deemed by the *Consultant* as being damaged due to the performance of the *Work*, shall be made good by the *Contractor* to the satisfaction of the *Consultant* at no additional cost to the *Owner*. The cost for such making good will not be considered or approved as a change in the *Work*.
- .4 Abide by municipal requirements for maintaining sidewalks and roads in proper condition throughout the course of the *Work*. *Provide* a flag-person as required for the safe ingress and egress of vehicles to and from the *Place of the Work*.
- .5 Floors and roofs shall not be over-loaded by accumulated materials. Place proper supports and braces as required to safely disseminate any temporary loading.

#### **1.15 FIRES AND SMOKING**

- .1 Fires are not permitted at the *Place of the Work*.
- .2 Explosives shall not be used in the execution of the *Work* and are not permitted at the *Place of the Work*.
- .3 Precautions shall be taken to avoid fire by spontaneous combustion. Remove combustible and non-combustible waste at regular intervals and/or when directed by the *Consultant* or the *Owner*.

#### **1.16 DOCUMENTS AT THE PLACE OF THE WORK**

- .1 Maintain at the *Place of the Work*, one copy of each of following:

- .1 *Contract Documents* including drawings, specifications, addenda, and other modifications to the *Contract*.
- .1 The Issued for Tender (IFC) version of the *Contract Documents* shall be the version retained at the *Place of the Work*. The IFC version shall be prepared by the *Consultant* and provided to the *Contractor*.
- .2 Drawings & Specifications "Issued for Construction" are complementary to the *Contract Documents*. To the best of our knowledge they are an accurate representation of documented revisions. In the case of any discrepancy, omission or conflict between the "Issued for Construction" documents and the *Contract Documents*, the *Contractor* is to promptly bring it to the attention of the architect."
- .3 In cases of dispute, the original signed version, of the *Contract Documents*, including addenda issued, shall govern over the IFC version.
- .2 'Reviewed' or 'Reviewed as Modified' shop drawings.
- .3 Construction and submittal schedules.
- .4 *Supplemental Instructions, Notices of Change, Change Orders, and Change Directives*.
- .5 Inspection and Testing Reports.
- .6 *Consultant's* field review reports and deficiency reports.
- .7 Reports by *Authorities Having Jurisdiction*.
- .8 Building and other applicable permits, and related permit documents.
- .9 Substantial Performance Procedure issued by *Consultant* to *Contractor*
- .10 Daily log including:
  - .1 Number of *Workers* actively *Working* at the *Place of the Work* by each subcontract.
  - .2 *Subcontractors Working* at the *Place of the Work*.
  - .3 Parts of the *Work* being *Worked* on.
  - .4 *Working* hours *Worked* at the *Place of the Work*.
  - .5 Activities with intermittent progress.
  - .6 Time lost and explanation for such time lost.
  - .7 Difficulties (*Work* scheduled to start but did not with the reason why, delays, labour inefficiencies, labour shortage).
  - .8 Products and materials delivered.
  - .9 Equipment mobilized and/or demobilized.
  - .10 Demolition conditions.
  - .11 Start and finish date of each part of the *Work*.
  - .12 *Site* specific information as required by *Owner*.

- .11 As-built drawings recording as-built conditions, instructions, changes for structure, equipment, wiring, plumbing, and the like, as called for in Section 01 77 00 and Divisions 21, 22, and 23 and Divisions 26, 27, and 28, prior to being concealed.

- .2 Make above material available to *Consultant* upon request.

#### **1.17 CONCEALED SERVICES**

- .1 Conceal wiring, conduit, pipes and ductwork in finished areas, unless otherwise indicated.

#### **1.18 TRADEMARK AND LABELS**

- .1 Trademarks and labels, including applied labels, shall not be visible in finished work in finished areas, unless otherwise accepted or indicated by *Consultant*.
- .2 The exceptions to this requirement are trademarks and labels which are essential to identify materials, systems, assemblies, and equipment for maintenance and replacement purposes, and for life safety, fire resistance and temperature rise ratings.

#### **1.19 WASTE AUDITS/PLANS FOR WASTE REDUCTION**

- .1 Comply with requirements of Authorities Having Jurisdiction.
- .2 Deliver to nearest appropriate depot materials accepted for recycling by *Region* or Municipality having jurisdiction over the *Place of the Work*, including but not limited to cardboard, paper, plastic, aluminum, steel, and glass. Deliver to nearest appropriate depot scrap and excess gypsum wallboard for recycling of this material. Costs for this *Work* are included in the *Contract Price*.

#### **1.20 INTERFERENCES**

- .1 Coordinate placement of equipment to ensure that components will be properly accommodated within spaces provided prior to commencement of the *Work*.
- .2 Take complete responsibility for remedial *Work* that results from failure to coordinate aspects of *Work* prior to its fabrication/installation.
- .3 Ensure that accesses and clearance required by Authorities Having Jurisdiction and/or for easy maintenance of equipment are provided in layout of equipment and services; notify *Consultant* if indicated clearances are in conflict.
- .4 Prepare coordination and interference drawings in accordance with Section 01 33 00.

#### **1.21 NOT IN CONTRACT ITEMS AND ITEMS SUPPLIED BY OWNER**

- .1 NIC (Not In *Contract*) shall be used to designate various items of equipment that require coordination for installation although are not Provided as part of the *Work*.
- .2 SBO (Supplied by *Owner*) shall be used to designate various items of equipment that will be supplied by the *Owner* for installation by the *Contractor* as part of the *Work*.
- .3 Install items indicated as supplied by *Owner* (SBO) during the *Work*. Coordinate shipping and delivery with the *Owner*. Store items supplied by *Owner* at the *Place of the Work* and protect from damage. Install completely, and leave in full operating condition, in accordance with manufacturer's directions.



## 1.22 ELECTRONIC FILES

- .1 Electronic files (CAD) will not be released until Electronic Files Transfer Form, appended to this section, has been completed and returned to the *Consultant*. Requests for release of electronic files for Structural, Mechanical, Electrical, Civil or Landscape will require to be completed on their release forms upon request.
  - .1 *Subcontractors* and *Suppliers* requiring AutoCAD files shall make arrangements with the *Contractor*. The *Consultant* will not *Provide* AutoCAD files directly to *Subcontractors* or *Suppliers*.
  - .2 The *Consultant* will require a copyright waiver, and/or CAD data disclaimer, and/or BIM data disclaimer to be signed by the *Contractor* prior to delivery of such AutoCAD files.
    - .1 Copies of each of these disclaimers are appended to this section for reference.
  - .2 The *Consultant* or other *Consultants/subconsultants* may charge a fee for providing the electronic files as indicated in the CAD data disclaimer or otherwise at the *Consultant's* or other *Consultant's/Subconsultant's* discretion.
    - .1 Payment, where required, shall be made directly to the other *Consultant/Subconsultant*, and not through the *Prime Consultant*.
  - .3 CAD files shall only be released once payment has been made as stipulated on Electronic Files Transfer Form.

## PART 2 - PRODUCTS

Not applicable.

## PART 3 - EXECUTION

Not applicable.

**END OF SECTION**



**PROJECT NAME**  
VPCH Office Expansion

**PROJECT ADDRESS**  
155 Queen St N,  
Hamilton, ON L8R 2V6

## DIGITAL DATA DISCLAIMER

1. The release of electronic files by **DPAI Architecture Inc.** does not imply transfer of copyright and ownership. Electronic files shall remain the property of DPAI Architecture Inc., and in no case shall the transfer of these electronic files be considered a sale.
2. The copyright of this CAD data belongs to **DPAI Architecture Inc.** and it may not be altered or modified or copied or transferred to another company or individual, either in part or whole, without express written permission from **DPAI Architecture Inc.** This material is being furnished for reference purposes only and has not been specially prepared for use by the recipient.
3. The information on the electronic files is considered instruments of service of **DPAI Architecture Inc.** and shall not be used for other projects, for additions to this project, or completion of this project by others.
4. This computer aided design (CAD) data is being provided at the request of and for the convenience of the recipient only. It may be incomplete, contain unintentional inaccuracies, or be partially obsolete. **DPAI Architecture Inc.** makes no warranties, either expressed or implied, of its merchantability and fitness for any particular purpose. The user is further warned that, while all digital CAD data appears to be extremely accurate, this apparent accuracy is an artifact of the techniques used to generate it and is in no way intended to imply actual accuracy. The user of this data takes full responsibility for the accuracy and correctness of all measurements, areas, inventories, etc. extracted from this data either manually or with the use of a computer.
5. The user is advised that any translation of CAD data from one computer system or environment to another can and often does result in the loss of important data. This loss can include, but may not be limited to: portions of text and dimensions; the existence, location or scale of symbols or other elements of graphics - the internal structure of data, including layers and data attributes; and the style or weight of lines. **DPAI Architecture Inc.** makes no representations as to the usability of this CAD data on any system.
6. Users of this computer data are advised to review all current versions, as well as subsequent versions, of project documentation for inconsistencies and revisions. It is the responsibility of the user to identify and make all required revisions or corrections to this data. **DPAI Architecture Inc.** will not issue updates to CAD data.
7. **DPAI Architecture Inc.** reserves the right to remove all indications of its ownership and/or involvement from each electronic file.
8. The User agrees not to modify or alter the electronic documents in any way.
9. The User agrees not to use or reuse the electronic documents in any manner except as expressly permitted by this agreement.
10. By acceptance of this electronic media and the files it contains, the user agrees, to the fullest extent of the law, to indemnify and hold **DPAI Architecture Inc.** harmless from any damage, cost or liability, including but not limited to reasonable attorney's fees and cost of defense, arising from any changes made to these files by anyone other than **DPAI Architecture Inc.** or from reuse of files and data without the prior written consent of **DPAI Architecture Inc.**
11. While reasonable care has been used to ensure that the transfer medium and the material are free of computer viruses, **DPAI Architecture Inc.** accepts no responsibility for any loss or damage that might result from the transmission of computer viruses in this process.
12. **DPAI Architecture Inc.** believes that no licensing or copyright fees due to others on account of the release of electronic files, but to the extent that any are, the user of the files will pay the appropriate fees and hold **DPAI Architecture Inc.** harmless for such claims.
13. If shop drawings are issued by the *Contractor* which appears to have made unaltered use of the CAD files issued by **DPAI Architecture Inc.**, they will be returned without review. Under no circumstances can it be assumed that **DPAI Architecture Inc.** working drawings are sufficiently detailed to become documents for final manufacturing - in other words, shop drawings.
14. The terms of this disclaimer are effective immediately upon the User's receipt of digital information.

## **PART 1 - GENERAL**

### **1.1 GENERAL REQUIREMENTS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General requirements
- .2 1.2 Section Includes
- .3 1.3 Cash Allowances

### **1.3 CASH ALLOWANCES**

- .1 Administer cash allowances in accordance with the *Contract* GC 4.1(CCDC2). The *Contract Price*, and not the cash allowances, includes the *Contractor's* overhead and profit in connection with such cash allowances. Under no circumstance is the *Contractor* entitled to overhead and profit on any Cash Allowances Authorizations.
- .2 The *Contract Price* includes the Cash Allowances stated below.
- .3 Expenditures from Cash Allowance Stipulated Sum shall be directed by *Consultant* in writing through a Cash Allowance Authorization Form.
- .4 Unexpended amounts of cash allowances shall be deducted from the *Contract Price* at completion of Work.
- .5 Cash allowances include supply and installation unless otherwise indicated.
- .6 The *Contractor* is responsible for coordination of parts of the *Work* to be paid for by Cash Allowance with the remainder of the *Work*, including shop drawings and other submittals, in the same manner as with other *Subcontractors*. Cost for such coordination work is not included in the cash allowance. Include such costs elsewhere in the *Contract Price*.
- .7 Cash allowances cover the net cost to the Contractor of services, products, construction machinery and equipment, freight, unloading, handling, storage, installation, and other authorized expenses incurred in performing the Work stipulated under the cash allowances.
- .8 Supply only cash allowances include:
  - .1 Net costs of *Products*
  - .2 Delivery to the *Place of Work*
  - .3 Applicable taxes and duties (excluding *Value Added Taxes*)
- .9 Supply only cash allowances do not include costs for the following (include such costs elsewhere in *Contract Price*):
  - .1 Storage and handling at the *Place of the Work*.
  - .2 Installation costs.
- .10 Supply and install cash allowances include:
  - .1 Net cost of *Products*.
  - .2 Delivery to the *Place of the Work*.

- .3 Unloading, storing, handling of *Products* on the *Place of the Work*.
- .4 Installation, finishing, and commissioning of *Products*.
- .5 Applicable taxes and duties (excluding Value Added Taxes).
- .6 Preparation and submission of submittals in accordance with Section 01 33 00.
- .11 Inspection and testing cash allowances include:
  - .1 Net costs of inspection/testing services.
  - .2 Applicable taxes (excluding Value Added Taxes).
- .12 Cash allowances do not include the Value Added Taxes payable by the Owner to the Contractor.
- .13 Storage at the Place of the Work and installation shall be in accordance with the manufacturer's instructions.
- .14 The value of *Work* performed under a Cash Allowance is eligible to be included in progress payments. Copies of invoices pertaining to expenditures against the Cash Allowance shall be appended to applications for progress payments. Without a submitted invoice, the processing of payments will not be included in the progress draw.
- .15 The *Contractor* shall prepare a schedule for the ordering of items called for under the cash allowances to avoid delaying the progress of the *Work*. Schedule shall be in accordance with Section 01 33 00.
- .16 The *Contractor* shall notify the *Consultant* in writing at such time as when 75% of the total Cash Allowance stipulated price has been expensed and when each individual item is expensed to 75%. Under no circumstance is the *Contractor* permitted to expense above the authorized cash allowance value issued per item. It is the responsibility of the *Contractor* to notify the *Owner* and *Consultant* when a revised Cash Allowance Authorization form is required to make adjustment to the issued value for that item.
- .17 Values noted for cash allowance items are estimates only. *Owner* is permitted to reallocate from other cash allowance values as required.
- .18 Once the total value amount (not per item) of the Cash Allowance is expensed, a change order be permitted, or as stipulated in the *Contract*, for expenses above and beyond the allotted total Cash Allowance value amount.
- .19 *Consultant* may direct *Contractor* to obtain bids, at no additional cost to the *Owner*, for *Work* for which payment is made from cash allowances.
- .20 The total amount of the Cash Allowance shall be advised and will cover the following items:
  - .1 Inspection and Testing Services. The *Contractor* shall obtain a minimum of 3 quotes and *Provide* to the *Consultant* and the *Owner* for review prior to issuance of Cash Allowance Authorization.
  - .2 Supply and install of I.T Cabling
  - .3 Supply and Install of Security items

## PART 2- PRODUCTS

Not applicable.

**PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Or equivalent
- .4 1.4 *Product Substitution Procedures*

### **1.3 OR EQUIVALENT**

- .1 *Acceptable Products, or Products lists* which include the phrase "or equivalent", shall be interpreted to mean that a named *Product* alternate or equal, if selected for use in lieu of indicated or specified *Product*, meets or exceeds performance, appearance, general arrangement, dimensions, availability, code and standards compliance, and colour of specified *Product*. The *Contractor* shall be responsible for all costs and modifications associated with the inclusion of named *Product* alternate or equal at no additional cost to the *Owner*.
- .2 The process for proposing and approving alternates or equals shall be the same process as for proposing and approving product substitutions.
- .3 Confirm delivery of specified items prior to proposing alternates or equals.

### **1.4 PRODUCT SUBSTITUTION PROCEDURES**

- .1 Base the *Work* of this *Contract* and the *Contract Price* upon using the new materials and *Products* specified.
- .2 Where materials and *Products* are specified only by reference to standards, *Provide* any material or *Product* that meets the standard.
- .3 Materials and *Products* specified by their proprietary names or catalogue number shall form the basis for the *Work*. No substitutes for these may be used without the *Consultant's* prior written authorization which may be obtained in accordance with requirements of this Section.
- .4 Where a material or *Product* is specified by naming two or more acceptable materials or proprietary *Products*, *Provide* any one of the specified materials or *Products*. If compliance with a referenced standard is also specified, the material or *Product* selected shall meet the standard.
- .5 Substitutions will be considered only when submitted in sufficient time to permit proper investigation by the *Consultant*, and under the conditions specified herein.
- .6 Requests for substitution may only be considered if submitted within 30 Days after *Contract* award. Requests for substitutions submitted after 30 Days after the *Contract* award may not be considered.
- .7 There is no obligation on the part of the *Consultant* or the *Owner* to accept any proposed substitutions that, in the *Consultant's* or the *Owner's* opinion, acting reasonably, do not meet the requirements of the *Contract Documents*, including this Section.
- .8 Substitutions proposed may be considered only under the following conditions:

- .1 If the proposed substitute materials and Products, having been brought to the attention of, and considered by, the *Consultant* as equivalent to those specified, will decrease the *Contract Price*.
  - .2 If the proposed substitute materials and Products, having been brought to the attention of, and considered by, the *Consultant* as equivalent to those specified, will not increase the *Contract Price* but will decrease the *Contract Time*.
  - .3 If a material or *Product* is specified together with a requirement for performance and it can be shown by the *Contractor* that the specified material or *Product* will not achieve the specified performance.
  - .4 When a substitution is otherwise advantageous to the *Owner* or to the execution of the *Work* as determined by the *Consultant*.
- .9 When proposing substitutions, the *Contractor* shall submit with each application, the material and *Product* names and complete specifications substantiating compliance of the proposed substitution with the requirements of the *Contract Documents*, including:
- .1 *Product* Identification.
  - .2 Detailed, item by item comparison between the properties and characteristics of the specified material or *Product*, and the proposed substitution.
  - .3 Manufacturer's name, address, and telephone number.
  - .4 Manufacturer's material or *Product* literature.
  - .5 Performance, technical and test data.
  - .6 Reference standards.
  - .7 *Product* limitations.
  - .8 Samples.
  - .9 List of existing installations.
  - .10 Changes to the *Contract Time*, if any.
  - .11 Changes to the *Contract Price* if any.
- .10 In making a request for substitution, the *Contractor* represents that:
- .1 The *Contractor* has personally investigated the proposed *Product* or method, and has determined that it is equal or superior in all respects to that specified.
  - .2 The *Contractor* will *Provide* the same guarantee for the substituted *Product* or method as for the *Product* or method specified or indicated;
  - .3 The *Contractor* will coordinate the installation of an accepted substitution into the *Work*, making such changes as may be required for the *Work* to be complete in all respects;
  - .4 The *Contractor* waives all claims for additional costs related to the substitution; and,
  - .5 The cost data provided by the *Contractor* as part of the *Contractor's* substitution proposal is complete and includes all related costs including, but not limited to;
  - .6 Coordination and supervision;

- .7 Installation and independent inspection and testing;
- .8 Any change in the cost of other affected areas; and,
- .9 Costs for any detailed design or related engineering work.
- .11 Should the proposed substitution be accepted, either in part or in whole, the *Contractor* assumes full responsibility when the substitution affects any other part of the *Work*.
- .12 The *Contractor* shall ensure that substitutions are accommodated by space allotted for the specified materials, Products, methods or processes.
- .13 The cost of changes in the work of all Specification Sections necessitated by the use of proposed substitutions will not be considered or approved as a change in the *Work* and no increase in the *Contract Time* will be considered or approved.
- .14 Substitutions that have not been accepted through the process described in this section and are shown on shop drawings, will be rejected, whether or not the shop drawings have been reviewed.
- .15 Credits arising from accepted substitutions will be credited to the *Contract Price* by way of a *Change Order* in accordance with Section 01 26 00.
- .16 No substitutions will be permitted without prior written recommendation by the *Consultant* and prior written approval by the *Owner*, acting reasonably.
- .17 *Consultant's* decision concerning acceptance or rejection of proposed substitutions is final.

## **PART 2- PRODUCTS**

Not applicable.

## **PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**



**From:** \_\_\_\_\_ **RFS No:** \_\_\_\_\_  
**To:** \_\_\_\_\_ (RFS No. To be completed by Consultant)  
**Copies:** \_\_\_\_\_ **Issue Date:** \_\_\_\_\_

**Product, Material or Equipment Required of the Contract Documents:**

Specification Section: \_\_\_\_\_ Drawing No./Detail: \_\_\_\_\_  
Description: \_\_\_\_\_

**Requested Substitute Product, Material or Equipment:**

Description: \_\_\_\_\_

Attachments Included: ☐ Drawings ☐ Product Data ☐ Samples ☐ Test Reports  
☐ Other: \_\_\_\_\_

Reason for Substitution: \_\_\_\_\_

Expected Lifespan: \_\_\_\_\_ Warranty Duration \_\_\_\_\_

Maintenance Regime: \_\_\_\_\_

Has this item been used in a similar application? ☐ Yes ☐ No

Describe Application: \_\_\_\_\_  
\_\_\_\_\_

Describe Results: \_\_\_\_\_  
\_\_\_\_\_

Owner Contact and Location: \_\_\_\_\_  
\_\_\_\_\_

**Comparisons of the Specified Item and the Proposed Substitution:**

Compare significant qualities of size, weight, durability, performance and visual effect:

—  
—

Describe any changes required in other elements of the Work to accommodate the proposed substitution, including work performed by the Owner and separate contractors:

—  
—

What effect will the proposed substitution have on the work schedule in comparison to the work schedule without approval of the proposed substitution?

-  
-

Cost comparison of the proposed substitution to the originally specified item, including correlating modifications required to other work:

-  
-

Net cost to the Owner: \_\_\_\_\_

Changes in contract time: \_\_\_\_\_

**Signatures:**

Permission to make any substitution after award of contract shall be effected by Change Order. It shall not relieve the Contractor, any subcontractor, or manufacturer, fabricator, or supplier from the responsibility for any deficiency that may exist in the substituted product or any departures or deviations from the Contract Documents as modified by such Change Order.

Except as otherwise expressly specified by the Contractor in the Request for Substitution and expressly approved in such Change Order, the Contractor shall be deemed to warrant, by his request, that the proposed substitute will satisfy all standards and requirements satisfied by the original product, material or equipment specified and the Change Order shall not be deemed to modify the Contract Documents with respect thereto.

If any substitution will affect a correlated function, adjacent construction, or the work of other trades or contractors, the necessary changes and modifications to the affected work shall be considered as an essential part of the proposed substitution, to be accomplished by the Contractor without additional time or expense to the Owner if and when accepted.

Contractor's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**Consultants' Action:**

Consultant's Name: \_\_\_\_\_

Consultant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

☐ Accepted ☐ Rejected ☐ More information required.

Comments: \_\_\_\_\_

\_\_\_\_\_

Consultant's Name: \_\_\_\_\_

Consultant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

☐ Accepted ☐ Rejected ☐ More information required.

Comments: \_\_\_\_\_

\_\_\_\_\_

Consultant's Name: \_\_\_\_\_

Consultant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

☐ Accepted ☐ Rejected ☐ More information required.

Comments: \_\_\_\_\_

\_\_\_\_\_

Consultant's Name: \_\_\_\_\_

Consultant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

☐ Accepted ☐ Rejected ☐ More information required.

Comments: \_\_\_\_\_

\_\_\_\_\_

Consultant's Name: \_\_\_\_\_

Consultant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

☐ Accepted ☐ Rejected ☐ More information required.

Comments: \_\_\_\_\_

\_\_\_\_\_

**End of Section**

## **PART 1 - GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Related Sections
- .4 1.4 Changes
- .5 1.5 Change Order
- .6 1.6 Valuation of Changes and *Contractor's* Mark-UP
- .7 1.7 Delays

### **1.3 RELATED SECTIONS**

- .1 Section 01 21 00 Allowances
- .2 Section 01 25 00 *Product* Substitution Procedures

### **1.4 CHANGES**

- .1 Refer to GC 6.1 of the General Conditions of the Contract.
- .2 The *Owner*, through the *Consultant*, without invalidating the *Contract*, may make changes in the *Work* consisting of additions, deletions, or other revisions to the *Work* by *Change Order* or a *Change Directive*.
- .3 The *Contractor* shall not perform a change in the *Work* without a *Change Order* or a *Change Directive*.
- .4 The *Consultant* will prepare and issue Notices of Change, Change Orders, and Change Directives.
- .5 Communication and correspondence related to all changes shall, at all times, be through the *Consultant*.

### **1.5 CHANGE ORDER**

- .1 Refer to GC 6.2 of the General Conditions of the Contract.
- .2 When a change in the *Work* is proposed by the *Owner* or the *Consultant* or required by conditions at the *Place of the Work* or *Authorities Having Jurisdiction*, the *Consultant* shall *Provide* a notice describing the proposed change in the *Work* to the *Contractor*, to be known as a *Notice of Change*.
- .3 Changes in the *Work* proposed by the *Contractor* shall be in accordance with Section 01 25 00. Proposed changes not in accordance with the requirements of Section 01 25 00 shall not be considered.
- .4 Upon receipt of a *Notice of Change* from the *Consultant*, the *Contractor* shall present, in a form acceptable to the *Consultant* and within ten (10) *Working Days* of the date on the *Notice of*

*Change*, a method of adjustment or an amount of adjustment for the *Contract Price*, if any, and the adjustment in the *Contract Time*, if any, for the proposed change in the *Work*.

- .5 *Contractor* shall number their pricing quotes in one sequence in order submitted to *Consultant*.
- .6 Owner and *Consultant* shall have fifteen (15) working days in which to review and approve *Contractor's* quotations for changes to the work.
- .7 When the *Owner* and the *Contractor* agree to the adjustments in the *Contract Price* and *Contract Time*, or to the method to be used to determine the adjustments, such agreement shall be effective immediately and shall be recorded in a *Change Order*, signed by the *Owner* and the *Contractor*. The value of the *Work* performed as the result of a *Change Order* shall be included in applications for progress payment as expenditures.

#### **1.6 VALUATION OF CHANGES AND CONTRACTOR'S MARK-UP**

- .1 Valuation and the *Contractor's* mark-up for overhead and profit for changes in the *Work* shall be calculated in accordance with the provisions of the General Conditions GC 6.2.

#### **1.7 MARK-UP FOR CHANGES IN THE WORK**

- .1 The mark-ups permitted to be applied to the *Contract Price* for changes to the *Work* shall be in accordance with the Supplementary Conditions GC 6.2 of the Contract (CCDC 2 - 2020) as provided.
- .2 Mark-ups for Changes in the *Work* shall apply to all extras to the *Contract Price* in accordance with the Supplementary Conditions GC 6.2 of the Contract (CCDC 2 - 2020) as provided.
- .3 Mark-ups for Changes in the *Work* shall only apply to credits to the *Contract Price* in accordance with the Supplementary Conditions GC 6.2 of the Contract (CCDC 2 - 2020) as provided

#### **1.8 DELAYS**

- .1 In the circumstances there is a delay in the construction schedule, refer to GC 6.5 of the General Conditions of the Contract for procedures and submission requirements.

#### **PART 2- PRODUCTS**

Not applicable.

#### **PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Related Sections
- .4 1.4 Request for Interpretation – RFI

### **1.3 RELATED SECTIONS**

- .1 Section 01 21 00 Allowances
- .2 Section 01 25 00 *Product* Substitution Procedures

### **1.4 REQUEST FOR INTERPRETATION – RFI**

- .1 A request for interpretation (RFI) is a formal process used during the *Work* to obtain an interpretation of the *Contract Documents* pursuant to GC 2.2.7 through to GC 2.2.10.
  - .1 An RFI shall not constitute notice of claim for a delay or extra to the *Contract Price*.
- .2 Submittal procedures:
  - .1 RFI form:
    - .1 Submit RFI on “Request for Interpretation” form as approved by the *Consultant*. The *Consultant* shall not respond to an RFI except as submitted on this form.
    - .2 Where RFI form does not *Provide* sufficient space for complete information to be provided thereon, attach additional sheets as required.
    - .3 Submit with RFI form necessary supporting documentation. The *Consultant* shall not respond to an RFI where necessary information is missing, insufficient, unclear, or ambiguous.
  - .2 Submit RFI form as follows:
    - .1 1 copy digitally in pdf format to the Consultant
    - .2 Submit RFIs sufficiently in advance of affected parts of the *Work* so as not to cause delay in the performance of the *Work*. Costs resulting from failure to do this will not be paid by the Owner.
    - .3 RFIs shall be submitted only to the Consultant and copied to the *Owner*.
    - .4 RFIs shall be submitted only by Contractor. RFIs submitted by Subcontractors or Suppliers shall not be accepted.
    - .5 Number RFIs consecutively in one sequence in order submitted.
    - .6 Submit one distinct RFI per RFI form.

- .3 RFI log:
  - .1 Maintain log of RFIs sent to and responses received from the *Consultant*, complete with corresponding dates.
  - .2 Submit updated log of RFIs with each meeting for coordination.
- .4 Submit RFIs sufficiently in advance of affected parts of the *Work* so as not to cause delay in the performance of the *Work*. Costs resulting from failure to do this will not be paid by the *Owner*.
- .5 The *Consultant* shall review RFIs from the *Contractor* submitted in accordance with this section, with the following understandings:
  - .1 The *Consultant's* response shall not be considered as a *Change Order* or *Change Directive*, nor does it authorize changes in the *Contract Price* or *Contract Time* or changes in the *Work*.
  - .2 Only the *Consultant* shall respond to RFIs. Responses to RFIs received from entities other than the *Consultant* shall not be considered.
- .6 Allow 10 *Working Days* for review of each RFI by the *Consultant*.
  - .1 The *Consultant's* review of RFI commences on date of receipt by the *Consultant* of RFI submittal and extends to date RFI returned by the *Consultant*.
  - .2 When the RFI submittal is received by the *Consultant* before noon, review period commences that *Day*; when RFI submittal is received by the *Consultant* after noon, review period begins on the next *Working Day*.
  - .3 If, at any time, the *Contractor* submits a large enough number of RFIs such that the *Consultant* cannot process these RFIs within 10 *Working Days*, the *Consultant*, will confer with the *Contractor* within 1 *Working Day* of receipt of such RFIs, and the *Consultant* and the *Contractor* will jointly prepare an estimate of the time necessary for processing same as well as an order of priority between the RFIs submitted. The *Contractor* shall accommodate such necessary time at no increase in the *Contract Time* and at no additional cost to the *Owner*.
  - .4 When RFI submittal shall be reviewed by one or more of *Consultant's* subconsultants, increase the review period by 5 *Working Days* for each separate subconsultant.
- .7 *Contractor* shall satisfy itself that an RFI is warranted by undertaking a thorough review of the *Contract Documents* to determine that the claim, dispute, or other matters in question relating to the performance of the *Work* or the interpretation of the *Contract Documents* cannot be resolved by direct reference to the *Contract Documents*. *Contractor* shall describe in detail this review on the RFI form as part of the RFI submission. RFI submittals that lack such detailed review description, or where the detail provided is, in the opinion of the *Consultant*, insufficient, shall not be reviewed by the *Consultant* and shall be rejected.

## **PART 2- PRODUCTS**

Not applicable.

## **PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Schedule Of Values
- .4 1.4 Form Of Submittal
- .5 1.5 Cash Flow Schedule
- .6 1.6 Review And Re-Submittal

### **1.3 SCHEDULE OF VALUES**

- .1 Submit a Schedule of Values to the *Consultant* at least 10 days prior to submitting first Application for Payment.
  - .1 For item 01 77 00, *Project Manuals, Warranties and As Built Drawings*, the *Contractor* is required to carry a value 2% of the *Contract Price* in accordance with section 01 77 00.
  - .2 Division 1 – General Conditions shall be broken down. Lump Sum Values shall not be accepted and shall not be used for contract modifications or Delays.
- .2 Upon request by *Consultant*, support values given with data that will substantiate their correctness.
- .3 Submit quantities of designated materials.
- .4 Refer to the General Conditions of the contract for details of payment procedure.
- .5 Schedule of Values shall be used only as basis for *Contractor's* Application for payment.

### **1.4 FORM OF SUBMITTAL**

- .1 Submit Schedule of Values in accordance with this section and the General Conditions of the contractor for Proper Invoice submissions at the end of each month.
- .2 With the submission of the initial Schedule of Values, *Contractor* shall submit an initial Cash Flow Projection for the project. With each Application for Payment, *Contractor* shall submit an updated Cash Flow projection.

### **1.5 CASH FLOW SCHEDULE**

- .1 Prior to commencement of the Work, submit a detailed cash flow projection schedule indicating anticipated billings on a month-by-month basis for duration of the Work, including timing of holdback release.
- .2 Update cash flow schedule monthly, recording cumulative as well as monthly totals.



## **1.6 REVIEW AND RE-SUBMITTAL**

- .1 After review by *Consultant*, revise and resubmit Schedule (and Working Schedule of Material Values), as required.
- .2 Resubmit revised schedule in same manner.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- 1.1 General Instructions
- 1.2 Section Includes
- 1.3 General
- 1.4 Identification of Systems
- 1.5 Commissioning and Systems Demonstrations
- 1.6 Superintendence
- 1.7 Dimensions
- 1.8 Coordination
- 1.9 Building Dimension, Templates, Built-ins, and Coordination

### **1.3 GENERAL**

- .1 *Provide* the *Work* in accordance with the *Contract Documents* and be responsible for delays or costs resulting from failure to properly inspect or coordinate the *Work*, and for replacement or corrective work required.

### **1.4 IDENTIFICATION OF SYSTEMS**

- .1 *Provide* identification of electrical and mechanical system installations and other automated systems or equipment in compliance with *Contract Documents*.

### **1.5 COMMISSIONING AND SYSTEMS DEMONSTRATIONS**

- .1 *Provide* testing, adjusting, balancing and certification and commissioning of mechanical and electrical installations and other automated systems or equipment in accordance with Section 01 77 00.
- .2 Instruct *Owner's* designated representatives in operation and maintenance of mechanical and electrical installations and other automated systems or equipment, in accordance with Section 01 77 00.

### **1.6 SUPERINTENDENCE**

- .1 The *Contractor* shall *Provide* superintendent and necessary supporting staff personnel who shall be in attendance at the *Place of the Work* while *Work* is being performed, with proven experience in erecting, supervising, testing and adjusting projects of comparable nature and complexity.
  - .1 The *Contractor* shall *Provide* a qualified superintendent to supervise the *Work* at all times.
- .2 The *Contractor* shall appoint a superintendent at the *Place of the Work* who shall have overall authority at the *Place of the Work* and shall speak for the *Contractor* and represent the *Contractor's* interest and responsibilities at meetings at the *Place of the Work* and in dealings with the *Consultant* and the *Owner*.

## 1.7 DIMENSIONS

- .1 Verify dimensions at the *Place of the Work* before commencing shop drawings. Before fabrication commences report discrepancies to *Consultant* in writing. Incorporate accepted variances on shop drawings and as-built records.

## 1.8 COORDINATION

- .1 Coordinate and ensure workers, *Subcontractors*, and Suppliers cooperate to ensure that the *Work* will be carried out expeditiously and in proper sequence.
- .2 Make adjustments to allow adjustable work fit to fixed work.

## 1.9 BUILDING DIMENSION, TEMPLATES, BUILT-INS, AND COORDINATION

- .1 Take necessary dimensions for the proper execution of the *Work*. Assume complete responsibility for the accuracy and completeness of such dimensions, and for coordination.
- .2 *Provide* forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted in the *Work* and set in place or instruct separate *Subcontractors* as to their location.
- .3 Supply items to be built in, as and when required together with templates, measurements, shop drawings and other related information and assistance.
- .4 Pay the cost of extra work and make up time lost as a result of failure to *Provide* necessary information and items to be built in.
- .5 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 by requirements of the *Contract Documents*, and ensure that work installed in error is rectified before construction resumes.
- .6 Check and verify dimensions referring to interfacing of services. Verify such dimensions with interconnected portions of the *Work*.
- .7 Do not scale directly from drawings. Obtain clarification from *Consultant* if there is ambiguity or lack of information.
- .8 Details and measurements of any work which is to fit or to conform with work installed shall be taken at the *Place of the Work*.
- .9 Advise *Consultant* of discrepancies and omissions in the *Contract Documents*, that affect aesthetics, or that interfere with services, equipment or surfaces. Do not proceed with work affected by such items without clarification from *Consultant*.
- .10 Prepare and submit setting drawings, templates and other information necessary for the location and installation of material, holes, sleeves, inserts, anchors, accessories, fastenings, connections and access panels, in accordance with Section 01 33 00.
- .11 *Subcontractors* shall direct related *Subcontractors* on site of specific locations required for sleeves and openings. The *Contractor* shall be responsible for coordinating such activity to ensure no interruption in the progress of the *Work*.
- .12 Prepare interference drawings to properly coordinate the *Work*, where necessitated, in accordance with Section 01 33 00.

## PART 2 - PRODUCTS

Not applicable.

**PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Administrative
- .4 1.4 Contract Start-Up Meeting
- .5 1.5 Pre-Installation Meetings
- .6 1.6 Progress Meetings
- .7 1.7 Pre-Takeover Meeting
- .8 1.8 Post-Construction Meeting
- .9 1.9 Special Meetings

### **1.3 ADMINISTRATIVE**

- .1 The *Contractor* shall schedule meetings as specified herein.
  - .1 Such scheduling shall be in consultation both with the *Owner* and with the *Consultant*.
  - .2 Written notice of each *Site* meeting shall, in general, appear at the conclusion of the minutes of the preceding meeting or, else, shall be issued by the *Consultant*, via memorandum, no less than 24 hours prior to said meeting.
- .2 The *Contractor* shall *Provide* the physical space for the meetings at the *Place of the Work*, generally to be the *Site* office (refer to Section 01 50 00 *Temporary Work* for the complete requirements of the *Site* office).
- .3 The *Consultant* will prepare agendas for meetings specified herein.
  - .1 Agendas shall include, as a minimum, the agenda items specified in the *Contract Documents*.
- .4 The *Consultant* will distribute written notice of each meeting specified herein, complete with meeting agenda, 4 *Working Days* in advance of meeting date to the following, each of who shall be responsible for distributing such notices to other affected parties associated with them (such as, for example, *Subcontractors* in the case of the *Contractor*):
  - .1 The Contractor.
  - .2 The *Owner*.
- .5 The *Consultant* will chair and record the minutes of meetings specified herein.
  - .1 The *Consultant* will distribute copies of minutes to the *Owner*, the *Contractor*, and all others in attendance within 3 *Working Days* after date of meeting.
  - .2 Any exceptions taken to, or clarification/correction required of, the various items recorded in the minutes, shall be furnished in writing and copied to all parties listed on the distribution list of the captioned minutes.

- .6 Representatives of parties attending meetings shall be authorized to act on behalf of the parties they represent.
- .7 *Subcontractors* and suppliers shall not attend meetings unless authorized by the *Consultant* and/or the *Owner*.
- .8 The *Contractor* shall prepare, and distribute to the *Consultant* and the *Owner* at each progress meeting date, the following:
  - .1 Monthly progress reports containing updated schedules, shop drawing logs, requests for interpretation logs, submittals and budget.
  - .2 2 Week Lookahead schedules shall be submitted 24hrs before scheduled meeting.

#### **1.4 CONTRACT START-UP MEETING**

- .1 Within 10 Days after award of the *Contract*, request a meeting of parties in the *Contract* to discuss and resolve administrative procedures and responsibilities prior to the commencement of the *Work*.
  - .1 The *Consultant* shall chair and minute the *Contract* start-up meeting, and distribute minutes as described above in Section 01 31 19.
- .2 Attendees at *Contract* start-up meeting shall include the following:
  - .1 Contractor.
  - .2 *Contractor's* site superintendent(s).
  - .3 Consultant.
  - .4 Owner.
- .3 Agenda to include the following:
  - .1 General:
    - .1 Welcome and Introduction.
    - .2 *Owner's* guidelines and policies.
  - .3 Communications:
    - .1 Appointment of official representatives of the participants on the *Project*.
    - .2 *Project* contact list.
    - .3 Emergency contact list.
    - .4 Correspondence protocols (email, telephone).
  - .4 Schedule of progress meetings.
  - .5 Status of permits, fees and requirements of the authorities having jurisdiction.
  - .6 Status of *Contract* execution.
  - .7 Insurance, transcripts of policies.
  - .8 Workplace Safety and Insurance Board Certificate.

- .9 *Documents at the Place of the Work* (Permit Set, Issued Incorporating Addenda Set / Issued for Construction).
- .2 *Contract Modifications and Instructions:*
  - .1 Requirements for *Contract* Modification and interpretation procedures:
    - .1 Requests for Interpretation.
    - .2 Supplemental Instruction.
    - .3 Notices of Change.
    - .4 Change Directives.
    - .5 Change Orders.
  - .2 Procedures for distribution, approvals, requests for time extension.
- .3 Submittals:
  - .1 Construction schedule.
  - .2 Submittal procedures and schedule of submittals.
  - .3 Requests for Substitutions / Alternates.
  - .4 Delivery of specified equipment and “long-lead” items.
  - .5 *Owner* supplied products (SBO items).
- .4 Schedule of Values, progress claims, administrative procedures and holdbacks.
- .5 Sustainability Requirements: LEED, One Planet Living, other (project specific).
- .6 *Site* Policies and Logistics.
  - .1 *Contractor's* safety procedures.
  - .2 *Site* issues and limitations:
    - .1 Parking.
    - .2 *Site* access, loading and storage.
    - .3 Garbage and construction waste handling.
    - .4 Hazardous substances.
  - .3 *Site* security.
  - .4 Temporary Facilities – signs, offices, storage sheds and utilities.
  - .5 Quality control.
  - .6 Infection prevention and control requirements (healthcare projects only).
  - .7 Insect control.
- .7 *Project Close Out:*
  - .1 Take-over procedures, acceptance and warranties.

- .2 As-built drawings.
- .3 Operation and Maintenance manuals.
- .4 *Owner* Training.
- .5 Substantial Performance of the Work.
- .6 Total Performance of the Work

## 1.5 PRE-INSTALLATION MEETINGS

- .1 During the course of the *Work* prior to *Substantial Performance of the Work*, schedule pre-installation meetings as required by the *Contract Documents* or as directed by the *Consultant*.
- .2 As far as possible, pre-installation meetings shall be scheduled to take place on the same *Day* as regularly scheduled progress meetings.
- .3 Agenda to include the following:
  - .1 Appointment of official representatives of participants in the project.
  - .2 Review of existing conditions and affected work and testing thereof as required.
  - .3 Review of installation procedures and requirements.
  - .4 Review of environmental and *Site* condition requirements.
  - .5 Schedule of the applicable portions of the *Work*.
  - .6 Schedule of submission of samples, colour chips, and items for the *Consultant's* consideration.
  - .7 Requirements for temporary facilities, *Site* sign, offices, storage sheds, utilities, fences.
  - .8 Requirements for notification for reviews. Allow a minimum of 48 hours' notice to the *Consultant* for review of the *Work*.
  - .9 Requirements for inspections and tests, as applicable. Schedule and undertake inspections and tests.
  - .10 Delivery schedule of specified equipment.
  - .11 Special safety requirements and procedures.
- .4 The following shall be in attendance:
  - .1 The Contractor.
  - .2 The *Subcontractors* affected by the work for which the pre-installation meeting is being conducted.
  - .3 The Consultant.
  - .4 Manufacturer's representatives, as applicable.
  - .5 Inspection and testing company, as applicable.



## 1.6 PROGRESS MEETINGS

- .1 During the course of the *Work* prior to *Substantial Performance of the Work*, schedule progress meetings as directed by the *Consultant*.
- .2 Attendees at progress meetings shall include the following:
  - .1 The Contractor.
  - .2 The *Contractor's Site* superintendent(s).
  - .3 The Consultant.
  - .4 The *Owner*.
- .3 Agenda to include the following:
  - .1 Review, approval of proceedings of previous meeting.
  - .2 Review of items arising from proceedings.
  - .3 Review of progress of the *Work* since previous meeting and the *Contractor's* monthly progress report.
  - .4 Field observations, problems, conflicts.
  - .5 Update construction schedule.
  - .6 Problems that impede compliance with construction schedule.
  - .7 Review of off-*Site* fabrication delivery schedules.
  - .8 Review material delivery dates/schedule.
  - .9 Corrective measures and procedures to regain construction schedule.
  - .10 Revisions to construction schedule.
  - .11 Progress, schedule, during subsequent period of the *Work*.
  - .12 Review submittal schedules.
  - .13 Review status of submittals.
  - .14 Maintenance of quality standards.
  - .15 Pending changes and substitutions.
  - .16 Review of the *Contract* modifications and interpretations, including, but not limited to: requests for interpretation and log, *Notices of Change*, *Change Orders*, *Supplemental Instructions*, for effect on construction schedule and on the *Contract Time*.
  - .17 Review of status of as-built documents.
  - .18 Other business.

## 1.7 PRE-TAKEOVER MEETING

- .1 60 *Working Days* prior to application for *Substantial Performance of the Work*, schedule a pre-takeover meeting.
- .2 Agenda to include the following:

- .1 Review, approval of proceedings of previous meeting.
- .2 Review of items arising from proceedings.
- .3 Review of procedures for *Substantial Performance of the Work*, completion of the *Contract*, and handover of the *Work*.
- .4 Field observations, problems, conflicts.
- .5 Review of outstanding *Contract* modifications and interpretations, including, but not limited to: requests for interpretation and log, *Notices of Change*, *Change Orders*, *Supplemental Instructions*, for effect on construction schedule and on the *Contract Time*.
- .6 Problems which impede Substantial Performance of the Work.
- .7 Review of procedures for deficiency review. Corrective measures required.
- .8 Review of arrangements for hydro, heating, and other services.
- .9 Progress, schedule, during succeeding period of the *Work*.
- .10 Review submittal requirements for warranties, manuals, and all demonstrations and documentation required for *Substantial Performance of the Work*.
- .11 Review of keying and hardware requirements.
- .12 Review of status of as-built documents and record drawings.
- .13 Status of commissioning and training.
- .14 Review the *Contractor's* deficiency list and status.
- .15 Cleaning for occupancy.
- .16 Other business.

## 1.8 POST-CONSTRUCTION MEETING

- .1 Prior to application for completion of the *Contract*, schedule a post-construction meeting. Four Days prior to date for meeting, the *Consultant* will confirm a date for meeting based on evaluation of completion requirements.
- .2 Agenda to include the following:
  - .1 Review, approval of proceedings of previous meeting.
  - .2 Confirmation that no business is arising from proceedings.
  - .3 Confirmation of completion of the *Contract*, and handover of reviewed documentation from the *Consultant* to the *Owner*.
  - .4 Confirmation of completion of Notices of Change, Change Orders, and Supplemental Instructions.
  - .5 Problems that impede the *Contract* completion.
  - .6 Identify unresolved issues or potential warranty problems.
  - .7 Confirmation of completion of deficiencies.
  - .8 Corrective measures required.

- .9 Confirmation of arrangements for hydro, heating and other services.
- .10 Confirm submittal requirements for warranties, manuals, and demonstrations and documentation for *Contract* completion are in order.
- .11 Review of procedures for communication during post-construction period.
- .12 Handover of reviewed record documents by the *Consultant* to the *Owner*.
- .13 Handover of the *Contract* completion insurance policy transcripts by the *Contractor*.
- .14 Submission of final application for payment.
- .15 Review and finalize outstanding claims, pricing, and allowance amounts.
- .16 Status of commissioning and training.
- .17 Demobilization and the *Place of the Work* restoration.
- .18 Review of requests for interpretation log.
- .19 Other business.

#### **1.9 SPECIAL MEETINGS**

- .1 The *Owner* and/or the *Consultant* reserve the right to require special meetings which may be held on short notice and at which attendance by the *Contractor* and representatives of affected *Subcontractors* and suppliers is mandatory. The *Consultant* will keep detailed and accurate meeting notes and distribute copies promptly to all in attendance and those affected by agreements made at such meetings.

#### **PART 2- PRODUCTS**

Not applicable.

#### **PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 General
- .4 1.4 Layout And Survey
- .5 1.5 Submittals
- .6 1.6 Drainage
- .7 1.7 Record Drawings
- .8 1.8 Survey Reference Points And Legal Survey Markers
- .9 1.9 Survey Layout
- .10 1.10 Construction Layout
- .11 1.11 Field Engineering

### **1.3 GENERAL**

- .1 *Provide* the *Work* in accordance with the *Contract Documents* and be responsible for delays or costs resulting from failure to thoroughly inspect or coordinate the *Work*, and for replacement or corrective work required.

### **1.4 LAYOUT AND SURVEY**

- .1 Lines, Levels and Locations for Building:
  - .1 Existing grades, lines and site conditions shown on drawings were taken from survey information established by persons engaged directly by Owner. The accuracy of survey information is not the Consultant's responsibility.
  - .2 The *Contractor* will establish location of property lines. The Contractor shall establish necessary lines, levels and provide batter boards and other means to control the accurate positioning of all building elements.
- .2 Work Adjacent to Public Property:
  - .1 Verify before commencing Work at adjacent public property, that no plans for altering clearances, set-backs, easements, grades, or otherwise have been made by local Authorities Having Jurisdiction, subsequent to their approval of Contract Documents, and which would affect the original intent.

### **1.5 SUBMITTALS**

- .1 Submit qualification data for land surveyor to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

- .2 Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- .3 Submit two (2) copies of certified survey signed by registered land surveyor.
- .4 Submit two (2) copies of final property survey showing the Work performed and record survey data.
- .5 Submit a Certificate of Compliance at completion of site grading stating the "As Constructed" grading elevations, and whether or not they differ from design grades.

## **1.6 DRAINAGE**

- .1 Ensure that positive drainage is provided to roof, floor and site drains and catch basins, as set in their final positions. Provide constant slopes for drained surfaces to drains and drainage courses.
- .2 Ensure that allowable construction tolerances and structural tolerances do not permit ponding of water.
- .3 Verify the extent of each area served by a drain, or drainage course, to eliminate possible undrained surfaces. Coordinate the Work of involved Sections before each proceeds.

## **1.7 RECORD DRAWINGS**

- .1 Prepare interference and equipment placing drawings to scale to ensure that all components will be properly accommodated within the spaces provided.
- .2 Ensure that clearances required by Authorities Having Jurisdiction and/or for easy maintenance of equipment will be shown on the above drawings.
- .3 Interference drawings shall be prepared before any orders for equipment and/or materials are released to suppliers.

## **1.8 SURVEY REFERENCE POINTS AND LEGAL SURVEY MARKERS**

- .1 Verify existing base horizontal and vertical control points designated on drawings.
- .2 Locate, confirm, and protect control points and legal survey markers prior to starting site work; preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice to Consultant.
- .4 Report to Consultant when a reference point or legal survey marker is lost or destroyed or requires relocation because of necessary changes in grades or locations.
- .5 Replace control points in accordance with original survey control.
- .6 Replace legal survey markers lost or destroyed as a result of construction activities.

## **1.9 SURVEY LAYOUT**

- .1 Coordinate with Contractor for layout and protection of grade controls.
- .2 Establish permanent benchmark(s) as required, referred to established benchmarks by survey control points, record locations, with horizontal and vertical data.
- .3 Establish lines and levels, locate and layout, by instrumentation.
- .4 Stake for grading, cuts, fills, and slopes.

- .5 Replace grade controls lost or destroyed as a result of construction activities.

#### **1.10 CONSTRUCTION LAYOUT**

- .1 Verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. Notify Consultant promptly if discrepancies are discovered.
- .2 Engage a land surveyor to lay out the Work using accepted surveying practices:
  - .1 Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - .2 Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - .3 Inform installers of lines and levels to which they must comply.
  - .4 Check the location, level and plumb, of every major element as the Work progresses.
  - .5 Notify Consultant when deviations from required lines and levels exceed allowable tolerances.
  - .6 Verify accuracy of site dimensions shown on drawings.
  - .7 Verify that present, or known future restrictions, are not violated by construction on the site or lines of traverse to all public utilities.
  - .8 Verify accurately the final underground location on site of all buried storm, sanitary, water and electrical duct banks, when applicable.
  - .9 Close site surveys with an error of closure equal to or less than the standard established by Authorities Having Jurisdiction.
- .3 Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- .4 Maintain a log of layout control Work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Consultant when requested.

#### **1.11 FIELD ENGINEERING**

- .1 Locate existing permanent benchmarks, control points and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations:
  - .1 Do not change or relocate existing benchmarks or control points without prior written approval of Consultant.
  - .2 Report lost or destroyed permanent benchmarks or control points promptly.
  - .3 Report the need to relocate permanent benchmarks or control points to Consultant before proceeding.
  - .4 Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

- .5 Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- .6 Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
- .7 Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- .2 Provide as-built site survey information after completion of demolition and excavation operations ready for construction
  - .1 Survey grade elevations shall be on a 9 m grid or as required to locate property lines and new building structural grid lines.

## **PART 2 - PRODUCTS**

Not applicable.

## **PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Construction Progress Reporting
- .4 1.4 Scheduling Roles
- .5 1.5 Scheduling software
- .6 1.6 Schedules
- .7 1.7 Construction Schedule Information
- .8 1.8 Format
- .9 1.9 Submission process
- .10 1.10 Baseline Construction Schedule
- .11 1.11 Progress Schedule
- .12 1.12 Baseline Schedule Revisions

### **1.3 CONSTRUCTION PROGRESS REPORTING**

- .1 Maintain at the *Place of the Work* a permanent written record of progress of *Work*. Make the record available to *Consultant* and *Provide* copy if requested. Include in record each day:
  - .1 Commencement and completion dates of the work of each trade in each area of *Project*.
  - .2 Attendance of *Contractor's* and *Subcontractors* work forces at *Project* and a record of the work they perform.
  - .3 Visits to *Place of the Work* by *Owner*, *Consultant* authorities having jurisdiction, inspection and testing companies, *Contractor*, *Subcontractors*, and Suppliers.

### **1.4 SCHEDULING ROLES**

- .1 Contractor
  - .1 The *Contractor* is responsible for the preparation and maintenance of Construction Schedule information including the Construction Schedule and other schedules as defined herein. The *Contractor* is responsible for obtaining planning and scheduling information from its management staff, site supervisory staff, *Subcontractors* and suppliers in a timely manner as an essential part of the preparation and maintenance of the Construction Schedule and other schedules as defined herein.
  - .2 The *Contractor* maintains full responsibility for the implementation and management of the construction activities contained in their schedules.
  - .3 The *Contractor* is to identify to the *Owner* and *Consultant* the *Contractor's* designated individual responsible for utilizing the specified scheduling software to prepare and maintain the Construction Schedule and other schedules, herein defined as the *Contractor's* Scheduler. The *Contractor's* Scheduler is required to have a minimum of 5 years of



experience utilizing the specified scheduling software for planning and scheduling of construction project.

## 1.5 SCHEDULING SOFTWARE

- .1 The Construction Schedule is to be developed utilizing Microsoft Project (2003 or later version). Other third-party scheduling software's are not acceptable.

## 1.6 SCHEDULES

- .1 Construction Schedule: Submit a detailed critical path bar chart Construction Schedule with activities itemized to show the orderly planning, organization and execution of the *Work*, which will enable the *Contractor*, *Consultant* and *Owner* to monitor the progress of the *Work* and forecast remaining *Work*. Include in the schedule, the milestone dates for completion of each phase and other milestones specific herein.
- .2 The Construction Schedule is to be in the form of a series of activities and milestones that are logically linked utilizing the critical path methodology.
- .3 The Construction Schedule must clearly represent the applicable sequence of work as outlined in the *Contract Documents*. The Construction Schedule must identify early dates and late dates as well as the *Project* critical path of activities and completion milestones through each phase of the *Project*.
- .4 Organize the Construction Schedule into the *Project's* phases as outlined in the *Contract Documents*. The Construction Schedule shall clearly identify the inter-relationships and logic dependencies between the work of different phases.
- .5 At any given point in time, the Construction Schedule must be fully detailed with activities and milestones for at least the next twelve (12) calendar months or for the entire project duration for projects under 12 months construction time. The level of schedule activity detail beyond the next twelve calendar months can be at a summary level that identifies major groups of activities and milestones for each phase.
- .6 The *Contractor* shall *Provide* further refined and expanded schedule information, as the *Work* progresses and in sufficient advance of the upcoming work. Dates for the development of this information shall be agreed with the *Owner*, *Consultant*.
- .7 In addition to the Construction Schedule, prepare and submit the following schedules, as specified in Section 01 33 00.
  - .1 Submittal Schedule for *Shop Drawings*, *Product Data* and Samples
  - .2 Submittal Schedule for Mock-ups
  - .3 Submittal Schedule of *Owner* supplied/*Contractor* installed equipment
  - .4 Equipment Delivery Schedule
  - .5 Building Commissioning and Turnover schedule, to be prepared together with *Owner*.

## 1.7 CONSTRUCTION SCHEDULE INFORMATION

- .1 Submission of the Construction Schedule shall constitute the representation by the *Contractor* that:
  - .1 The *Contractor* has distributed the proposed Construction Schedule to the *Subcontractors* for their review and comment.

- .2 Seasonal weather conditions have been considered and included in the planning and scheduling of the *Work* influenced by high and low ambient temperatures and/or precipitation to ensure completion of the *Work* in accordance with the *Contract Documents*.
  - .3 The *Contractor* has incorporated any other special conditions in planning the *Work* such as specified non-work periods, etc.
  - .4 The *Work* has been co-ordinated and scheduled to permit time for work associated with the allowances (cash allowances) included as part of this *Contract*.
  - .5 The *Work* has been co-ordinated and scheduled to permit time for work associated with the alternatives included as part of this *Contract*.
- 
- .2 Include the dates for the commencement and completion of each major task for each distinct part of the *Project* construction. Activities shall be itemized to show the orderly planning, organization and execution of the *Work*, which will enable the *Contractor* and the *Owner* to monitor the progress of the *Work* and forecast remaining *Work*.
  - .3 Include activities in the Construction Schedule for the commencement and completion of each major element of all *Contractor* and *Subcontractor* work.
  - .4 Include specific activities and milestones in the Construction Schedule for work under the responsibility of the *Owner* that must coordinate with the *Contractor's* work including but not limited to *Owner* supplied equipment, vacancy and move-in periods. Such activities will be identified by the *Contractor* and *Owner*.
  - .5 Include specific activities and milestones in the Construction Schedule for work under the responsibility of the *Consultant* that must coordinate with the *Contractor's* work including but not limited to inspections and approvals. Such activities will be identified by the *Contractor* and *Consultant*.

## 1.8 FORMAT

- .1 Prepare the Construction Schedule in the form of a time-scaled, horizontal bar chart that clearly identifies the *Project* critical path of activities and completion milestones for the distinct phases and sub- phases of the *Project*. *Provide* a separate bar identifying the start and finish of each significant element of construction as required to define a clear progression of activities through the distinct phases/sub- phases of the *Project* as specified in the *Contract Documents*.
- .2 Show sufficient detail to identify the major activities and milestones dates for overall planning and coordination purposes. Activities (with the exception of the contingency for unforeseen delays and delays resulting from changes to the *Contract*) shall have a maximum duration of 4 weeks. Show milestones for the start and completion of each major work area, building system and phase or sub- phase of the *Work*.
- .3 Ensure that work of all disciplines (i.e. mechanical, electrical and all other trades) is included and logically linked within the Construction Schedule. Show manufacturing time and delivery dates {milestones} for major equipment and materials. Show deliveries of *Owner* supplied equipment required to meet the Construction Schedule.
- .4 Activities must be in sufficient detail to include for decisions / approvals required by the *Owner* and/or *Consultant* for shop drawings, mock ups, sample submissions, deliveries, cash allowance requirement schedule, off site fabrication, erection, on site installation and any other events or sub activities which may pertain to the activities of the Construction Schedule.

- .5 Construction Schedule information should be in sufficient detail to allow for accurate assessment of percentage completion and coordination with other tasks within the *Project Master Schedule*.
- .6 *Provide* a horizontal time scale identifying the first day of each week as Monday. Show in the Construction Schedule the intended working days and holidays used as the basis for the Construction Schedule information and critical path calculations.
- .7 Activity descriptions should be as consistent and clear as possible in terminology. Start activity descriptions with verbs.
- .8 Include as part of the Construction Schedule information, "dependency logic" information indicating the major predecessor and successor links between schedule activities. When requested, identify the crewing assumptions for the Construction Schedule activities and dependency logic that is governed by or representing crewing availability.

## 1.9 SUBMISSION PROCESS

- .1 Submit the Construction Schedule information, to *Owner* within ten (10) working days from date of award of *Contract*. Construction Schedule information should be consistent with the milestones.
- .2 The *Owner* and *Consultant* shall have ten (10) *Working Days* from initial submission, to review and adjust the Construction Schedule, in consultation with the *Contractor*. The *Contractor* shall revise and resubmit the Construction Schedule for further review and comment. Upon final review, that Construction Schedule will be defined as the "Baseline" version of the Construction Schedule.

### 1.10 BASELINE CONSTRUCTION SCHEDULE

- .1 The Baseline Construction Schedule will form the basis for *Contractor* and *Owner* planning and progress tracking.
- .2 No changes to the Baseline Construction Schedule reflecting later completion dates of activities or target milestones will be accepted as a revision to the Construction Schedule, unless accepted by *Owner* in writing.
- .3 Neither the review of the Baseline Schedule or other date submitted by the *Contractor* pursuant to this Section, nor any other action on the part of the *Consultant* under this section shall in any way be deemed as representation by *Owner* that the *Contractor*, by following a particular schedule or sequence of operation, can or will complete the *Work* by the time(s) required by the *Contract* or by any other time(s). The review of any Baseline Schedule or other date does not relieve the *Contractor* of his obligation to complete the *Work* by the time(s) required in the *Contract*.
- .4 Submit two paper copies on 11 x 17 inch (Ledger), plus electronic copy in native format from the agreed upon scheduling software. *Owner* will review schedule and return review copy.

### 1.11 PROGRESS SCHEDULE

- .1 On a monthly basis, update the Construction Schedule showing projected percentage of completion of each item as of the first day of the month. Indicate progress of each activity to date and projected start and finish dates for each activity. Upon submission this will be deemed the Progress Schedule.
- .2 Include the complete sequence of construction activities.
- .3 Show approved changes occurring since the previous submission of the Progress Schedule:
  - .1 Changes in scope/time
  - .2 Activities modified since previous submission

- .3 Revised projections of progress and completion
- .4 Other identifiable changes
- .5 Submit the Progress Schedule with each application for payment, clearly indicating progress of *Work* to date for which money is being claimed.
- .6 Submit a separate narrative report to define:
  - .4 Problem areas, anticipated delays, and the impact on the schedule
  - .5 Corrective action recommended and its effect
  - .6 Indicate slippage from the schedule, its impact on completion of the phase and the total *Project*, and possible corrective actions. Appropriate corrective action may include, but not be limited to, assignment of additional labour, trade *Subcontractors* or equipment, shift or overtime work at no additional cost to the *Owner*.
  - .7 Submit a separate six week "look-ahead" narrative report indicating major activities to be undertaken or constructed, areas of work, and any impacts upon the *Owner* over the next month.

#### **1.12 BASELINE SCHEDULE REVISIONS**

- .1 Updating the Construction Schedule, as required, to reflect actual progress up to the monthly cut-off date shall not be considered a revision to the Baseline Schedule. All other changes, including, but not limited to, the following shall be considered Baseline Schedule revisions:
  - .1 Adding and/or deleting activity relationships
  - .2 Adding and/or deleting activities
  - .3 Changes to original durations
  - .4 Changes to *Contract* Milestone dates or Constraint dates
  - .5 Performance of work out of sequence
  - .6 Scope Changes through *Change Orders*
- .2 If, as a result of the monthly Progress Schedule submission, it appears the Progress Schedule no longer represents the actual progress of the *Work*, the *Contractor* shall request, a revision to the Baseline Schedule in accordance with General Condition 11.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Administrative
- .4 1.4 Bonds, Certificates And Schedules
- .5 1.5 Schedule Of Submittals
- .6 1.6 Submission Procedures
- .7 1.7 Product Data Sheets
- .8 1.8 Shop Drawings
- .9 1.9 Samples
- .10 1.10 Certificates And Certification Submittals
- .11 1.11 Coordination And Interference Drawings

### **1.3 ADMINISTRATIVE**

- .1 Submit to the *Consultant* all submittals listed for review. Submit with reasonable promptness and in an orderly sequence so as not to cause any delay in the *Work*. Failure to submit in ample time will not be considered sufficient reason for an extension of the *Contract Time*, and no claim for extension by reason of such default will be allowed.
- .2 Submit only those submittals specifically required by the *Contract Documents*, or those specifically requested by the *Consultant*. Any submittals submitted that are not specifically required by the *Contract Documents*, or requested by the *Consultant*, will be returned to the *Contractor* at the *Contractor's* expense without being reviewed.
- .3 *Work* affected by a submittal shall not proceed until the review of that submittal is complete.
- .4 Submittals that contain substitutions will be rejected. Substitutions are permitted only when approved in accordance with Section 01 25 00.
- .5 The *Contractor's* review of submittals:
  - .1 The *Contractor* is to review submittals prior to submission to the *Consultant*. This review represents that the necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with the requirements of the *Work* and all of the *Contract Documents*.
  - .2 Submittals shall bear stamp of the *Contractor* and signature of a responsible official in the *Contractor's* organization indicating in writing that such submittals have been checked and coordinated by the *Contractor*. The *Contractor's* review shall be performed by qualified personnel who have detailed understanding of those elements being reviewed and of the conditions at the *Place of the Work* proposed for installation.
  - .3 Check and sign each submittal and make notations considered necessary before submitting to the *Consultant* for review. Where submittal is substantially and obviously in conflict with

- requirements of the *Contract Documents*, reject submittal without submitting to the *Consultant* and request resubmission.
- .4 The *Contractor* shall assume sole responsibility for any conflicts occurring in the *Work* that result from lack of comparison and coordination of submittals required for the *Work*.
  - .5 Notify the *Consultant* in writing of changes made on submittals from the *Contract Documents*. The *Consultant's* review of submittals shall not relieve the *Contractor* of responsibility for changes made from the *Contract Documents* not covered by written notification to the *Consultant*.
  - .6 Submittals that clearly have not been reviewed by the *Contractor*, or are not stamped, signed, dated, and identified as to the specific project, will be returned without being reviewed.
  - .7 No changes to the *Work* or the *Contract Documents* shall be made by way of submittals.
  - .8 .1 Changes to the *Work* shall only be made following procedures specified for changes in the *Work*.
  - .9 .2 Submittals that include changes to the *Work* or the *Contract Documents* shall be stamped "REVISE AND RESUBMIT" and returned.
- .6 The *Consultant's* review of submittals:
- .1 Review of submittals by the *Consultant* is for the sole purpose of ascertaining conformance with the general design concepts and the general intent of the *Contract Documents*. This review shall not mean that the *Consultant* approves the detail design inherent in the submittals, responsibility for which shall remain with the *Contractor*. Such review shall not relieve the *Contractor* of responsibility for errors or omissions in the submittals, or responsibility for meeting requirements of the *Contract Documents*.
  - .2 As part of their scope of work, *Consultant* shall review shop drawings no more than twice. Should three or more reviews be required due to reasons of *Contractor* omissions causing resubmission requests, then *Contractor* shall reimburse the *Consultant* for time expended in these extra reviews. Time shall be invoiced to the *Owner* (to be deducted from monies due to the *Contractor* and paid to *Consultant* by *Owner*) at rates recommended by *Consultant's* professional association and disbursements shall be invoiced at *Consultant's* cost. The *Contractor* shall cover directly costs and administration associated with courier services and the like for these extra shop drawing reviews.
  - .3 The *Contractor* shall be responsible for dimensions to be confirmed and correlated at the *Place of the Work* for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the *Work*.
  - .4 The *Consultant's* review and markings on submittals do not authorize changes in the *Work* or the *Contract Time*, and will be accommodated at no additional cost to the *Owner*. If, in the opinion of the *Contractor*, the *Consultant's* markings on submittals constitute a change in the *Work* or will effect a change in the *Contract Time*, then the *Contractor* shall so notify the *Consultant* in writing and request an interpretation following the procedures for requests for interpretation in accordance with Section 01 26 00. If the *Consultant* finds that the *Consultant's* markings on submittals do constitute a change in the *Work* or will effect a change in the *Contract Time*, then a *Change Order* will be prepared therefore. The time taken to process such a request for interpretation shall not, in and of itself, constitute a change in the *Work* nor increase the *Contract Time*.

- .5 Submittals received but not required by the *Contract Documents* or requested by the *Consultant* will not be reviewed by the *Consultant* and will be marked 'NOT REVIEWED' by the *Consultant* and returned to the *Contractor*.
- .7 Prepare submittals using SI (metric) units.
- .8 Verify that field measurements and affected adjacent work are coordinated.
- .9 The *Contractor's* responsibility for errors and omissions in the submissions is not relieved by the *Consultant's* review of submittals.
- .10 The *Contractor's* responsibility for deviations in the submission from the requirements of the *Contract Documents* is not relieved by the *Consultant's* review of submittals.
- .11 Make submittals with reasonable promptness and in an orderly sequence so as to cause no delay in the *Work*. Be responsible for delays, make up time lost and pay added costs, at no additional cost to the *Owner*, incurred because of not making submittals in due time to permit proper review by *Consultant*.
  - .1 Once submitted, a submittal shall not be re-submitted until original submission has been reviewed by *Consultant* and returned to *Contractor*.
- .12 Submittals that contain substitutions will be rejected. Substitutions are permitted only on substitution submittals as specified in Section 01 25 00.
- .13 Do not proceed with work affected by a submittal, including ordering of Products, until relevant submittal has been reviewed by *Consultant*.
- .14 Keep copies of reviewed submittals at the *Place of the Work* in an organized condition. Only submittals that have been reviewed by the *Consultant* and include the *Consultant's* Submittal Review Form, as applicable, are permitted at the *Place of the Work*.
- .15 The *Work* shall conform to reviewed submittals subject to the requirements of this section. Remove and replace materials or assemblies not matching reviewed submittals at no increase in the *Contract Time* and at no additional cost to the *Owner*.
- .16 Engineered submittals:
  - .1 Submittals for items required to be engineered shall be prepared under the direct control and supervision of a Professional Engineer, registered in the *Place of the Work* and having the minimum professional liability insurance and requirements as required by the Professional Engineers of Ontario, who shall also apply his/her professional seal and signature to submittals prepared under their direct control and supervision.
  - .2 Include with engineered submittal, Professional Engineer's 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, and *Authorities Having Jurisdiction*.
  - .4 Engineered submittals shall include design calculations, complete with references to codes and standards used in such calculations, supporting the proposed design represented by the submittal. Prepare calculations in a clear and comprehensive manner so that they can be easily reviewed. Incomplete or haphazard calculations will be rejected.
  - .5 The Professional Engineer responsible for the preparation of engineered submittals shall undertake periodic field review, including review of associated mock-ups, at locations

wherever the work as described by the engineered submittal is in progress, during fabrication and installation of such work, and shall submit a field review report after each visit. Field review reports shall be submitted to the *Consultant*, to *Authorities Having Jurisdiction* as required, and in accordance with the Ontario Building Code.

- .6 Field reviews shall be at intervals as necessary and appropriate to the progress of the work described by the submittal to allow the Professional Engineer to be familiar with the progress and quality of such work and to determine if the work is proceeding in general conformity with the *Contract Documents*, including reviewed shop drawings and design calculations.
- .7 Upon completion of the parts of the *Work* covered by the engineered submittal, the Professional Engineer responsible for the preparation of the engineered submittal and for undertaking the periodic field reviews described above, shall prepare and submit to the *Consultant* and *Authorities Having Jurisdiction*, as required, a letter of general conformity for those parts of the *Work*, certifying that they have been provided in accordance with the requirements both of the *Contract Documents* and of the *Authorities Having Jurisdiction* over the *Place of the Work*.
- .8 Costs for such field reviews and field review reports and letters of general conformity are included in the *Contract Price*.

#### 1.4 BONDS, CERTIFICATES AND SCHEDULES

- .1 Prior to commencement of the *Work*, the *Contractor* is required to *Provide* to the *Owner* a copy of the *Contractor's* current Certificate of Clearance from the Workplace Safety and Insurance Board.
- .2 No later than 10 *Working Days* prior to, and as a condition of, the first application for progress payment, the *Contractor* is required to submit the following to the *Consultant*:
  - .1 A copy of the *Contractor's* Certificate of Clearance from the Workplace Safety and Insurance Board provided to the *Owner* in accordance with paragraph 1.4.1 (above).
  - .2 A schedule of values for the parts of the *Work* showing values for each part of the *Work* distributed over each section of the *Technical Specifications* to the satisfaction of the *Consultant*. Make revisions to the schedule as required until acceptance by the *Consultant* is achieved.
  - .3 A construction progress schedule in accordance with paragraph 1.8 of this Section (below).
  - .4 Bonding information shall be submitted to the *Region* in accordance with the requirements of the *Contract Documents*.

#### 1.5 SCHEDULE OF SUBMITTALS

- .1 Before commencement of the *Work*, submit to the *Consultant* a detailed schedule of submittals required by the *Contract Documents* correlated to the construction progress schedule specified under paragraph 1.8 of this section (below).
  - .1 Schedule shall be accompanied by a checklist, correlated to both the schedule of submittals and the schedule of inspections and tests (specified under Section 01 45 00), listing the following:
    - .1 Shop drawings.
    - .2 Samples.
    - .3 Mock-ups.



- .4 Reviews, tests and inspections by:
  - .1 Manufacturers.
  - .2 Authorities Having Jurisdiction.
  - .3 Inspection and testing companies.
  - .5 Demonstration and training.
- .2 Indicate dates for submitting, review time, resubmission time, float time, and last date for meeting construction schedule.
- .3 *Consultant* will review submittal schedule and advise the *Contractor* if volume and timing of submittals will permit timely review and response. The *Consultant* may require modifications to submittals schedule in order to allow adequate time for review of submittals. Adjust submittals schedule and construction schedule as required to comply with *Consultant's* needs.
- .4 Make provisions in schedule for at least 10 *Working Days* for the *Consultant's* review of submittals. When submittals have to be reviewed by one or more of the *Consultant's* subconsultants, add 5 more *Working Days* for a total of 15 *Working Day* review period.
- .5 If the *Consultant* requires resubmission of submittals, allow for an additional 10 *Working Days* review for each resubmission.
- .6 If, at any time, the *Contractor* submits a large enough number of submittals such that the *Consultant* cannot process these submittals within 10 *Working Days*, the *Consultant*, in consultation with the *Contractor* within 3 *Working Days* of receipt of such submittal, will *Provide* the *Contractor* with an estimate of the time necessary for processing same. The *Contractor* shall accommodate such necessary time at no increase in the *Contract Time* and at no additional cost to the *Owner*.
- .7 The *Contractor* shall periodically resubmit the submittal schedule to correspond to changes in the construction schedule. Such resubmissions shall maintain the minimum 10 *Working Day* period for the *Consultant's* review.
- .8 Schedule submissions of submittals well in advance of scheduled dates for installation, to *Provide* lead time for reviews and possible resubmissions and for placing orders and securing delivery so as to avoid delays in the *Work*.

## 1.6 SUBMISSION PROCEDURES

- .1 Coordinate each submittal with requirements of the *Work* and *Contract Documents*. Individual submittals shall include related information.
- .2 Distribute copies of submittals to parties whose work is affected by submittals except *Consultant* and *Owner* before final submission for review by *Consultant*.
- .3 Accompany submittals with transmittal letter, containing:
  - .1 Date.
  - .2 *Project* title and number.
  - .3 *Contractor's* name and address.
  - .4 *Contractor's* review stamp.
  - .5 Identification and quantity of each submittal.

- .6 Other pertinent data.
- .4 Each submittal shall be identified numerically by relevant specification section number with a numeric indicator for multiple submittals by that section followed by revisions number, for example 04 05 19-01-R0.
- .5 Submit original PDF documents only: scanned documents shall not be accepted.
- .6 Make any changes in submittal that *Consultant* may require, consistent with *Contract Documents*, and resubmit as directed by *Consultant*.
- .7 Notify *Consultant*, in writing when resubmitting, of any revisions other than those requested by *Consultant*.
- .8 After *Consultant's* review, distribute copies to affected parties.

## 1.7 PRODUCT DATA SHEETS

- .1 Submit *Product* data sheets as follows:
  - .1 1 copy digitally in pdf format to *Consultant*
- .2 Submit *Product* data sheets as called-for by the *Contract Documents* or as the *Consultant* may reasonably request where shop drawings will not be prepared due to a standardized manufacture of a *Product*. Manufacturers' catalogue cuts will be acceptable in such cases, providing that they are 213 mm x 275 mm (8-1/2" x 11") originals, and that they indicate choices including sizes, colours, model numbers, options and other pertinent data, including installation instructions. Submissions showing only general information are not acceptable.
- .3 Where requirements of *Contract Documents* are more stringent than design proposed on *Product* data sheets, the requirements of the *Contract Documents* take priority.
- .4 Upon completion of review by *Consultant*, 1 marked set of *Product* data sheets will be returned to *Contractor* in digital format for reproduction and distribution.
- .5 Retain 1 complete set of prints of reviewed *Product* data sheets for issuance to *Owner* immediately prior to *Substantial Performance of the Work*, in an acceptable, bound manner and in accordance with Section 01 77 00.

## 1.8 SHOP DRAWINGS

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data which are to be provided by the *Contractor* to illustrate details of a portion of the *Work*.
- .2 The *Contract* shall submit shop drawings digitally in PDF format to the *Consultant*.
- .3 The *Contractor* shall *Provide* all shop drawings called for in the *Contract Documents* or as the *Consultant* may reasonably request.
- .4 The *Contractor* shall submit copies of reviewed shop drawings to *Authorities Having Jurisdiction* as required.
- .5 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes, and all other information necessary for completion of the work.
- .6 Where articles or equipment attach or connect to other articles or equipment, clearly indicate that such items have been coordinated, regardless of where in the *Contract Documents* the adjacent items are specified or indicated. Indicate cross references to the *Contract Documents*.

- .7 Shop drawings shall clearly define the division of responsibility. No Products, items or equipment, or description of work, shall be indicated to be supplied, or work to be done, "By Others" or "By Purchaser." It shall also be understood that any items, equipment, or description of the work shown on the shop drawings shall form a part of the *Contract Documents* unless specifically noted to the contrary. Shop drawings that do not clearly define the division of responsibility will be returned to the *Contractor* for same before being accepted for review by the *Consultant*.
- .8 Shop drawings shall include:
- .1 Fabrication and erection dimensions.
  - .2 Plans, sections, elevations, arrangements and sufficient full size details which indicate complete construction, components, methods of assembly as well as interconnections with other parts of the *Work*.
  - .3 Design calculations prepared by professional engineer, as required, substantiating sizes for members and connections based on design loads.
  - .4 Clear definition of the division of responsibility for the work described thereon. No Products, items or equipment, or description of work, shall be indicated to be supplied, or work to be done, "By Others" or "By Purchaser". Shop drawings marked with either of these phrases will be rejected without having been reviewed by the *Consultant*.
  - .5 Location and type of exposed anchors, attachments and locations and types of fasteners, including concealed reinforcements to accept mounted fasteners.
  - .6 Adhesives, joinery methods and bonding agents.
  - .7 Kinds and grades of materials, their characteristics relative to their purpose, detailed description of finishes and other fabrication information.
  - .8 Configurations, types and sizes required; identify each unit type on drawing and on *Product*.
  - .9 Descriptive names of equipment and mechanical and electrical characteristics when applicable.
  - .10 Data verifying that superimposed loads will not affect function, appearance and safety or work shown on shop drawings, as well as other interconnected work.
  - .11 Assumed design loadings, dimensions of elements and material specifications for load-bearing members.
  - .12 Proposed chases, sleeves, cuts and holes in structural members.
  - .13 Wall thicknesses of metals.
  - .14 Location and types of welds. For structural welds use AWS symbols and clearly show net weld lengths and sizes.
  - .15 Materials, gauges, and sizes being supplied including connections, attachments, reinforcement, anchorage and locations of exposed fastenings.
  - .16 Installation instructions and details for products to be installed by separate *Subcontractors*, including function of each part.
  - .17 A list of Products covered by, or included on, the shop drawing. List of Products shall be complete and show manufacturer's name, *Product* name, generic description, standard

certification where specified, manufacturer's complete installation data and precautions against wrong installation, operation and maintenance.

- .18 Refer to individual sections of the specifications for more particular requirements for shop drawings.
- .9 Compatibility statement: Include with each shop drawing a statement that each *Product* and material indicated on the shop drawing is compatible with each other *Product* and material with which it comes into contact.
- .10 *Consultant* markings and resulting action required:
  - .1 Shop drawings requiring no changes will be marked 'REVIEWED', and shall be submitted for as-built drawings purposes.
  - .2 Shop drawings requiring several changes will be marked 'REVIEWED as NOTED' and shall be revised and submitted for as-built drawings purposes.
  - .3 Shop drawings requiring substantial changes will be marked 'REVISE AND RESUBMIT' and Shall be revised and resubmitted until *Consultant* stamps drawings with 'REVIEWED' or 'REVIEWED as NOTED'.
- .11 The *Consultant* will require a maximum of 10 *Working Days* from receipt of shop drawings for processing of same. The *Contractor* shall make allowances in the scheduling of the *Work* for this period of time for each submission and shall, also, make allowances in the schedule for the following potentialities:
  - .1 If, upon review, adjustments are made on the shop drawings by the *Consultant* and they are returned to the *Contractor* marked "Revise and Resubmit," the shop drawing shall be revised as required and clean copies resubmitted to the *Consultant* for an additional review. The *Consultant* will, for each resubmission, require a maximum of 10 *Working Days* from receipt for processing of shop drawings.
  - .2 No claim for an increase in the *Contract Time* or claim for a change in the *Work* shall be considered or approved as a result of any of the following:
    - .1 The time taken for processing of shop drawings by the *Consultant* unless longer than 10 *Working Days* after receipt of same.
    - .2 The time taken by the *Contractor* for revision and resubmission of shop drawings.
    - .3 Any adjustments made on the shop drawings by the *Consultant* that are consistent with the intent of the *Contract Documents*.
- .12 Make the changes in the shop drawings as the *Consultant* may require, consistent with the *Contract Documents*. When resubmitting, notify the *Consultant* in writing of any revisions made other than those requested.
- .13 If, upon review by the *Consultant*, no errors or omissions are discovered or if only minor corrections are made, all submitted copies of the shop drawing (except the two retained by the *Consultant*) will be returned to the *Contractor* marked as "Reviewed" or "Reviewed as Noted", and fabrication or installation of the work may proceed.
- .14 Upon completion of review by *Consultant*, 1 marked set of shop drawings will be returned to *Contractor* in digital format for reproduction and distribution.

- .15 Retain 1 complete set of prints of reviewed shop drawings for issuance to *Owner* immediately prior to *Substantial Performance of the Work*, in an acceptable, bound manner and in accordance with Section 01 77 00.
- .16 Submit copies of reviewed shop drawings to authorities having jurisdiction as required.

## 1.9 SAMPLES

- .1 Submit for review samples as requested in the *Contract Documents*. Label samples as to origin and intended use in the *Work*.
- .2 Unless otherwise directed by the *Consultant*, deliver samples prepaid to the *Site* office and notify the *Consultant* in writing of the availability of sample for review.
- .3 Notify the *Consultant* in writing at the time of submission of any deviations in the samples from the requirements of the *Contract Documents*.

## 1.10 CERTIFICATES AND CERTIFICATION SUBMITTALS

- .1 Certificates and certifications submittals: *Provide* a statement that includes signature of entity responsible for preparing certification.

## 1.11 COORDINATION AND INTERFERENCE DRAWINGS

- .1 The *Contractor* shall be responsible for preparing and submitting to the *Consultant* for review, a consolidated set of installation coordination/interference drawings for the building showing how the building systems (including, but not limited to, domestic heating and cooling piping, air distribution systems, air control boxes, reheat coils, fire protection piping, electrical distribution, fire alarm systems, lighting, communication cabling, security cabling, new and existing structural work and conduit runs) will fit together above ceiling areas and in exposed ceiling, to allow ceiling heights required by the *Contract Documents* and by maintenance and control access.
  - .1 Each *Subcontractor* whose work is affected by the information presented on the coordination and interference drawings shall sign-off on the drawings prior to submission to the *Consultant* and thereby agrees to coordinate their parts of the *Work* to preserve the coordination and interference guidelines represented by the coordination and interference drawings.
- .2 Prepare sleeve drawings for work of Divisions 03 and 05, and Divisions 21, 22, and 23, and Divisions 26, 27, and 28 showing size and location of penetrations through load bearing elements. Submit sleeving drawings in electronic form to *Consultant* for review not less than 10 *Working Days* prior to construction of affected work.
- .3 Prepare embedded conduit drawings, showing size and location of penetrations through load bearing elements. Submit embedded conduit drawings in electronic form to *Consultant* for review not less than 10 *Working Days* prior to construction of affected work.
- .4 Prepare insert setting drawings for work to be cast into concrete and/or mortared into masonry elements. Submit insert setting drawings in electronic form to *Consultant* for review not less than 10 *Working Days* prior to construction of affected work.
- .5 Coordinate placement of equipment to ensure that components will be properly accommodated within spaces. *Provide* prior to commencement of *Work*. In areas where equipment and services are exposed, care shall be taken to organize and layout services in an organized and orderly manner. Where possible services are to run parallel or at right angles to one another as required. *Consultant* may request that service layout be reconfigured to suit sightline concerns during the

coordination drawings review phase. These drawing changes are to be executed at no additional cost to the *Owner*.

- .6 Take complete responsibility for remedial work that results from failure to coordinate the *Work* prior to fabrication and installation.
- .7 Ensure that accesses and clearance required by jurisdictional authorities and/or for easy maintenance of equipment are Provided in layout of equipment and services.
  - .1 Indicate required access points, clearances, and sizes for equipment and pieces of equipment required in the *Work*. Note areas where access is compromised by interferences with other services for review by the *Consultant*. Do not proceed with installation of equipment in such compromised areas until a proposed means of providing access has been accepted by the *Consultant*.
- .8 Prepare and circulate coordination, interference and sleeving drawings prior to placing orders for equipment and materials.
- .9 Coordination and interference drawings shall be circulated for mark-ups by *Subcontractors* responsible for work of Divisions 3, 5, 9, 11, 14, Divisions 21, 22, and 23, and Divisions 26, 27, and 28.
- .10 Coordinate preparation and submission of coordination and interference drawings with shop drawings.
- .11 Show cross sections in key areas, as required, and as defined by *Consultant*. Show rebar, structural elements, piping, air handling and heating systems distribution, sprinkler system distribution, lighting, gypsum board wall and ceiling assemblies, acoustical isolation, Products and systems involving life safety, conveying systems, electrical distribution.
- .12 Show ductwork as 2 lines. Show cross sections in key areas, as required, and as directed by *Consultant*. Show re-bar, structural elements, air handling and heating systems distribution, gypsum board wall and ceiling assemblies, acoustical isolation, Products and systems involving life safety, conveying systems, and electrical distribution.
- .13 Coordination and interference drawings shall be produced in uniform scale on media that will allow overlays to be assembled. Upon incorporation of details, drawings shall be submitted to *Consultant* for review. Areas of conflict or interference shall be resolved in a mutually agreed manner between *Subcontractors* and resubmitted on coordination and interference drawings until accepted by *Consultant*.

## **PART 2 - PRODUCTS**

Not applicable.

## **PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.
- .2 This section describes requirements applicable to all Division Sections.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Reference Standards
- .4 1.4 Responsibility
- .5 1.5 Safety Activities
- .6 1.6 Posting Of Documents
- .7 1.7 Correction Of Non-Compliance
- .8 1.8 Hazardous Work
- .9 1.9 Work Stoppage
- .10 1.10 Fire Protection

### **1.3 REFERENCE STANDARDS**

- .1 Safety Province of Ontario: Occupational Health and Safety Act, Regulation and Code R.S.O - Amended 2022, including requirements for a "Constructor" as defined by the Act.

### **1.4 RESPONSIBILITY**

- .1 The " Constructor " according applicable local jurisdiction, is responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site specific Health and Safety Plan.
- .3 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, and follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction. Advise Consultant verbally and in writing.

### **1.5 SAFETY ACTIVITIES**

- .1 Perform site specific safety hazard assessment related to project.
- .2 Schedule and administer Health and Safety meeting with Consultant prior to commencement of Work.
- .3 Perform Work in accordance with Section 01 41 00 - Regulatory Requirements and this section.

## **1.6 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Consultant.

## **1.7 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Consultant.
- .2 Provide Consultant with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Consultant may stop Work if non-compliance of health and safety regulations is not corrected.

## **1.8 HAZARDOUS WORK**

- .1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Consultant.
- .2 Use powder actuated devices only after receipt of written permission from Owner.

## **1.9 WORK STOPPAGE**

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

## **1.10 FIRE PROTECTION**

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.
- .3 Maintain placed or installed fire resistive construction to protect the portions of the Work during construction.

## **PART 2 - PRODUCTS**

Not applicable.

## **PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**



## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Requirements
- .4 1.4 References to Regulatory Requirements
- .5 1.5 Precedence
- .6 1.6 Codes
- .7 1.7 Industry Standards
- .8 3.1 Applicable Laws, Ordinances and Regulations

### **1.3 REQUIREMENTS**

- .1 This Section includes regulatory requirements applicable to the *Contract Documents* and the Project and *Work*. This Section shall cover the general requirements for regulatory requirements pertaining to the Work and is supplementary to all other regulatory requirements mentioned or referenced elsewhere in the *Contract Documents*.
- .2 The applicable edition of all codes shall be that currently adopted at the time of issuance of permits by the Authority Having Jurisdiction and shall include all modifications and additions adopted by that authority.
- .3 The applicable date of laws and ordinances shall be that of the date of performance of the Work affected by such laws and ordinances.
- .4 Specific reference in the Specifications to codes and regulations or to requirements of regulatory agencies shall mean the latest edition of each adopted by the regulatory agency in effect at the time of issuance of permits.
- .5 All materials, installation, and construction shall comply with the applicable provisions of current laws, codes, safety rules, and regulations of local, federal and any other applicable authorities ("Codes").
- .6 Codes referenced in the *Contract Documents* shall have full force and effect as though set out in full in these Specifications. Nothing in the Contract shall be construed to permit Work not conforming to applicable Code requirements.
- .7 The Codes and other authorities referenced in the Contract Documents are not a comprehensive list of all Codes applicable to the Work; the Codes listed in the Contract Documents are referenced for the information and convenience of the Contractor only. The Consultant does not represent that all Codes applicable to the Work have been cited or adequately described in the Contract Documents. Contractor is solely responsible for compliance with all Codes applicable to the Work and relevant to the Contractor's means and methods of performing said Work.

### **1.4 REFERENCES TO REGULATORY REQUIREMENTS**

- .1 General:

- .1 References to codes, standards or regulatory requirements made on Drawings or in Specifications are considered an integral part of Contract Documents as minimum requirements.
- .2 All statutes, ordinances, laws, rules, codes, regulations, standards, and lawful orders of all public Authorities Have Jurisdiction of the Work, are hereby incorporated into these Contract Documents as if repeated in full herein and are intended to be included in any reference to Code or Building Code, unless otherwise specified, including, without limitation, the references below.
- .3 Referenced Codes, laws, ordinances, rules and regulations shall have full force and effect as though printed in full in these Specifications. Contractor is assumed to be and shall be familiar with these requirements, including having readily available access to these requirements.
- .4 References on the Drawings or in the Specifications to "code", "Code" or "building code" similar terms, not otherwise identified, shall mean the codes specified above, together with all additions, amendments, changes, and interpretations adopted by code Authorities of the Jurisdiction having authority over the Project.
- .5 Contractor shall conform to all applicable federal, provincial, and local codes, laws, ordinances, rules and regulations, whether or not referenced in the Contract Documents. Compliance with applicable regulatory requirements is the responsibility of the Contractor.

## **1.5 PRECEDENCE**

- .1 Where specified requirements differ from the requirements of applicable codes, ordinances and standards, the more stringent requirements shall take precedence with no change in Contract Price or Contract Time.
- .2 Where Contract Documents require or describe products or execution of better quality, higher standard or greater size than required by applicable codes, ordinances and standards, Contract Documents shall take precedence.
- .3 Where no requirements are identified on Contract Documents, comply with all requirements of applicable codes, ordinances and standards of governing Authorities Have Jurisdiction.

## **1.6 CODES**

- .1 Applicable Codes:
  - .1 The codes that apply to this Project include, but are not limited to, the currently adopted editions. Comply with Codes in effect at the time of issuance of permits.
- .2 Application of the Codes:
  - .1 Whenever there is a conflict between general and specific requirements in the code, the specific requirements shall be followed.
  - .2 Where differences exist between codes affecting this Work, the code affording the greatest protection shall govern.
  - .3 Where codes other than those listed in this Section are referred to in the different sections of the Specifications, it is understood that they apply fully as if cited herein.
  - .4 All Work performed shall be in accordance with applicable codes; a copy of each shall be kept at the Place of Work.
  - .5 If Contractor observes that the drawings and Specifications are at variance with the codes, he or she shall notify the consultant, in writing, at once.

## **1.7 INDUSTRY STANDARDS**

### **.1 Application:**

- .1 The industry standards applicable to the Work are indicated in appropriate individual sections of these Specifications, either by their names and the names of the trade associations, government agencies or other producers of standards, or by well recognized abbreviations thereof:
  - .1 Refer questions on the meaning of abbreviated designations to the Consultant for clarification before proceeding with Work affected thereby.
  - .2 Comply with standards in effect at the date of these Contract Documents, except where a standard or specific date or edition is indicated.
- .2 Any material specified by reference to the number, symbol, or title of a specific standard, such as Commercial Standard, Federal Specifications, a trade association standard, or other similar standard, shall comply with the requirements in the latest revision thereof and any amendments or supplements thereto in effect on the date of Contract Documents.
- .3 The standard referred to, except as modified in the Contract Documents, shall have full force and effect as though printed in these Specifications.
- .4 These standards are not furnished to Contractor since manufacturers and trades involved are assumed to be familiar with their requirements. Where copies of standards are needed for proper performance of the Work, the Contractor shall obtain such copies which shall be maintained at the Place of Work by the Contractor and made available for review on request by the Consultant
- .5 Where referenced Standard specifications require weather protection, it shall be provided by the Contractor at no additional cost to the Owner and shall be deemed necessary in order to construct the Project within the specified time period.

## **PART 2 - PRODUCTS**

Not applicable.

## **PART 3 - EXECUTION**

### **3.1 APPLICABLE LAWS, ORDINANCES AND REGULATIONS**

- .1 Work shall be accomplished in conformance with all applicable laws, ordinances, rules and regulations of federal, provincial, and local governmental agencies and jurisdictions having authority over the Project.
- .2 Work shall be accomplished in conformance with all rules and regulations of public utilities and utility districts.
- .3 Where such laws, ordinances, rules and regulations require more care or greater time to accomplish Work, or require better quality, higher standards or greater size of products, Work shall be accomplished in conformance to such requirements with no change to the Contract Time and Contract Price, except where changes in laws, ordinances, rules and regulations occur subsequent to time of issuance of permits.
- .4 No Change Order shall be considered for any change in any applicable federal, provincial, or local code or regulation if similar language existed in an alternate applicable regulation in force at the time of issuance of permits.

- .5 Contractor shall not allow design or construction of any conditions wherein the finished Work will not comply with current applicable codes. No Change Order shall be considered for the Work correction of any Work not complying with code.

**END OF SECTION**

## PART 1 – GENERAL

### 1.1 GENERAL INSTRUCTIONS

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 01.

### 1.2 SECTION INCLUDES

- .1 1.1 General Instructions  
.2 1.2 Section Includes  
.3 1.3 Abbreviations

### 1.3 ABBREVIATIONS

- .1 When the following abbreviations are used in the Contract Documents, they have the meaning listed:

A	
&	And
@	At
A	Ampere
AA	Aluminum Association
AAADM	American Association of Automatic Door Manufacturers
AABC	Associated Air Balance Council
AAMA	Architectural Aluminum Manufacturer's Association
AASHO	American Association of State Highway Officials
ABS	Acrylonitrile Butadiene Styrene
AC	Alternating Current
ACG	AABC Commissioning Group
ACI	American Concrete Institute
ACME	Association of Consulting Management Engineers
ACT	Acoustic Ceiling Tile
ACR	Air Conditioning and Refrigeration Field Services
ADA	Americans with Disabilities Act
ADC	Air Distribution and Control
AFF	Above Finish Floor
AFUE	Annual Fuel Utilization Efficiency
AG	Above Grade
AGA	American Gas Association
AHC	Architectural Hardware Consultant
AHJ	Authorities Having Jurisdiction
AHRI	Air Conditioning, Heating & Refrigeration Institute
AHU	Air Handling Unit
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AIMA	Acoustical & Insulating Material Association
AISC	American Institute of Steel Construction

AISI	American Iron and Steel Institute
AJT	UL Class J Time Delay Fuse
AL	Aluminum
ALUM	Aluminum
AMACF	Advanced Main Air Circulating Fan
AMCA	Air Moving and Conditioning Association Inc.
ANSI	American National Standards Institute
AODA	Accessibility for Ontarians with Disabilities Act
AP	Aluminum Panel
API	Atmospheric Pressure Ionization
ARCH	Architectural
ARI	Air-Conditioning, Heating, and Refrigeration Institute
ASC	Application Specific Controllers
ASHRAE	American Society of Heating Refrigerating and Conditioning Engineers
ASL	Above Sea Level
ASME	American Society of Mechanical Engineers
ASSE	American Society of Safety Engineers
ASTM	American Society for Testing and Materials
ATC	Acoustic Tile Ceiling
ATS	Automatic Transfer Switch
AUTO	Automatic
AWG	American Wire Gauge
AWI	Architectural Woodwork Institute (USA)
AWMAC	Architectural Woodwork Manufacturers Association of Canada
AWS	American Welding Society
AWWA	American Water Works Association

## **B**

BO	Bottom Of
B/W	Between
B-AAC	BACnet Advanced Application Controller
BAB	Roof Anchor - Bolt Around Beam
BACnet	Building Automation and Control networks
BAS	Building Automation System
B-ASC	BACnet MS/TP Advanced Application Controller
B-AWS	BACnet Advanced Operator Workstation
BBMD	BACnet/IP Broadcast Management Device
BCup	Copper-Phosphorous Brazing Alloy
BD	Board
BF	Barrier Free
BFPB	Barrier-Free Push Button
BFDO	Barrier-Free Door Operator
BHMA	Builders Hardware Manufacturers Association
BIT	Bituminous

BL or BLK	Block
BLDG	Building
BLKG	Blocking
BMS	Building Management System
BN	Bullnose
B-OD	BACnet Operator Display
B-OWS	BACnet Operator Workstation
BS	Black-Out Window Shade
BTL	BACnet Testing Laboratory
BTU	British thermal unit
BX	Flexible Metal Conduit cable
<b>C</b>	
C.B.U	Concrete Block Unit
C.L.	Centerline
C.M.U	Concrete Masonry Unit
C.W.	Curtain Wall
C/W	Complete With
CA	Commissioning Agent
CA ITEM	Cash Allowance Item
CAB	Cabinet
CaGBC	Canada Green Building Council
CATV	Cable Television
CBD	Cement Board
CCA	Canadian Construction Association
CCMC	Canadian Construction Materials Centre
CCRC	Canadian Code for Residential Construction
CCT	Correlated Color Temperature
CCTV	Closed Circuit Television
CEC	Canadian Electrical Code
CEMA	Canadian Electrical Manufacturers Association
CFC	Chlorofluorocarbon
CFM	Cubic feet per minute
CFMA	Construction Financial Management Association
CFUA	Canadian Fire Underwriters Association
CG	Corner Guard
CGA	Canadian Gas Association
CGL	Commercial General Liability
CGSB	Canadian General Standards
CH	Coat Hook
CHAN	Channel
CIQS	Canadian Institute of Quantity
CISC	Canadian Institute of Steel Construction
CISPI	Cast Iron Soil Pipe Institute

CITC	Canadian Institute of Timber Construction
CK	Caulk
CL	Closet
CLA	Canadian Lumbermen's Association
CLG	Ceiling
cm	Centimeter
CMHC	Canada Mortgage and Housing Corporation
CNTR	Counter
CO	Carbon Monoxide
COFI	Council of Forest Industries of British Columbia
COL	Column
CONC	Concrete
CONST	Construction
CONT	Continuous
CONTR	Contractor
CORR	Corridor
COV	Change of Value
CP	Cap Screw
CPCI	Canadian Pre-stressed Concrete Institute
CPMA	Canadian Paint Manufacturers Association
CPT	Carpet
CPTB	Carpet Base
CPVC	Chlorinated polyvinyl chloride
CR	Card Reader
CRCA	Canadian Roofing Contractors Association
CRN	Canadian Registration Number
CRS	Course
CSA	Canadian Standards Association
CSC	Construction Specifications of Canada
CSI	Construction Specifications Institute (USA)
CSPI	Corrugated Steel Pipe Institute
CSR	Vibro-Acoustics Restrained Spring
CSSBI	Canadian Sheet Steel Building Institute
CT	Ceramic Floor Tile
CTB	Ceramic Tile Base
CUA	Canadian Underwriter's Association
cUL	Canadian Underwriters Laboratories
CWB	Canadian Welding Bureau
CWC	Canadian Wood Council
CWP	Cold Working Pressure
CWS	Canada-Wide Standard
CWT	Ceramic Wall Tile
Cx	Commissioning
CYL	Cylinder Lock



<b>D</b>	
D.F	Drinking Fountain
D.O	Door Operator
DB	Dry-bulb temperature
dB	Decibel
dBA	Decibel A-weighting
DC	Door Contact
DDC	Direct Digital Control
DET	Detail
DFO	Department of Fisheries and Oceans
DFT	Dry Film Thickness
DHI	Door Hardware Institute
DIA	Diameter
DIM	Dimension
DIN	Deutsches Institut fur Normung
DIVS.	Divisions
DN	Down
DND	Department of National Defense, Canada
DR	Door
DS	Downspout
DWG	Drawing
DWGS	Drawings
DWR	Drawer
DWV	Drain, Waste and Vent
DX	Direct Expansion

<b>E</b>	
E	East
E.W	Each Way
ECM	Electronic Control Module
ED	Exit Device
EDC	Electronic Door Contact
EDO	Electronic Door Operator
EDS	Electronic Door Strike
EEMAC	Electrical Equipment Manufacturers Association of Canada
EFT	Electrical Fast Transient
EGSA	Electrical Generating Systems Association
EHO	Electronic Hold Open
EIA	Electronic Industries Alliance
EJ	Expansion Joint
EL	Elevation
ELECT	Electrical
ELEV	Elevator
EMC	Electromagnetic compatibility

EMER	Emergency
EMI	Electromagnetic interference
EMS	Electric Motor Starter
EMT	Electrical Metallic Tubing (Conduit)
ENCL	Enclosure
ENTR	Entrance, Entry
EP	Epoxy Paint
EPA	Environmental Protection Agency
EPDM	Ethylene Propylene Diene Monomer rubber
EPX	Epoxy Flooring
EQ	Equal
EQUIP	Equipment
ERV	Energy Recovery Ventilator
ES	Electric Strike
ESA	Electrical Safety Authority
ESD	Electro Static Discharge
EW	Eye Wash
EX or EXIST	Existing
EXP	Exposed
EXT	Exterior

## F

F.A	Fire Alarm
FACP	Fire Alarm Control Panel
FAPS	Fire Alarm Pull Station
FCC	Federal Communications Commission
FCU	Fan Coil Unit
FD	Floor Drain
FDC	Fire Department Connection
FDN	Foundation
FE	Fire Extinguisher
FEC	Fire Extinguisher Cabinet
FF	Factory Finished
FH	Rating Fire & Hose
FHC	Fire Hose Cabinet
FIN	Finish
FLR	Floor
FM	Factory Mutual
FPM	Feet per minute
FR	Fire Retardant
FRR	Fire Resistance Rating
FRS	Fire Route Sign
FS	Folding Seat
FT	Feet, Foot
FT	Foot

FTG Footing

## G

g/L	Grams Per Liter
GA	Gauge
GALV	Galvanized
GANA	Glass Association of North America
GB	Grab Bar
GFI	Ground Fault Interrupter
GFCI	Ground Fault Circuit Interrupter
GL	Glazing
GND	Ground
GPM	Gallons Per Minute
GR	Grade
GWB	Gypsum Wall Board
GWB-AR	Gypsum Wall Board-Abuse Resistant (Inherently MR As Well)
GWB-MR	Gypsum Wall Board-Moisture Resistant
GWMP	Ground Water Management Plan
GYP	Gypsum Board

## H

HB	Hose Bib
HCFC	Hydrochlorofluorocarbons
HD	Hand Dryer
HDA	Heavy Duty Asphalt
HDF	High Density Fiberboard
HDPE	High Density Polyethylene
HDW	Hardware
HDWD	Hardwood
HLR	Horizontal Lifeline Fall Protection System - Roof Mounted
HLW	Horizontal Lifeline Fall Protection System - Wall Mounted
HM	Hollow Metal
HMP	Hollow Metal Panel
HOA	Hand-Off-Automatic
HOC	Hold Open Close
HOD	Hold Open Device
HORIZ	Horizontal
HP	Horse Power
HR	Hour
HRC	High Rupturing Capacity
HRD	Hair Dryer
HS	Hardware Schedule
HSN	Hub and Spigot No-hub (see ASTM C564)
HSP	Hose Standpipe
HSS	Hollow Steel Selection

HT	Height
HV	High Voltage
HVAC	Heating, Ventilation, and Air Conditioning
HW	Hot Water
Hz	Hertz

## I

IAP	Insulated Aluminum Panel
IAPMO	International Association of Plumbing and Mechanical Officials
IAQ	Indoor Air Quality
IC	Intumescent Coatings
ICD	Implantable Cardioverter-defibrillator
ID	Identification
IDIA	Inside Diameter
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society of North America
IFB	Impregnated Fibre Board
IG	Insulating Glass
IGCC	Insulating Glass Certification Council
IGMA	Insulating Glass Manufacturers Association
IGMAC	Insulated Glass Manufacturers Association of Canada
IN	Inch, Inches
INFO	Information
INSUL	Insulated
INSUL	Insulation
INT	Interior
I/O	Input/Output
IP	Internet Protocol
ISO	International Organization for Standardization
IT	Infrastructure Technology

## J

JC	Janitor Closet
JT	Joint

## K

kA	kiloampere
KHz	kilohertz
KP	Kick Plate
kPa	kilopascal
KPD	Key Pad
Kph	kilometers per hour
KVA	kilovolt amps
KVAR	kilovolt-amperes reactive

kW	kilowatt
kwh	kilowatt-hour
KWS	kilowatt-second

## L

L.F	Linear Foot
L.H	Left Hand
l/s	Liters Per Second
LAM	Laminate
LAN	Local Area Network
LAV	Lavatory
LCD	Liquid Crystal Display
LDA	Light Duty Asphalt
LED	Light-Emitting Diode
LINO	Linoleum
LKR	Locker
LNT	Lintel
LP	Low Point
LPM	Liters Per Minute
LRG	Large
LSRCA	Lake Simcoe And Region Conservation Authority
LTIC	Laminated Timber Institute of Canada
LV	Low Voltage
LVL	Level
LVR	Louver
LVR.O	Louver Opening
LVT	Low Voltage thermostat

## M

M	Meter
M.O	Masonry Opening
m/s	Meter Per Second
mA	Milli-Ampere
MAINT	Maintenance
MAS	Masonry
MAT	Mineral Acoustic Tile
MAT'L	Material
MAX	Maximum
MCC	Motor Control Center
MCM	Thousand Circular Mils
MECH	Mechanical
MED	Medium
MERV	Minimum Efficiency Reporting Value
MFG	Manufacturing
MFR	Manufacturer

MI	Mirror
MIA	Marble Institute of America
MIN	Minimum
MIN	Minute
MISC	Miscellaneous
MM	Millimeter
MM	Millimeters
MNR	Ministry of Natural Resources
MOE	Ministry of The Environment
MP	Metal Plate
MPA	Megapascal
MPH	Miles Per Hour
MPMDD	Modified Proctor Maximum Dry Density
MS	Metal Stud
MSS	Manufacturers Standardization Society
MS/TP	Master Slave Token Passing
MSTP	Multiple Spanning Tree Protocol
MTC	Ministry of Transportation and Communications
MTC COORD	Multiple Trade Coordination Required
MTD	Mounted
MTL	Metal
mV	Millivolt
MWLLBD(L)	Murphy Wall Bed - Lateral
MWLLBD(V)	Murphy Wall Bed - Vertical

## **N**

N	North
NAAMM	National Association of Architectural Metal Manufacturers (USA)
NACE	National Association of Corrosion Engineers
NAIMA	North American Insulation Manufacturers Association
NBC	National Building Code of Canada
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards (USDC)
NC	Noise Criterion
NCM	No Centre Mullion
ND	Napkin Dispenser
NDT	Non-Destructive Testing
NEBB	National Environmental Balancing Bureau
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NFWH	Non-Freeze Wall Hydrant
NG	Natural Gas
NHLA	National Hardwood Lumber Association (USA)
NIC	Not in Contract

NLGA	National Lumber Grades Authority
NO	Number
NO/NC	Normally Open/Normally Closed
NOX	Nitrous Oxide
NPSH	Net Positive Suction Head
NPT	National Pipe Thread
NPD	Kinetics Noise Control
NRC	National Research Council
NS	Non-Slip
NTS	Not to Scale
NWWDA	National Wood Window and Door Association

## O

OAT PG	Outdoor Air Temperature Program
O&M	Operations & Maintenance
OBC	Ontario Building Code
OC	On Centre
OCIP	Owner Controlled Insurance Program
OD	Outside Diameter
ODBC	Oracle Database Connectivity
ODP	Qzone Depletion Prevention
ODS	Overhead Door Stop
OEM	Original Equipment Manufacturing
OESC	Ontario Electrical Safety Code
OFC	Ontario Fire Code
OH	Overhead
OHC	Overhead Closer
OHSAA	Occupational Health and Safety Act
OPG	Opening
OPP	Opposite
OPSS	Ontario Provincial Standard Specifications
ORN	Ornamental
OSA	Outside Air
OS&Y	Outside Screw and Yoke
OWSJ	Open Web Steel Joist
OZ.	Ounce

## P

PA	Paging System
Pa	Pascal
PANIC	Rated Panic Device
PAR	Parallel
PART	Partition
PB	Push Button
PC	Precast

PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PDF	Portable Document Format
PDI	Plumbing and Drainage Institute
PE	Pressure Electric (Switch)
PER	Perimeter
PERP	Perpendicular
PF	Picofarad
PH	Potential Hydrogen (Ph Unit of Measure)
PIB	Polyisobutylene
PID	Proportional Integrative Derivative
PL or PLL	Plastic Laminate
PL	Plate
PLAM	Plastic Laminate
PLF	Platform
PNL	Panel
PNT	Paint
POL	Polished
PP	Push Plate
PR	Pair
PREFAB	Prefabricated
PREFIN	Prefinished
PREMANUF	Pre-Manufactured
PRFN	Pre-Finished
PRL	Private Lock
PROF	Profile
PRV	Pressure Reducing Valve
PSI	Pounds Per Square Inch
PSID	Pounds Per Square Inch Differential
PSIG	Pounds Per Square Inch Gauge
P/T	Pressure and Temperature
PT	Porcelain Tile
PTD	Paper Towel Dispenser
PTD/WR	Paper Towel Dispenser & Waste Receptacle
PTFE	Polytetrafluoroethylene
PTL	Push to Lock
PTTW	Permit to Take Water
PVC	Polyvinyl Chloride
PWD	Plywood

## Q

QTR.	Quarter
QTY	Quantity

## R



R	Radius
R/A	Return Air
RA	Roof Anchor
RAT'G	Rating
RB	Resilient Base
RCA	Reinforced Concrete Apron
RCM	Removable Centre Mullion
RD	Roof Drain
REF	Reference
REQ'D	Required
RES	Residential
REX	Request to Exit
RFCI	RF-Conducted Immunity
RFI	Radio Frequency Interference
RM	Room
RMCAO	Ready mix Concrete Association of Ontario
RMS	Root Mean Square
RO	Rough Opening
RPM	Revolutions per minute
RPU	Remote page unit
RSH	Recessed Soap Holder
RSI	R-Value (SI units)
RSL	Resilient
RWL	Rainwater Leader
<b>S</b>	
S	South
SA	Supply Air
SAE	Society of Automotive Engineers
SAT	Supply Air Temperature
SBS	Styrene Butadiene Styrene
SC(OT)	Scupper - Overflow Type
SCADA	Supervisory Control and Data Acquisition
SCHED	Schedule
SCR	Shower Curtain and Rod
SCS	Solid Core Steel
SCW	Solid Core Wood
SD	Soap Dish
SDI	Steel Deck Institute
SEAL	Sealer
SECT	Section
SEI CMM	American Software Engineering Institute Capability Maturity Model
SER	Service
SH	Shower Head
SH/C	Shower Head & Control

SHLV	Shelving
SHR	Vibro-Acoustics Spring Hangers
SIM	Similar
SM	Sheet Metal
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SND	Sanitary Napkin Dispenser
SP	Steel Plate
SPDT	Single Pole Double Throw
SPEC	Specification
SPEC'D	Specified
SPMDD	Standard Proctor Maximum Dry Density
SPS	Solid Polymer Surfacing
SPST	Single Pole Single Throw
SQ	Square
SQFT	Square Feet, Square Foot
SR/C	Shower Rod and Curtain
SS	Stainless Steel
SSK	Service Sink
SSPC	Steel Structure Painting Council
SSUR	Solid Surfacing (Material)
SSUR(IS)	Solid Surface (Material) For Island Countertops
SSUR(W.S)	Solid Surface (Material) For Window Sills
ST	Stain
STA	Standard
STC	Sound Transmission Class
STD.	Station
STL	Steel
STN	Stone
STOR	Storage
STRUCT	Structural
SUSP	Suspended
SYS	System

## T

T&G	Tongue and Groove
T/O	Top Of
TAB	Testing, Adjusting, and Balancing
TB	Thermally Broken
TBB	Tile Backer Board
TBT	Thermally Broken Threshold
TCP	Transmission Control Protocol
TEC	Thermoelectric coolers
TEL	Telephone
TEMP	Temperature
TG	Tempered Glass

TH	Threshold
THD	Total Harmonic Distortion
THRU	Through
TIA	Telecommunications Industry Association
TIAC	Thermal Insulation Association of Canada
TOD	Time of Day
TOFM	Toilet - Floor Mounted
TOS	Top of Structure
TOWM	Toilet - Wall Mounted
TPD	Toilet Paper Dispenser
TRANSP	Transparent
TRCA	Toronto and Region Conservation Authority
TS	Transition Strip
TSSA	Technical Standards & Safety Authority
TTD	Toilet Tissue Dispenser
TTH	Toilet Tissue Holder
TTMAC	Terrazzo, Tile and Marble Association of Canada
TV	Television
TVSS	Transient Voltage Surge Suppressor
TWB	Towel Bar
TWF	Through Wall Flashing
TYP	Typical

## U

UL	Underwriters Laboratories (USA)
ULC	Underwriters Laboratories Canada
UNFIN	Unfinished
UNO	Unless Noted Otherwise
UOD	Underside of Deck
UOS	Unless Otherwise Specified
UPS	Uninterruptible Power Supply
UR	Urinal
UOS	Underside of Steel
USAS	United States of America Standards Institute
USB	Universal Serial Bus
USGPM	Us Gallons Per Minute
USS	Underside of Structure
UTC	Coordinated Universal Time
UV	Ultraviolet

## V

V	Volts
VAC	Voltage Alternating Current
VAV	Variable Air Volume
VB	Vapour Barrier

VCT	Vinyl Composite Tile
VDC	Voltage Direct Current
VERT	Vertical
VEST	Vestibule
VFD	Variable Frequency Drive
VIF	Verify
VLAN	Virtual Local Area Network
VOC	Volatile Organic Compound
VP	Vent Pipe

## W

W	West
W/	With
W/O	Without
WAN	Wide Area Network
WC	Water Column
WD	Wood
WG	Wired Glass
WHI	Warnoch Hersey
WM	Wire Mesh
WO	Window Opening
WOG	Water Oil Gas
WR	Washroom
WRGBB	Water Resistant Gypsum Backing Board
WS	Wall Stop
WS	Window Shade
WSBO	Window Shade & Blackout Blind
WSIB	Workplace Safety and Insurance Board
WT	Wall Tile
WTS	Weatherstripping
WWF	Welded Wire Fabric

## X

XLPE	Cross-linked Polyethylene
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## Y

YR	York Region
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## PART 2 - PRODUCTS

Not Included

## PART 3- EXECUTION

Not Included

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- 1.1 General Instructions
- 1.2 Section Includes
- 1.3 Related Requirements
- 1.4 Inspection And Testing
- 1.5 Access to the Work and Cooperation
- 1.6 Procedures
- 1.7 Defective Work
- 1.8 Scheduling and Reports
- 1.9 Test and Mix Designs
- 1.10 Mill Tests
- 1.11 Mockups
- 1.12 Equipment and Systems
- 1.13 Manufacturer's Field Review

### **1.3 RELATED REQUIREMENTS**

- .1 Pre-installation meetings: in accordance with Section 01 31 19.
- .2 Materials and workmanship quality assurance and reference standards: in accordance
- .3 with Section 01 60 00.
- .4 Balancing and testing of systems - under Divisions 21, 22, and 23, and Divisions 26, 27, and 28.

### **1.4 INSPECTION AND TESTING**

- .1 The *Owner* and the *Consultant* shall have access to the *Work* at all times. If part of the *Work* is in preparation at locations other than the *Place of the Work*, access shall be given to such work whenever it is in progress.
- .2 Inspection and testing services will be used to verify compliance with requirements of the *Contract Documents*. These services do not relieve the Contractor of responsibility for compliance with the *Contract Documents*.
  - .1 Specified tests, inspections, and related actions do not limit the Contractor's other quality assurance and control procedures that facilitate compliance with the *Contract Documents* requirements.
  - .2 Requirements for the Contractor to provide quality control services required by Consultant, Owner, or authorities having jurisdiction are not limited by provisions of this section.
- .3 The Consultant will, on behalf of Owner, appoint inspection and testing companies, representing, reporting and responsible to the Owner through the Consultant.
  - .1 Cost of inspection and testing company services will be authorized as a disbursement from Cash Allowance as specified in Section 01 21 00. Inspection and testing company shall

- submit monthly invoice original to Contractor for review, relating invoices to tests and inspection reports. Provide original receipts for disbursements. Invoices for inspection and testing services shall be forwarded by Contractor to Consultant for inclusion in progress payment application.
- .4 Additional testing services required because of changes in materials, proportions of mixes requested by Contractor or Subcontractors as well as additional testing services for materials occasioned by lack of identification or by failure of such materials being replaced to meet requirements of the Contract Documents or testing of structure or elements including load testing, shall be carried out at no additional cost to the Owner.
  - .5 Inspection and testing required by codes or ordinances, or by an authority having jurisdiction, and made by a legally constituted authority, shall be the responsibility of the Contractor and shall be paid for by the Contractor and not be paid by Owner, unless otherwise specified in the Contract Documents.
  - .6 Inspection or testing performed exclusively for Contractor's convenience shall be sole responsibility of Contractor and will not be paid by Owner.
  - .7 Inspection and testing shall be performed by company qualified to perform the inspections or tests specified or required.
  - .8 Requirements of regulatory companies:
    - .1 Testing shall be conducted in accordance with requirements of the building code.
    - .2 Obtain certification where required by the building code and standards.
  - .9 Inspection and tests required by codes or ordinances, or by an Authority Having Jurisdiction, and made by a legally constituted authority, shall be the responsibility of the *Contractor* and not requested or directed by the *Consultant*. Required inspection and testing shall be paid for by the *Contractor* and not be paid by the *Owner*, unless otherwise specified in the *Contract Documents*.
  - .10 Inspection or testing performed exclusively for *Contractor's* convenience shall be the sole responsibility of the *Contractor* and will not be paid for by the *Owner*.
  - .11 The inspection and testing service does not relieve the *Contractor* of its responsibility to perform regular shop and *Site* inspection, and quality control of production.
  - .12 Inspection and testing services, field and laboratory testing, shall be required for, but not limited to, the following:
    - .1 Excavation, backfill and compaction; inspection and testing.
    - .2 Founding soils; inspection.
    - .3 Paving systems; inspection and testing.
    - .4 Concrete reinforcement.
    - .5 Concrete.
    - .6 Mortar.
    - .7 Structural steel.
    - .8 Steel deck.
    - .9 Roofing

## 1.5 ACCESS TO THE WORK AND COOPERATION

- .1 The *Contractor* shall allow the Independent Inspection and Testing Agencies access to the *Work*, wherever the *Work* is in progress, or wherever Products, materials, or equipment are stored prior to shipping, including to off-*Site* manufacturing and fabrication plants.
- .2 Provide access to the *Work* for representatives of inspection and testing companies.
- .3 *Provide* inspection company with materials and installation information as required and/or requested.
- .4 Cooperate with inspection and testing companies and give adequate notification of any changes in source of supply, additional work shifts and other proposed changes.
- .5 No *Product* nor part of the *Work* shall be installed before it is tested when a test is specified or required, nor shall work be executed where a test or inspection is required and the inspector cannot attend.
- .6 Supply labour required to assist inspection and testing company in sampling and making tests.
- .7 Repair work damaged as a result of inspection and testing work.
- .8 Cost of above labour and material shall be borne by the *Contractor*.
- .9 Inspection and testing company services do not relieve the Contractor of responsibility for normal shop and site inspection, and quality control of manufacturing and installation.

## 1.6 PROCEDURES

- .1 The *Contractor* shall notify the appropriate agency and the *Consultant* sufficiently in advance of the requirement for tests in order that attendance arrangements can be made reasonably.
- .2 Submit samples and/or materials required for testing, as specifically requested in the *Contract Documents*. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the progress of the *Work*.
- .3 The *Contractor* shall *Provide* labour and facilities to obtain and handle samples and materials at the *Place of the Work*. *Provide* sufficient space to store and cure test samples.

## 1.7 DEFECTIVE WORK

- .1 Where evidence exists that defective workmanship may have occurred, or that the *Work* may have been carried out incorporating defective materials, or tests demonstrate that installed conditions do not comply with the requirements of the Contract Documents, the Consultant reserves the right to have appropriate inspections, tests, and surveys performed, analytical calculation of structural strength made and the like in order to help determine the extent of defect and whether such work must be replaced. Inspections, tests, and surveys carried out under these circumstances will be made at the Contractor's expense, and will not be paid by Owner, unless the results indicate that the work so tested, inspected or surveyed is not defective or that, in Consultant's opinion, the work so tested, inspected, or surveyed may be accepted, in which case tests, inspections or surveys will be paid by Owner.
- .2 If the *Contractor* covers, or permits to be covered, work that has been designated for special tests, inspections or approvals before such tests, inspections or approvals have been made, the *Contractor* shall, if so directed by the *Consultant* uncover the work, have the inspections or tests satisfactorily completed, and make good the work. Such uncovering and making good will not be considered or approved as a change in the *Work*.

- .3 The *Consultant* may order any part of the *Work* to be examined if the *Work* is suspected not to be in accordance with the *Contract Documents*. If, upon examination, such work is found not to be in accordance with the *Contract Documents*, the *Contractor* shall correct such work and pay the cost of the examination and correction neither of which will be considered or approved as a change in the *Work*. If such work is found to be in accordance with the *Contract Documents*, the *Owner* will pay for the cost of examination and replacement as a change in the *Work* in accordance with Section 01 26 00.
- .4 Additional testing required because of changes in materials, proportions of mixes requested by the *Contractor* or *Subcontractors* as well as any extra testing of materials occasioned by lack of identification or by failure of such materials being replaced to meet requirements of the *Contract Documents* or testing of structure or elements including load testing, shall be carried out at no additional cost to the *Owner*.
- .5 The *Contractor* shall make good any *Subcontractor's* work damaged by such removals or re-executions at the *Contractor's* expense and promptly.
- .6 If, in the opinion of the *Consultant*, it is not expedient to correct the defective work or the work not performed in accordance with the *Contract Documents*, the *Owner* may deduct from the monies otherwise due to the *Contractor*, the difference in value between the work performed and that required in the *Contract Documents*, the amount of which shall be determined by the *Consultant*.

## 1.8 SCHEDULING AND REPORTS

- .1 Contractor shall prepare schedule for inspection and testing company services in accordance with Section 01 33 00 and as follows:
  - .1 Establishing schedule:
    - .1 By advance discussion with the selected inspection or testing company, determine the appropriate time necessary to perform the required services and to issue related reports.
    - .2 Allow for required time within construction schedule.
  - .2 Adherence to schedule:
    - .1 Contractor shall advise inspection and testing companies in advance when inspection and testing of the *Work* is required.
    - .2 Amount of advance notice shall be as required by the inspection and testing company but shall be no less than 2 Working Days.
    - .3 When inspection and testing company is ready to perform inspection and testing according to predetermined schedule, but is prevented from inspection and testing or taking specimens due to incompleteness of the parts of the *Work* scheduled for inspection and testing, extra costs for inspection and testing attributable to the delay may be back-charged to Contractor at no additional cost to the *Owner*.
- .3 Notify inspection and testing company at least 3 Working Days before work required to be inspected commences, and arrange for a meeting at the Place of the *Work*, to be held 1 Working Day before the work starts with the following present:
  - .1 The Contractor, and the Subcontractor responsible for the work to inspected and/or tested, the inspection and testing company representatives, the product manufacturer's representative when required, and the *Consultant*.



- .4 Give 2 Working Days' prior notice to inspection and testing company of the commencement of each phase of the Work requiring inspection and provide inspection and testing company with materials and installation information.
- .2 Reports and documents
  - .1 Inspection and testing company shall submit shop inspection and site inspection reports within 5 Working Days of each inspection.
  - .2 Distribute reports as follows:
    - .1 Owner; 2 copies.
    - .2 Consultant; 1 copy.
    - .3 Contractor; 2 copies.
    - .4 Consulting engineers, as applicable; 1 copy each.
    - .5 *Provide* copies to the *Subcontractor* whose work is being inspected and/or tested, or to the manufacturer/fabricator of the material being inspected and/or tested.
  - .3 Inspection and testing companies shall submit a written report for each inspection or test, including pertinent data such as conditions at the Place of the Work, dates, test references, locations of tested materials, actual Product identification, testing methodology, procedures, and descriptions, site instructions given, recommendations and/or any other information required by standard applicable to reporting of tests and inspections.
    - .1 Report shall clearly indicate failure of Product or procedures to meet applicable standards, give recommendations for retesting or correction. Inspector shall contact Contractor and Consultant immediately when Product or Product assembly fails to meet requirements of the Contract Documents.
  - .4 Upon completion of portions of the Work subject to independent inspection and testing, submit to the Consultant duplicate certificates of acceptance of the installation issued by the independent inspection and testing company.
- .3 Copies of all inspection and test reports shall be submitted as part of the Project Records Documents in accordance with Section 01 77 00.

## 1.9 TEST AND MIX DESIGNS

- .1 Furnish test results and mix designs as required by the *Contract Documents* or as may reasonably be requested by the *Consultant*.
- .2 The procedures for submittal of test results and mix designs shall be the same as those required for shop drawings in accordance with Section 01 33 00 Submittals.
- .3 Test results and mix designs are to be considered as forming part of the Project Record Documents in the same manner as shop drawings in accordance with Section 01 77 00 Project Closeout.
- .4 The costs of tests and mix designs beyond those called for in the *Contract Documents*, or beyond those required by the authorities having jurisdiction, shall be appraised by the *Consultant* and may be authorized as a change in the *Work*.
- .5 Specimens and samples for testing, unless otherwise specified in the Contract Documents, will be taken by the inspection and testing company; sampling equipment and personnel will be provided

by the inspection and testing company; and deliveries of specimens and samples to the testing company will be performed by the testing company unless otherwise specified.

- .6 Inspection and testing company shall take samples necessary to verify quality as specified. Taking of samples shall not endanger the structure or life safety and shall be taken so as to best represent the Work as a whole.
- .7 Samples shall be handled, packaged, stored, and delivered in accordance with specified tests. Sample handling where required shall duplicate conditions at the Place of the Work (such as site-cured concrete cylinders).

#### **1.10 MILL TESTS**

- .1 Submit mill test certificates required by the *Contract Documents*.
- .2 The procedures for submittal of mill test certificates shall be the same as those required for shop drawings in accordance with Section 01 33 00 Submittals.
- .3 Mill test certificates are to be considered as forming part of the *Project Record Documents* in the same manner as shop drawings in accordance with Section 01 77 00.

#### **1.11 MOCKUPS**

- .1 The *Contractor* shall ensure that all *Subcontractors* and suppliers prepare mockups for work specifically requested in the *Contract Documents*. Any costs associated with the preparation of mockups shall be included in the *Contract Price*.
- .2 Provide field or shop erected example of work complete with specified materials and workmanship.
- .3 Construct in locations acceptable to the *Consultant* unless otherwise indicated in the *Contract Documents*.
- .4 Prepare the mockups for review by the *Consultant* with reasonable promptness and in an orderly sequence, so as not to delay the progress of the *Work*.
- .5 Failure to prepare mockups in ample time will not be considered sufficient reason for an extension of the *Contract Time*, and no claim for extension by reason of such default will be allowed.
- .6 Refer to the respective Specification Sections to determine whether the mockup may remain as part of the *Work* or must be removed.
- .7 Protect and maintain mock-ups until directed to be removed. Commence work demonstrated in mock-up only after review and acceptance of workmanship. Mock-ups may not become part of finished work, except with explicit, prior, written acceptance of Consultant.
- .8 *Work* for which a mockup is required in accordance with the *Contract Documents* shall not proceed until the required mockup has been reviewed by the *Consultant*.
- .9 Resubmit mock-ups until written acceptance is obtained from Consultant.

#### **1.12 EQUIPMENT AND SYSTEMS**

- .1 Submit testing, adjustment and balancing reports for mechanical and electrical systems as required by the *Contract Documents*, and in accordance with Divisions 21, 22, and 23 and Divisions 26, 27, and 28, as applicable.

- .2 The procedures for submittal of adjustment and balancing reports for mechanical and electrical systems shall be the same as those required for shop drawings in accordance with Section 01 33 00 Submittals.
- .3 Adjustment and balancing reports for mechanical and electrical systems are to be considered as forming part of the *Project Record Documents* in the same manner as shop drawings in accordance with Section 01 77 00 *Project Closeout*.

#### **1.13 MANUFACTURER'S FIELD REVIEW**

- .1 Where manufacturer's field review is specified, manufacturer's representative shall review the relevant parts of the work at the *Place of the Work*, or wherever such affected work is in progress, to ensure that work is being executed in accordance with manufacturer's written recommendations.
- .2 Manufacturer's field review is to ensure that the Products specified are being used in the *Work* and are being applied on surfaces prepared in accordance with their recommendations and the requirements of the *Contract Documents*.
- .3 Unless otherwise indicated in the *Contract Documents*, manufacturer's representative shall undertake a minimum of 1 field review, with additional reviews as deemed necessary by the manufacturer, to determine that the work of such sections is in accordance with the manufacturer's written recommendations.
- .4 The *Contractor* shall ensure that the manufacturer's representative submits a type-written report on manufacturer's letterhead within 2 *Working Days* after each field review. Report shall document manufacturer's representative's field observations and recommendations.

#### **PART 2 - PRODUCTS**

Not applicable.

#### **PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Installation and Removal
- .4 1.4 Temporary Drainage and Dewatering
- .5 1.5 Sanitary Facilities
- .6 1.6 Water Supply
- .7 1.7 Temporary Heating and Ventilation
- .8 1.8 Temporary Power and Light
- .9 1.9 Temporary Telephone
- .10 1.10 Hoisting
- .11 1.11 Plant, Machinery and Scaffolding
- .12 1.12 Site Storage and Over Loading
- .13 1.13 Site Office
- .14 1.14 Equipment, Tool, and Material Storage
- .15 1.15 Construction Sign
- .16 1.16 Hoarding
- .17 1.17 Weather Enclosures
- .18 1.18 Dust Tight Screens
- .19 1.19 Protection of Building Finishes and Equipment
- .20 1.20 Protection of Concrete Floors to Remain Exposed in Finished Work
- .21 1.21 Waste Management
- .22 1.22 Snow Removal
- .23 1.23 Control of Dust, Debris and Noise
- .24 1.24 Traffic Control and Road Maintenance
- .25 1.25 Security
- .26 1.26 Design and Safety Requirements for Temporary Facilities
- .27 1.27 Moisture Control

### **1.3 INSTALLATION AND REMOVAL**

- .1 *Provide* temporary utilities, facilities, and controls in order to execute the *Work* expeditiously.
- .2 Arrange, obtain, and pay cost for permits required for temporary facilities and controls.
- .3 Remove from the *Place of the Work* all such work after use.

#### **1.4 TEMPORARY DRAINAGE AND DEWATERING**

- .1 The *Work* includes the removal of collected groundwater and surface water accumulating from precipitation and groundwater infiltration throughout the course of the *Work* until date of *Substantial Performance of the Work*.
- .2 *Provide* temporary drainage and pumping facilities to keep excavations and the *Place of the Work* free from standing water.
- .3 Do not discharge onto adjacent properties. Do not discharge onto adjacent roadways where such discharge may interfere with the safe and normal use thereof or where catch basins do not exist.
- .4 Keep drainage lines and gutters open. No flow of water shall be directed across or over pavements except through pipes or properly constructed troughs. Keep portions of the *Work* properly and efficiently drained during construction and until completion. Be responsible for disturbances, dirt and damage which may be caused by or result from water backing up or flowing over, though, from or along any part of the *Work*, or due to operations which may cause water to flow elsewhere.
- .5 Keep trenches and other excavations free of water. Remove water in a manner that will prevent loss of soil and maintain the stability of existing soils.
- .6 Dispose of such water in a manner that will not be hazardous to public health and safety, private property, or to the *Work*.
- .7 Drainage of trenches or other excavation through storm drainage pipe will be allowed only with the express permission of the Authority Having Jurisdiction.
- .8 When drainage is permitted in writing to be directed to existing catch basins, regularly and at *Substantial Performance of the Work* inspect such catch basins and remove accumulated debris and sediment.

#### **1.5 SANITARY FACILITIES**

- .1 *Provide* sufficient sanitary facilities for workers in accordance with local health authorities.
- .2 Maintain in clean condition and properly screened from public view.

#### **1.6 WATER SUPPLY**

- .1 *Provide* a continuous supply of potable water for use in the *Work*.
- .2 Arrange for connection with the appropriate utility company and pay costs for installation, maintenance, and removal.
- .3 Pay for utility charge at prevailing rates.

#### **1.7 TEMPORARY HEATING AND VENTILATION**

- .1 *Provide* and pay for temporary heating, cooling, and ventilating required for the *Work* during the construction period, including attendance, maintenance and fuel.
- .2 *Provide* temporary heat and ventilation as required to:
  - .1 Facilitate continuous uninterrupted progress of the *Work*.
  - .2 Protect the *Work* and Products against damage and defacement caused by weather, harmful levels of temperature, humidity, and moisture.

- .3 *Provide* ambient temperatures and humidity levels for proper storage, installation and curing of materials, in accordance with specified standards and manufacturer's requirements.
- .4 *Provide* adequate ventilation to meet health regulations for safe working environment.
- .3 Construction heaters used inside buildings must be vented to the outside or be flameless type. Solid fuel salamanders are not permitted.
- .4 Maintain temperatures of minimum 10°C in areas where the *Work* is in progress, unless indicated otherwise in the specification sections.
- .5 Ventilate heated areas and keep building free of exhaust or combustion gases.
- .6 Heat shall be uniformly distributed to avoid hot or cold areas or excessive drying.
- .7 Make good any damage caused by inadequate or excessive heat. Such making good will not be considered or approved as a change in the *Work*.

#### **1.8 TEMPORARY POWER AND LIGHT**

- .1 Arrange for temporary power required during construction for the proper execution of the *Work* and the safe and proper operating of power tools. Temporary power to be in accordance with Divisions 26, 27 and 28.
- .2 Arrange for connection with the appropriate utility company. Pay costs for any required permits, for installation, maintenance, and removal.
- .3 Pay for utility charge at prevailing rates.
- .4 Abide by the rules of the Canadian Electrical Code.
- .5 Maintain in good working order throughout the course of the *Work*.

#### **1.9 TEMPORARY TELEPHONE**

- .1 *Provide* and pay for a temporary telephone, to be located in the *Site* office, and available for use by the *Owner*, *Consultant* and *Subcontractors*.
- .2 The *Contractor* shall pay all service and local use charges for the telephone, including installation and removal on completion of the *Work*. Long distance charges shall be paid to the *Contractor* by the person or company making the call.
- .3 Superintendent shall be equipped with mobile telephone device.

#### **1.10 HOISTING**

- .1 *Provide*, operate, and maintain any hoists/cranes required for moving of workers, materials and equipment.
- .2 Hoists/cranes are to be operated by a qualified operator only. Proof of operator's qualification shall be provided upon request.

#### **1.11 PLANT, MACHINERY AND SCAFFOLDING**

- .1 *Provide* formwork, scaffolding, equipment, tools, machinery including lifts, and incidental appurtenances necessary for the proper execution of the *Work*.
- .2 Erect plant, machinery and scaffolding to permit access to building and the *Work*.

- .3 Use scaffolds in such manner as to interfere as little as possible with other trades' operations.
- .4 Support scaffolds from finished surfaces only after taking precautions to prevent damage. No supports, clips, brackets, or similar devices shall be welded, bolted, or otherwise affixed to any finished member or surface without prior permission.

#### **1.12 SITE STORAGE AND OVER LOADING**

- .1 Confine the Work and the operations of workers to limits indicated by the Contract Documents. Do not unreasonably encumber the premises with Products or construction machinery and equipment.
- .2 Do not load or permit to be loaded any part of the Work with a weight or force that will endanger the Work.
- .3 Handle and store materials so as to prevent damage or defacement to the Work and surrounding property.

#### **1.13 SITE OFFICE**

- .1 *Provide* a weathertight, lockable office for the use of the *Contractor*, *Subcontractors*, the *Consultant*, engineers, and the *Owner* when at the *Place of the Work*, and for the purposes of *Site* meetings.
- .2 The *Site* office shall have heat, light, and ventilation from sources as outlined above.
- .3 *Provide* a meeting table, shelving, file cabinets, and the like, suitable for the storage and review of the *Contract Documents*, shop drawings, *Change Orders*, *Supplemental Instructions*, and all other record documents as required by the *Contract Documents* and by the *Authorities Having Jurisdiction*.
- .4 The *Site* office shall not be used for the storage of Products, or construction machinery or equipment.

#### **1.14 EQUIPMENT, TOOL, AND MATERIAL STORAGE**

- .1 *Provide* and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds at the *Place of the Work* in a manner to cause the least interference with the *Work*.
- .3 Owner is not responsible for securing Products or materials at the *Place of the Work*.

#### **1.15 CONSTRUCTION SIGN**

- .1 Supply and install a sign at the *Place of the Work* during the course of the *Work*. *Contractor* is to supply and install nominal 100 mm x 100 mm wood posts and framing and is to fix the sign to the framing.
- .2 The maximum size of the sign shall be 1200 mm x 2400 mm.
- .3 No other signs, other than for safety, caution, or instruction, will be permitted.

#### **1.16 HOARDING**

- .1 *Provide* hoarding and barricades as and where required by *Authorities Having Jurisdiction* or required to protect the public, workers, and public and private property from injury or damage.

- .2 Include for the provision of overhead protection and temporary exits and exit signs as may be required during the course of the *Work*.
- .3 Include for the provision of temporary gates and/or doors to *Provide* restricted access to the *Place of the Work* as required.

#### **1.17 WEATHER ENCLOSURES**

- .1 *Provide* weathertight closures to unfinished door and window openings, tops of shafts, and other openings in floors and roofs.
- .2 Close-off floor areas where walls are not finished, seal-off other openings, and enclose building interior work area for temporary heat.

#### **1.18 DUST TIGHT SCREENS**

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

#### **1.19 PROTECTION OF BUILDING FINISHES AND EQUIPMENT**

- .1 *Provide* protection for finished and partially finished building finishes and equipment during performance of the *Work*.
- .2 Protect the *Work* from damage, discolouring, and defacement. Maintain protection until the *Work* is complete.
- .3 Protect completed work from soiling, abrasion, punctures, damage, and defacement, and maintain protection until the surrounding or overhead work is complete.
- .4 Keep surfaces free of oils, grease or other materials that may damage or deface them or affect bond of applied *Products*.
- .5 Remove and replace materials damaged or defaced as a result of failure to provide adequate protection.
- .6 Have damaged or defaced work corrected by workers meeting qualification requirements of the *Contract Documents*.
- .7 *Provide* minimum 3 mm thick Masonite board protection, or finish flooring manufacturer approved alternative, to all finished floors.
- .8 The *Contractor* shall be held responsible for damage due to lack of, or improper, protection, and will be required to make good any such damage. Such making good will not be considered or approved as a change in the *Work*.

#### **1.20 PROTECTION OF CONCRETE FLOORS TO REMAIN EXPOSED IN FINISHED WORK**

- .1 Non-marking protection material shall be placed over concrete floors designated as exposed.
- .2 Post the following on warning signs at locations leading to areas of where concrete floors are to remain exposed in finished work (see Concrete Floor Contractors Association of Canada):
  - .1 Concrete floors shall be protected from staining, damage and excessive loading at all times:
    - .1 No traffic is permitted on new concrete floors for the first 3 days after placement.



- .2 Foot traffic is permitted between 3-7 days after placement (curing materials must be replaced where disturbed by traffic).
- .3 Scissor lifts and light equipment are permitted 7 days after slab placement.
- .4 Vehicles shall be diapered to prevent oil and other liquid spills (remove leaking equipment from the jobsite immediately).
- .5 Tires shall be non-marking or taped with non-marking tape to prevent marking of the floors.
- .6 Trucks, forklifts, and any other heavy loads may only to be placed on the floor if they have been previously approved by the Consultant.
- .7 Spills shall be cleaned up immediately to avoid permanent staining of the concrete.
- .8 Concrete shall be protected from scratching and impact damage at all times. No cutting, painting, welding, or other injurious activities shall be performed without protecting the concrete from damage prior to the commencement of work.

#### **1.21 WASTE MANAGEMENT**

- .1 Do not bury rubbish and waste materials at the *Place of the Work*.
- .2 Do not dispose of waste into waterways or storm or sanitary sewers.
- .3 Do not burn waste materials at the *Place of the Work*.
- .4 Comply with waste disposal requirements of authorities having jurisdiction.
- .5 Remove waste material from the *Place of the Work* daily. If waste is collected in bins, bins to be removed from site once full.
- .6 Arrange and pay for removal of debris and waste from the *Place of the Work*.
- .7 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris. Pay fees.

#### **1.22 SNOW REMOVAL**

- .1 Allow no accumulation of ice and snow within the *Place of the Work*. There shall be no use of salt for de-icing in areas of building work.
- .2 Remove snow from access routes to the *Work* to maintain uninterrupted progress of the *Work*.

#### **1.23 CONTROL OF DUST, DEBRIS AND NOISE**

- .1 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
- .2 Control dust and dirt produced during the *Work* to prevent dispersion beyond the immediate work areas.
- .3 Prevent materials from contaminating air beyond application area, by providing temporary enclosures and ventilation/filtration.
- .4 Limit noise levels in accordance with requirements of authorities having jurisdiction and the *Owner*.

- .5 Prevent abrasive-blasting, pressure-washing spray, and other extraneous materials from contaminating air beyond application area.

#### **1.24 TRAFFIC CONTROL AND ROAD MAINTENANCE**

- .1 Do not block roads or impede traffic. Keep construction traffic to designated roads only.
- .2 *Provide* flag person to direct traffic as required.
- .3 *Provide* a hard surface area at the *Place of the Work* for cleaning down trucks prior to entry onto municipal roads or private roads outside of the *Place of the Work*.
- .4 Keep public and private roads free of dust, mud and debris resulting from truck, machinery and vehicular traffic related specifically to this *Project*, for the duration of *Work*.
- .5 Clean roads regularly, public, or private. Wash down and scrape flush roads at least daily when earth moving operations take place. Maintain public property in accordance with requirements of *Authorities Having Jurisdiction*.

#### **1.25 SECURITY**

- .1 The *Contractor* shall be solely responsible for securing the *Place of the Work* and the *Work*, and for securing areas used for the storage of Products or construction machinery and equipment. The *Owner* will have no responsibility in this regard.
- .2 *Provide* and maintain security lighting.
- .3 *Provide* and maintain temporary locks. Premises to be locked after working hours.

#### **1.26 DESIGN AND SAFETY REQUIREMENTS FOR TEMPORARY FACILITIES**

- .1 Be responsible for design, erection, operation, maintenance, and removal of temporary structural and other temporary facilities. Engage and pay for registered professional engineering personnel skilled in the appropriate disciplines to perform these functions where required by law or by the *Contract Documents*; and in cases where such temporary facilities and their method of construction are of such a nature that professional engineering skill is required to produce safe and satisfactory results.
- .2 Engage and pay for a Professional Engineer to design and supervise construction and maintenance of hoardings, covered ways, protective canopies, and project sign(s). Designs provided by the *Consultant* or the *Owner* for such work cover general appearance only.

#### **1.27 MOISTURE CONTROL**

- .1 Concrete slabs shall be properly cured and dried before installation of finished flooring assemblies.
  - .1 Allow for one of the following methods:
    - .1 Drying time.
    - .2 Drying action by mechanical methods.
    - .3 Moisture mitigation coating as specified below.
    - .4 Drying action by other method and/or materials as approved by affected flooring manufacturer.
- .2 Before installation of weather barriers, when materials are subject to wetting, protect as follows:

- .1 Protect porous materials from water damage.
- .2 Protect stored and installed material from flowing or standing water.
- .3 Keep porous and organic materials from coming into prolonged contact with concrete.
- .4 Remove standing water from decks.
- .5 Keep deck openings covered or dammed.
- .3 After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture, protect as follows:
  - .1 Do not load or install gypsum board or other porous materials or components, or items with high organic content, into partially enclosed building.
  - .2 Keep interior spaces reasonably clean and protected from water damage.
  - .3 Periodically collect and remove waste containing cellulose or other organic matter.
  - .4 Discard or replace water-damaged material.
  - .5 Do not install material that is wet.
  - .6 Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- .4 After completing and sealing of the building enclosure but prior to the full operation of permanent heating, ventilation, and air conditioning systems, maintain as follows:
  - .1 Control moisture and humidity inside building by maintaining effective drying conditions.
  - .2 Use permanent heating, ventilation, and air conditioning system to control humidity subject to the prior written approval of the *Consultant*.
  - .3 Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

## **PART 2 - PRODUCTS**

Not applicable.

## **PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Availability of Products
- .5 1.5 Delivery, Storage and Handling
- .6 1.6 Concealment
- .7 1.7 Remedial *Work*
- .8 1.8 Location of Fixtures
- .9 1.9 Fastenings
- .10 1.10 Protection of *Work* in Progress
- .11 2.1 Quality
- .12 2.2 Availability
- .13 2.3 Inserts, Anchors, and Fasteners
- .14 3.1 Manufacturer's Instructions
- .15 3.2 Overloading
- .16 3.3 Galvanic/Dissimilar Metal Corrosion
- .17 3.4 Penetrations
- .18 3.5 Workmanship

### **1.3 SUMMARY**

- .1 *Product* quality, availability, and delivery, storage, and handling.
- .2 Existing facilities.
- .3 Workmanship, coordination, and fastenings.
- .4 Manufacturer's instructions.

### **1.4 AVAILABILITY OF PRODUCTS**

- .1 In the event of delays in supply of *Products*, and should it subsequently appear that the *Work* may be delayed for such reason, *Consultant* reserves the right to substitute more readily available *Products* of similar character, at no additional cost to the *Owner*.

### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 The *Contractor* is to be responsible for the costs of transportation of the *Products* required in the performance of the *Work*.
- .2 Transportation costs of *Products* supplied by the *Owner* will be paid for by the *Owner*.

- .3 The *Contractor* shall be responsible for unloading, handling, and storing all Products in accordance with the manufacturers' requirements and recommendations, and in a manner to prevent damage, adulteration, deterioration and soiling.
- .4 Store packaged or bundled Products in original and undamaged condition, with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in the *Work*.
- .5 Store Products subject to damage from weather in weathertight enclosures.
- .6 Store any cementitious products clear of earth or concrete floors, and away from walls.
- .7 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .8 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .9 Removal and replacement of Products damaged due to improper delivery, storage, or handling will not be considered or approved as a change in the *Work*.

#### **1.6 CONCEALMENT**

- .1 In finished areas, conceal pipes, ducts and wiring in floors, walls, and ceilings, except where indicated otherwise.
- .2 Before installation, inform the *Consultant* if there is a contradictory situation where concealment is not possible. Install as required by the *Consultant*.

#### **1.7 REMEDIAL WORK**

- .1 Perform remedial work required to repair or replace the parts or portions of the *Work* identified as defective or unacceptable. Coordinate adjacent affected work as required.
- .2 Perform remedial work using specialists familiar with the materials affected. Perform the work in such a manner as to neither damage nor endanger any other portion of the *Work*.
- .3 Any remedial work required will not be considered or approved as a change in the *Work*.

#### **1.8 LOCATION OF FIXTURES**

- .1 Consider the location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform the *Consultant* of a conflicting installation and proceed as directed.

#### **1.9 FASTENINGS**

- .1 *Provide* metal fastenings and accessories in same texture, colour, and finish as adjacent materials, unless specifically indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in the *Contract Documents*.
- .4 Space anchors within their load limit or shear capacity and ensure that they *Provide* positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.

- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

## 1.10 PROTECTION OF WORK IN PROGRESS

- .1 Adequately protect items of *Work* completed or in progress. *Work* damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by the *Consultant*. Such removal and replacement, or repair, will not be considered or approved as a change in the *Work*.
- .2 Prevent overloading of any part of the *Work*. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without the written approval of the *Consultant*.

## PART 2 - PRODUCTS

### 2.1 QUALITY

- .1 Products, construction materials and equipment, and articles (any of which may be referred to as "Products" throughout the *Contract Documents*) incorporated in the *Work* shall be new, not damaged or defective, and of the best quality (compatible with the *Contract Documents*) for the purpose intended. If requested, the *Contractor* shall furnish evidence as to the type, source, and quality of the Products provided.
- .2 Specified options: The *Work* is based on materials, *Products* and systems specified by manufacturer's catalogued trade names, references to standards, by prescriptive specifications and by performance specifications.
  - .1 Where only one manufacturer's trade name is specified for a *Product*, the *Product* is single sourced and shall be supplied by the specified manufacturer.
  - .2 Where more than one manufacturer's trade name is specified for a *Product*, supply one *Product* from list of *Products* specified.
  - .3 When a *Product* is specified by reference to a standard, select one *Product* from manufacturer that meets or exceeds the requirements of the standard and manufacturer's written application directions.
  - .4 When a *Product* or system is specified by prescriptive or performance specifications, *Provide* one *Product* or system which meets or exceeds the requirements of the prescriptive or performance specifications and manufacturer's written application directions.
  - .5 The onus is on the *Contractor* to prove compliance with governing published standards, prescriptive specifications and with performance specifications.
  - .6 Visual selection specification:
    - .1 Where specifications include the phrase "as selected by *Consultant* from manufacturer's full range" or similar phrase, select a product that complies with requirements. *Consultant* will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
  - .7 Visual matching specification:
    - .1 Where specifications require "match *Consultant's* sample", provide a product that complies with requirements and matches *Consultant's* sample. *Consultant's* decision will be final on whether a proposed product matches.

- .3 *Products*, materials, equipment and articles (referred to as *Products* throughout the *Contract Documents*) incorporated in the *Work* shall be new, not damaged or defective, and of the quality standards specified, for the purpose intended. If requested, furnish evidence as to type, source and quality of *Products Provided*.
- .4 Basis of design:
  - .1 Where *Contract Documents* list Basis of Design this indicates the *Product* or system that was used in the preparation of the design included in the *Contract Documents*, and which may be deemed as an acceptable *Product*.
  - .2 The basis of design establishes the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products from other manufacturers.
  - .3 This does not preclude the use of other *Products* or systems in the *Work*, provided the proposed *Product* or system complies with the design and performance requirements contained in the *Contract Documents*, and *Products* or systems proposed for use in the work that are not the named basis of design follow procedures for product substitutions specified under Section 01 25 00.
- .5 Where *Contract Documents* list acceptable *Products* or acceptable manufacturers, select as applicable, one *Product* meeting performance of specifications and manufacturer's written application directions.
- .6 Where *Contract Documents* require design of a *Product* or system, and minimum material requirements are specified, the design of such *Product* or system shall employ materials specified within applicable section. Where secondary materials or components are not specified, augment with materials meeting applicable code limitations, and incorporating compatibility criteria with adjacent work.
- .7 Defective *Products*, whenever identified prior to the completion of the *Work*, will be rejected, regardless of previous inspections or reviews. Inspection or review of the *Work* in progress by the *Consultant*, the *Owner*, or Independent Inspection and Testing Agencies does not relieve the *Contractor* of responsibility for the quality of the *Products* or *Work*, but, rather, is a precaution against oversight or error. The *Contractor* shall remove and replace defective *Products* at the *Contractor's* own expense and be responsible for any delays and expenses caused by rejection, which delays, and expenses will not be considered or approved as changes in the *Work*.
- .8 Should any dispute arise as to the quality or fitness of the *Products*, the decision rests solely with the *Consultant* and shall be based upon the requirements and intent of the *Contract Documents*.
- .9 Unless otherwise indicated in the *Contract Documents*, maintain uniformity of manufacture and manufacturer for any particular or similar item or items throughout the *Work*.
- .10 *Products* exposed in the finished work shall be uniform in colour, texture, range, and quality, and be from one production run or batch, unless otherwise indicated.
- .11 *Owner* retains right to select from choices available within specified *Products* for colours, patterns, finishes or other options normally made available. Submit full range of *Product* options in accordance with 01 33 00 for such selection.
- .12 Permanent labels, trademarks, and nameplates on *Products* are not acceptable in prominent locations, except where required for operating instructions, or when located in the mechanical/electrical room, or as may be provided otherwise in the *Contract Documents*.

.13 Quality control:

- .1 Implement a system of quality control to ensure compliance with *Contract Documents*.
- .2 Notify *Consultant* of defects in the *Work* or departures from intent of *Contract Documents* that may occur during construction. *Consultant* will recommend appropriate corrective action in accordance with requirements of the *Contract*.

## 2.2 AVAILABILITY

- .1 While it was the intent of the *Bid Documents* and procedures, and the goal of the competitive *Bid* process that led to the formation of this *Contract*, to *Provide* unlimited competition to *Provide* Products, certain Products specified or indicated are accompanied by reference to brand names, proprietary names, trade marks, catalogue numbers, or catalogue designations or symbols, indicated as “acceptable products,” “acceptable materials,” or “acceptable manufacturers”. In such cases, the name of a distributor, supplier, or a dealer is sometimes given to assist the *Contractor* in finding a source of supply.
- .2 The naming of a source of supply does not relieve the *Contractor* of the responsibility of finding his or her own source of supply. If unable to obtain the specified *Product*, the *Contractor* shall supply a substitute *Product* equal to, or superior to, the *Product* specified and in accordance with the procedures and requirements of Section 01 25 00, which substitution will not be considered or approved as a change in the *Work*. Should the *Contractor* be unable to obtain a substitute *Product* equal to, or superior to, the specified *Product*, and the *Owner* accepts an inferior *Product*, the *Contract Price* shall be adjusted accordingly in an amount determined by the *Consultant*, in consultation with the *Contractor*, and in accordance with Section 01 26 00 *Contract Modification Procedures*.
- .3 The use of *Product* brand names, proprietary names, trade marks, catalogue numbers, or catalogue designations or symbols does not preclude the *Contractor* from proposing substitutions for the named Products, provided such proposals are in accordance with Section 01 25 00.

## 2.3 INSERTS, ANCHORS, AND FASTENERS

- .1 Use only factory made, threaded or toggle type inserts as required for supports and anchors, properly sized for load to be carried.
- .2 Where inserts cannot be placed, use factory made expansion shields for light weights only.
- .3 Supply and locate inserts, holes, anchor bolts and sleeves during placement or fabrication of structural elements.
- .4 Fasteners stressed in withdrawal are not acceptable, except where otherwise indicated.
- .5 Metal fastenings shall be uniform to metals materials and components being anchored or of a metal which will not set up a galvanic action causing damage to the fastening or metal component under moist conditions.
- .6 Fastenings for prefinished materials shall be of concealed type unless otherwise indicated, and when exposed finish is required, of matching prefinishing materials.
- .7 Metal fastenings and accessories shall be same texture, colour and finish as material on which they occur, as selected by *Consultant*.
- .8 Power actuated fasteners:



- .1 Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E1190-11 conducted by a qualified independent testing agency.
- .2 Do not use power actuated fasteners which are stressed in withdrawal in finished work.
- .3 Do not use power actuated fasteners within 100 mm (4") of the edge of concrete or masonry, unless otherwise accepted in writing by *Consultant*.
- .4 Do not use power actuated fasteners in post-tensioned concrete.

### **PART 3 - EXECUTION**

#### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise indicated in the *Contract Documents*, install Products in accordance with manufacturer's printed installation or application instructions. Do not rely on labels or enclosures supplied with Products. Obtain printed instructions directly from manufacturers.
- .2 Notify the *Consultant* in writing, of conflicts between the *Contract Documents* and manufacturer's instructions.
- .3 Improper installation or erection of Products, due to failure in complying with these requirements, authorizes the *Consultant* to require removal and re-installation at no additional cost to the *Owner*.
- .4 Manufacturers' representatives shall have access to the *Work* at all times. The *Contractor* shall render assistance and facilities for such access in order that the manufacturers' representatives may properly perform their function.

#### **3.2 OVERLOADING**

- .1 Protect the existing building from loads which may cause permanent deformation.
- .2 Protect the *Work* from loads which may cause permanent deformation.

#### **3.3 GALVANIC/DISSIMILAR METAL CORROSION**

- .1 Insulate dissimilar metals from each other by suitable plastic strips, washers or sleeves to prevent galvanic corrosion where conductive liquid or electrolyte (rainwater or condensation) exists.

#### **3.4 PENETRATIONS**

- .1 Holes or voids created in assemblies or partitions for penetrating mechanical, electrical, or sprinkler service items, shall be of sufficient size to accommodate the penetrating item as well as additional required fill materials, such as sealants, firestopping and smoke sealants, insulation, and the like, without exceeding the maximum opening allowable by the manufacturer of the additional required fill material and design requirements appropriate for size of penetration.
  - .1 Finish penetrations in areas exposed to view to satisfaction of *Consultant*.

#### **3.5 WORKMANSHIP**

- .1 General:
  - .1 Execute the *Work* using workers experienced and skilled in the respective duties for which they are employed.
  - .2 Do not employ an unfit person or anyone unskilled in their required duties.

- .3 Decisions as to the quality or fitness of workmanship in cases of dispute rest solely with the *Consultant*, whose decision is final.
- .4 Upon request by the *Consultant*, submit proof, in the form of CCDC 11 - *Contractor's* Qualification Statement, of qualifications of *Subcontractors* to verify *Subcontractor's* qualifications and experience meet or exceed the requirements of the *Contract Documents*.
  - .1 If, upon review of the *Contractor's* Qualification Statement, it is found that the *Subcontractor* does not meet the qualification requirements specified in the *Contract Documents* pertaining to the parts of the *Work* for which the *Subcontractor* has been retained, the *Contractor* shall replace the unqualified *Subcontractor* with a qualified *Subcontractor*, satisfactory to the *Contractor* and the *Owner*, at no additional cost to the *Owner* and at no increase in the *Contract Time*.
- .5 Remove *Products* or materials that have been broken, chipped, cracked, discoloured, abraded, or damaged during construction period and *Provide* undamaged *Products* or materials meeting the requirements of the *Contract Documents*.
- .2 Coordination:
  - .1 Ensure cooperation of workers in layout of the *Work*. Maintain efficient and continuous supervision.
  - .2 Be responsible for coordination and placement of openings, sleeves and accessories.
- .3 Backer plates:
  - .1 Provide backer plates to support and provide anchorage base to carry loads from surface or recessed applied materials.
- .4 Concealment:
  - .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
  - .2 Before installation, inform the *Consultant* of any contradictory situation. Install as directed by the *Consultant*.
- .5 Cutting and remedial work:
  - .1 Perform cutting and remedial work required to make parts of the *Work* come together. Coordinate the *Work* to ensure this requirement is maintained. Obtain permission from the *Consultant* before commencing any cutting. Refer also to requirements of Section 01 73 29.
- .6 Location of fixtures:
  - .1 Consider location of fixtures, access panels, outlets and mechanical and electrical items indicated as approximate only. Locate fixtures, and the like approximately; architectural drawings will relate these items to known dimensions, such as ceiling tile grid or wall locations and the like.
  - .2 Obtain the *Consultant's* acceptance for precise locations of fixtures, access panels, outlets, mechanical, and electrical items.
  - .3 The *Consultant* reserves the right to relocate electrical outlets and mechanical fixtures at a later date, but prior to installation, without cost, provided that the relocation per outlet does not exceed 3050 mm (10') from the original location.

- .4 Inform the *Consultant* of conflicting installations. Install only as directed by the *Consultant*.
- .7 Fastenings:
  - .1 *Provide* metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
  - .2 Prevent electrolytic action and corrosion between dissimilar metals and materials.
- .8 Protection of work in progress:
  - .1 Take reasonable and necessary measures, including those required by *Authorities Having Jurisdiction*, to *Provide* protection.
  - .2 Adequately protect parts of the *Work* completed or in progress. Parts of the *Work* damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by the *Consultant*, at no additional cost to the *Owner*.
  - .3 Prevent overloading of any part of the building. Do not cut, drill or sleeve any load bearing structural member without written permission of the *Consultant*, unless specifically indicated. Refer also to Section 01 73 29.
  - .4 Adequately protect finished flooring from damage. Take special measures when moving heavy loads or equipment on them.
  - .5 Keep floors free of oils, grease or other materials likely to discolour them or affect bond of applied surfaces.
  - .6 Protect work of other *Subcontractors* from damage while doing subsequent work. Damaged work shall be made good by appropriate *Subcontractors* but at expense of those causing damage.
  - .7 Protect existing buildings, curbs, roads and lanes. If, during the *Work*, any buildings, curbs, roads or lanes are damaged, bear costs for repairs.
- .9 Existing utilities:
  - .1 When breaking into or connecting to existing services or utilities, execute the *Work* at times approved by the *Owner*, with a minimum of disturbance to *Owner's* ongoing operations, the *Work*, and traffic.
  - .2 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in a manner approved by Authority Having Jurisdiction and stake or otherwise record location of capped service.
- .10 Protection of mechanical and electrical Products or materials:
  - .1 Wrap in protective plastic and seal mechanical and electrical items of mechanical and electrical equipment prior to and during for shipment, storage at the *Place of the Work* and after installation.
  - .2 Remove protective coverings only to the extent required for installation of the items. Re-install protection immediately following installation.
  - .3 Remove protective coverings in stages, as work areas are completed, or when directed by the *Consultant*.
- .11 Operational requirements:

- .1 Operable Products shall be provided fully operational and ready for intended use.
- .2 Adjust operating hardware and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts for smooth squeak-free function, in accordance with manufacturer's instructions.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Submittals
- .4 1.4 Preparation
- .5 1.5 Performance Requirements

### **1.3 SUBMITTALS**

- .1 Submittal Items:
  - .1 Submit written request in advance of cutting, coring, and alteration that affects:
    - .1 Structural integrity of any element of *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 *Owner* or work of other contractors.
  - .2 Include in the request:
    - .1 Identification of *Project*.
    - .2 Location and description of affected work.
    - .3 Statement on necessity for cutting or alteration.
    - .4 Description of proposed work, and *Products* to be used.
    - .5 Alternatives to cutting and patching.
    - .6 Effect on *Owner* or work of other contractors.
    - .7 Written permission of affected separate contractor.
    - .8 Date and time work will be performed.
    - .9 Non-destructive structural survey: Location of reinforcement in concrete structure confirmed by non-destructive, positive method other than X-ray.
- .3 Do not commence cutting, patching, or remedial work until request has been reviewed by *Consultant*.

### **1.4 PREPARATION**

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting the performance of the *Work*.

- .3 Beginning of cutting and patching shall be taken to mean acceptance of the existing conditions.
- .4 *Provide* supports to assure the structural integrity of the surrounding elements as well as devices and methods to protect other portions of the *Work* from damage.
- .5 *Provide* protection from weather for areas that may be exposed by uncovering work.
- .6 Where uncovering of area exposes local deterioration, cracking, evidence of water infiltration, structural settlement, previous modifications, or other unexpected conditions, advise *Consultant* immediately in writing and leave conditions exposed until receipt of *Consultant's* written instructions. If area is exposed to the Exterior, *Provide* temporary protection from inclement weather.

### 1.5 PERFORMANCE REQUIREMENTS

- .1 Execute cutting, fitting, and patching to complete the *Work*. Under no circumstances will overcutting of corners of opening be accepted. Ensure corners of openings to be cut are predrilled or sawed.
- .2 Remove and replace defective and non-conforming work.
- .3 Remove samples of installed work for testing if directed by *Consultant*.
- .4 Shop drawings identifying precise locations and size of openings to be cored and cut are to be submitted for review by *Consultant*. *Provide* non-destructive structural survey of structural concrete to be cored or cut, for *Consultant* review. Coring and cutting work locations shall be reviewed by *Consultant* for acceptance before proceeding.
- .5 *Provide* openings in non-structural elements of the *Work* for penetrations of mechanical and electrical work
- .6 Perform work by methods to avoid damage to other work, and which will *Provide* proper surfaces to receive patching and finishing.
- .7 Employ qualified installer with at least 3 years of relevant experience to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed to be used anywhere within existing buildings unless approved by *Consultant*.
- .9 Restore work with new *Products* in accordance with requirements of *Contract Documents*.
- .10 Fit work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and with suitable allowance for deflection, expansion, contraction, and firestopping.
- .11 Enclose pipes, ducts, conduit and wires passing through floors at areas where faucets occur in a 100 mm (4") high metal sleeve and make air and watertight with water resistant firestopping.
- .12 Completely seal voids of penetrations of fire rated wall, ceiling, and floor constructions with firestopping and smoke seals.
- .13 Refinish surfaces to match adjacent finishes. Refinish continuous surfaces to nearest intersection. Refinish entire assembly units.

### PART 2 - PRODUCTS

Not applicable.

### PART 3 - EXECUTION

Not applicable.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Environmental Controls
- .4 1.4 Materials
- .5 1.5 Cleaning During Construction

### **1.3 ENVIRONMENTAL CONTROLS**

- .1 Conduct cleaning and disposal operations to comply with local ordinances and antipollution laws.
- .2 Store volatile wastes in covered metal containers and remove from *Place of the Work* daily.
- .3 Prevent accumulation of wastes which create hazardous conditions.
- .4 Provide adequate ventilation during use of volatile or noxious substances.

### **1.4 MATERIALS**

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

### **1.5 CLEANING DURING CONSTRUCTION**

- .1 Clean-up the *Place of the Work* daily. Maintain clean and clear egress routes at all times.
- .2 Maintain *Place of the Work*, grounds and public properties free from accumulations of waste materials and rubbish.
- .3 *Provide* containers at the *Place of the Work* for collection of waste materials and rubbish. Remove waste materials and rubbish from the *Place of the Work* when containers become full.
- .4 Vacuum and clean interior building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until *Substantial Performance of the Work*.
- .5 Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- .6 Promptly as the *Work* proceeds, on a daily basis and upon completion, clean up and remove rubbish, surplus materials and equipment.
- .7 Remove as the work of this section progresses, corrosive and foreign materials which may set or become difficult to remove at time of final cleaning or which may damage members.
- .8 Wash exposed surfaces with a cleaning solution approved by *Product* manufacturers.
- .9 Debris and waste not permitted within cavities of *Work*.

## **PART 2 - PRODUCTS**

## **PART 3 - EXECUTION**



## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Definitions
- .5 1.5 Description of *Work*
- .6 1.6 Waste Reduction Plan
- .7 1.7 Documentation
- .8 1.8 Submittals
- .9 2.1 Equipment
- .10 3.1 Demolition And New Construction
- .11 3.2 Diversion Of Materials
- .12 3.3 Supplements

### **1.3 SUMMARY**

- .1 All materials generated from the *Work* are to be managed in accordance with Ontario Regulation 347 “General – Waste Management Regulation R.R.O. 1990 (as amended) and Ontario Regulation 102/94 “Waste Audits and Waste Reduction *Work Plans*” and Ontario Regulation 103/94 “Industrial, Commercial and Institutional source Separation Programs” of the Ontario *Environmental Protection Act* (EPA).

### **1.4 DEFINITIONS**

- .1 Waste Reduction Plan (WRP): Relates to the tracking and auditing of actual waste generated from the *Work*. The Plan consists of identified and unidentified construction waste materials that are to be salvaged, recycled and diverted from landfill and involves a series of ongoing activities to separate reusable and recyclable waste materials into material categories from other types of waste at point of generation. See sample appended to this section.
- .2 Record of Disposal and Recycled Materials (RDRM): Identifies and tracks, on a monthly basis, all waste materials and verifies quantities of all recycled materials and final disposal locations.
- .3 Waste Management Coordinator (WMC): Designated individual who is in attendance on-*Site* full or part-time. *Contractor* is to designate, or have designated, individuals from each *Subcontractor* to be responsible for waste management related to their Trade and for coordinating activities with the WMC.

### **1.5 DESCRIPTION OF WORK**

- .1 Salvage, recycle and divert from landfill a minimum of 95% of all construction waste generated from the *Work*. Identify significant generic types of products, work, or requirements that will achieve this goal. Develop a Waste Reduction Plan and participate in Materials Source Separation Program. *Provide* the documentation specified in this Section.

- .2 Comply with the requirements of the latest edition of the Ontario *Environmental Protection Act* and 3-R's Regulations related to source separation (recycling) programs and waste audits and waste reduction work plans on construction sites.
- .3 Take an active role in implementing environmentally sound business practices and producing goods and services that lessen burden on environment in production, use and final disposition. Support implementation of reduction, re-use and recycling strategies and use of environmentally sound products. Reduce or eliminate excessive packaging and promote use of environmental responsible packaging practices.
- .4 Enter into agreements with local recycling companies and haulers for all anticipated recycled materials.

## 1.6 WASTE REDUCTION PLAN

- .1 Within fourteen (14) Days after receipt of Notice to Proceed and prior to any waste removal from the project, develop and submit to the *Owner* for review a Waste Reduction Plan on sample appended to this section.
- .2 Waste Reduction Plan to Include:
  - .1 Types and estimated quantities of salvageable materials that are expected to be generated during demolition.
  - .2 Types and estimated quantities of recyclable materials expected to be generated during construction including but not limited to those listed below.
  - .3 Contracting with a deconstruction specialist to salvage all or most materials generated.
  - .4 Selective salvage as part of demolition contractor's work.
- .3 The methods to be used to recycle these materials. Methods shall include one or more of the following options:
  - .1 Requiring *Subcontractors* to take materials back for recycling at a permitted facility.
  - .2 Contracting with a full service recycling service.
  - .3 Processing and reusing materials on-*Site*.

## 1.7 DOCUMENTATION

- .1 Final Waste Reduction Plan: Once the *Owner* has accepted the Waste Reduction Plan, submit, within 14 *Working Days*, a Final Waste Reduction Plan.
- .2 To each application for Progress Payment attach a record of the amount of material disposed (in tons) and the amount of each material recycled (in tons) using form appended to this section as Sample Record of disposal and Recycled Materials. For co- mingled materials, include weight tickets from the recycling facility and verification of the recycling rate for mixed loads at the facility.
- .3 Be responsible for providing such information whether directly involved in recycling the materials or not.

## 1.8 SUBMITTALS

- .1 Submit spreadsheet of Record of Disposal and Recycled Materials following sample form appended to this section as Sample Record of Disposal and Recycled Materials.

## PART 2 - PRODUCTS

## **2.1 EQUIPMENT**

- .1 Supply all equipment as necessary to complete work.

## **PART 3 - EXECUTION**

### **3.1 DEMOLITION AND NEW CONSTRUCTION**

- .1 Recycle the items listed in Sample Record of Disposal and Recycled Materials appended to this Section (on or off-*Site*).
- .2 *Provide* on-*Site* facilities for collection, handling, and storage of anticipated quantities of reusable and/or recyclable materials.
- .3 *Provide* containers to deposit reusable and/or recyclable materials.
- .4 Locate containers in locations to facilitate deposit of materials without hindering daily operations.
- .5 Collect, handle, store on-*Site* and transport off-*Site*, salvaged materials in separate condition. Transport to approved and authorized recycling facility.
- .6 Use safety meetings, signage, and subcontractor agreements to communicate the goals of the Waste Reduction Plan.
- .7 Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- .8 Comply with Division 1 requirements for controlling dust and dirt, environmental protection, and noise control.

### **3.2 DIVERSION OF MATERIALS**

- .1 Maximize the amount of materials that can be recycled, salvaged or reused. An emphasis shall be placed on, but shall not be limited to, wood, steel and metal, concrete, brick, gypsum board, etc. in accordance with Ontario Regulations 102/94 and 103/94 and as described herein.
- .2 Following the list on Sample Record of Disposal and Recycled Materials appended to this section, separate materials from general waste stream and stockpile in separate piles or containers to approval of *Consultant* and consistent with applicable fire regulation. Mark containers or stockpile areas. *Provide* instruction on disposal practices.

### **3.3 SUPPLEMENTS**

- .1 The documents listed below, attached following END OF SECTION, form part of this Section:
- .2 Sample Construction Waste Reduction Plan.
- .3 Sample Record of Disposal and Recycled Materials.

**END OF SECTION**

## SAMPLE CONSTRUCTION WASTE REDUCTION PLAN

<b>Company</b>	
<b>Project Name</b>	<b>Project Size (m2)</b>
<b>Goals:</b>	

### 1. Analysis of Expected Job-Site Waste:

Drywall – Wood – Paper - Concrete Debris – Cardboard - Asphalt Debris - Foam board – Plastic – Plywood – Gravel – Dirt - Trees, branches, and other organic products mixed with dirt - Metals, including rebar, brass, chrome, aluminum, copper, metal stud scrap, screws, nails.

### 2. Measurement

Rough quantities will be measured in tonnes where possible, and in cubic yards and pounds where necessary and converted to tones afterward. The recycling coordinator estimates a total of \_\_\_\_\_ tonnes of material will be produced through our activities on this job site, and the \_\_\_\_\_ % of these materials will be recycled, reused, or salvaged.

### 3. Removal Methods

We have entered into an agreement with \_\_\_\_\_, a wasteless disposal service, to *Provide* recycling services for the duration of the project. The disposal bin is set up as the main recycling station. Drop boxes will be used for individual materials as space quantities allow. Projected savings for all debris will be approximately \$ \_\_\_\_\_. All materials will be taken to \_\_\_\_\_ recycling depot located at \_\_\_\_\_. Mixed waste drop boxes will be separate by the disposal company off-site and recycled to the greatest extent possible. At their location, the disposal company \_\_\_\_\_ is currently recycling 90% - 100% of their intake.

### 4. Removal Costs and Revenues

The current costs and revenues in Halton *Region* for recycling construction waste materials are as follows:

Material	Cost or Revenue / 40 cubic yard bin
Asphalt and Concrete	_____ <\$75> _____ cost
Commingled Recyclables	_____ <\$100> _____ cost
Wood	_____ <\$100> _____ cost
Light scrap metal	_____ <\$100-120> _____ revenue
Cardboard	_____ <\$90-105> _____ revenue

### 5. Options for Disposal

To the greatest extent practicable, all reusable items will be salvaged. The demolition and deconstruction plans will address in detail the measures to be taken. Items to be reused include (but are not limited to):

Siding – Roof decking – Timber and beams – Windows – Doors and Hardware – Mechanical and Electrical equipment – Concrete (pulverize and use as base rock) – Landscaping and organic materials (such as mulch and compost). All salvageable materials will be donated to a local <charity> <organization>, or sold to a <used building supplier>. Any materials that cannot be retained or salvaged will be recycled.

Furnishings, equipment, doors and hardware, electrical, mechanical will be salvaged to the greatest extent possible. Asphalt and concrete will be ground as appropriate for reuse. Dirt and gravel will be trucked to reclamation or reuse sites as appropriate for the material. Any wood landscape waste to be chipped and mulched for reuse on site. All non-woody organic materials to be composted for reuse on site. Mixed dry-waste, including wood, drywall, metal, cardboard, plastic and Styrofoam will be recycled.

#### 6. **Materials Handling Procedures**

An area will be designated for recycling and separation activities. The interior of the construction site office will have recycling containers for paper, glass, cardboard and aluminum. Drop boxes will be used adjacent to the new building as appropriate. Labels directing the separation of materials will be posted at the construction trailer and on each of the drop boxes. Construction debris will be continually picked up during the day and placed into the proper recycling or disposal bins.

The *Project* Manager will instruct each Trade's Supervisor and all workers as to proper waste management and recycling practice. This instruction will include hazardous wastes generated through chemical use and through demolition. We will incorporate waste reduction and recycling instructions into each Trade's *Contract* requiring all Trades to cooperate fully.

#### 7. **Personnel**

The *Project* Manager will supervise the implementation of this plan in the field by the following individuals who will:

Assist with oversight and monitoring of the plan in the field. Organize and keep recycling area tidy.  
Coordinate recycling bin pick-up and removal.  
Receive waste production and recycling information from each Trade and vendor. Compile and report of all waste material information sheets.  
Review waste management plan results.

The Construction Waste Management Reporting Sheet will be submitted to \_\_\_\_\_ at the Trade meeting and on a biweekly basis, no later than 15 Days after month end. Each trade will be responsible for ensuring the accuracy of this information.

#### 8. **Hazardous Wastes**

Hazardous wastes will be separated, labeled, stored and recycled or disposed of according to local regulations, worker safety regulations, and provincial and federal regulations under the direction of our safety Officer. Where practical, efforts will be made to reuse hazardous materials like paints, adhesives and other products.

**SAMPLE RECORD OF DISPOSAL AND RECYCLED MATERIALS**

<b>Company</b>	Contact Person	Phone:
		email:
<b>Project Location</b>	Waste Contractor	Report Start Date:
		Report End Date:

Material Type	Minimum Diversion %	Actual Diversion %	Material Destination	Weight
Acoustic Ceiling Tile	95			
Aluminum	95			
Asphalt	95			
Cardboard	95			
Concrete	100			
Copper	95			
Drywall	95			
Ductwork	100			
Fill-clean	100			
Fill – other	100			
Fluorescent lamps and ballasts	N/a			
General waste – office paper, pop cans, bottles	75			
Glass	95			
Land-clearing debris	100			
Plastic - general	75			
Plastic -packaging	95			
Steel	95			
Topsoil	100			
Trees	95			
Wood	95			

I, \_\_\_\_\_ declare this report is accurate to the best of my knowledge.  
 Submitted on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.  
 Signed: \_\_\_\_\_

## **PART 1 - GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.
- .2 No less than two percent (2%) of the *Contract Price* shall be assigned as the cost for the preparation and delivery to the *Consultant* of the *Project Record Documents*. This value shall be indicated on the schedule of values in accordance with Sections 01 29 73 and 01 33 00.
- .3 The review to determine *Substantial Performance of the Work* will not take place until the documents and products described in this section have been received by the *Consultant*.
- .4 The procedures for completing *Contract* and acceptance by the *Owner* shall be in accordance with the methods described in OAA/OGCA Document 100 (July 1, 2018, and reissued January 8, 2019) and any additional requirements described below.
- .5 Stages will be reviewed at the *Contract* start-up meeting to ensure that parties understand their responsibilities. Refer to Section 01 31 19 for procedures and requirements for *Contract* start-up meeting.
- .6 Within 4 weeks of commencement of the *Work*, submit to the *Consultant* a list of closeout submittals required by the *Contract Documents*.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Cleaning Prior to *Substantial Performance of the Work*
- .4 1.4 Final Cleaning
- .5 1.5 Project Record Documents
- .6 1.6 Spare Parts and Maintenance Materials
- .7 1.7 Systems Demonstration
- .8 1.8 Substantial Performance and Takeover Procedures
- .9 1.9 Warranty Period

### **1.3 CLEANING PRIOR TO SUBSTANTIAL PERFORMANCE OF THE WORK**

- .1 Immediately prior to *Consultant's* review to determine if *Substantial Performance of the Work* has been achieved, remove surplus *Products* and construction machinery and equipment not required for the performance of the remaining *Work* and clean as described under paragraph 1.4 - Final Cleaning to the greatest extent practicable given work remaining to be completed. Cleaning shall be to a sufficient extent to permit the *Consultant's* review to be performed properly and reasonably.

### **1.4 FINAL CLEANING**

- .1 Environmental controls:
  - .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
  - .2 Store volatile wastes in covered metal containers and remove from *Place of the Work* daily.

- .3 Prevent accumulation of wastes which create hazardous conditions.
- .4 Provide adequate ventilation during use of volatile or noxious substances.
- .2 Materials:
  - .1 Use only cleaning materials recommended by manufacturer of surface to be cleaned and as recommended by cleaning material manufacturer.
- .3 Final cleaning:
  - .1 Remove waste *Products* and debris other than that caused by the *Owner*, and leave the *Work* clean and suitable for occupancy by *Owner*.
  - .2 When the *Contract* is completed, remove surplus *Products*, tools, construction machinery and equipment.
  - .3 Clean glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, prefinished surfaces, and fixtures.
  - .4 Remove stains, spots, marks and dirt from decorative parts of the *Work*, electrical and mechanical fixtures, furniture fittings, walls, and floors.
  - .5 Vacuum clean and remove dust from building interiors, behind grilles, louvres, and screens. Vacuum clean interior of electrical equipment.
  - .6 Clean floor finishes to recommendations of manufacturer.
  - .7 Remove non-permanent labels.
  - .8 Remove dirt and residue from surfaces.
  - .9 Inspect finishes, fittings and equipment and ensure specified workmanship and operation.
  - .10 At completion of the *Work*, remove protective coatings, clean surfaces and remove excess compounds and sealant materials. Make good defective, scratched or damaged work.
  - .11 Clean equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment.
  - .12 Remove seal wrap on mechanical and electrical *Products* and materials and clean as required.
  - .13 Clean and/or replace lamps, light fixtures, lenses, and grilles.
  - .14 Remove protective covering and labels from lamps, hardware, and specialty items.
  - .15 Under the direction of the *Consultant*, aim adjustable luminaires.

## 1.5 PROJECT RECORD DOCUMENTS

- .1 Collect reviewed submittals, and assemble required closeout submittals executed by *Subcontractors*, *Suppliers*, and manufacturers. Prior to submitting closeout submittals to the *Consultant*, undertake the following:
  - .1 Review maintenance manual contents (operating, maintenance instructions, asbuilt drawings, materials) for completeness.
  - .2 Review supply and completeness of spare parts required by *Contract Documents* and manufacturers.



- .3 Review in relation to *Contract Price*, *Change Orders*, *Change Directives*, holdbacks and other adjustments to the *Contract Price*.
  - .4 Review inspection and testing reports to verify conformance to intent of *Contract Documents* and that changes, repairs or replacements have been completed.
  - .5 Execute transition of performance bond and labour and materials payment bond to warranty period requirements.
  - .6 Submit a final statement of accounting giving total adjusted *Contract Price*, previous payments, and monies remaining at time of application for completion of the *Contract*. *Consultant* will issue a final change order reflecting approved adjustments to *Contract Price* not previously made.
- .2 No later than 20 Working Days prior to submitting request for Consultant's review to determine if Substantial Performance of the Work has been achieved, submit to the Consultant the closeout submittals specified in this section, including, but not limited to, reviewed shop drawings, Product data sheets, samples, operating instructions, as-built records, fully executed warranties and guarantees, reports recording demonstration and training provided to Owner for operation and maintenance of building systems, software required for operation and maintenance of building systems, maintenance materials, and keys.
  - .3 For equipment put into use with Owner's permission during the Work, submit required closeout submittals within 10 Working Days after start-up
  - .4 For items of the Work delayed materially beyond date of Substantial Performance of the Work, provide updated closeout submittals within 10 Working Days after acceptance, listing date of acceptance as start of warranty period.
  - .5 Neither the Consultant's review to determine if Substantial Performance of the Work has been achieved, nor acceptance of the Work, will take place until receipt, by the Consultant, of acceptable copies of the closeout submittals required herein and by the Contract Documents.
  - .6 Operation and Maintenance Manuals:
    - .1 Submit operation and maintenance manuals, consisting of the following general components:
      - .1 Operation and maintenance.
      - .2 Shop drawings.
      - .3 Warranties.
      - .4 *Project* data.
  - .7 Submit Operation and Maintenance Manuals as follows:
    - .1 Fifteen (15) Days prior to applying for the review to determine *Substantial Performance of the Work*, the *Contractor* shall submit to the *Consultant* digital versions ("PDF" files) of operation and maintenance manuals. Files shall be original PDF files, not scanned, and shall be searchable.
    - .2 Submit using digital storage medium or transfer process acceptable to the *Consultant* and the *Owner*.
    - .3 If revisions to the Operation and Maintenance Manuals are required, comments will be provided by the Consultant team for re-submission prior to undertaking the review to determine *Substantial Performance of the Work*.

- .4 Manuals are to be re-submitted to the *Consultant* for review once any required revisions have been made.
- .5 Manuals shall contain operational information on equipment, cleaning and lubrication schedules, filters, overhaul and adjustment schedules, and all other operation and maintenance information as required by the *Contract Documents*, including all warranties.
- .6 Final Hard Copies, (3 Copies) shall be printed and submitted to the Owner. Contractor shall organize the data in the form of an instructional manual in binders of commercial quality, with hard covers, 8-1/2" x 11" in size, with a maximum ring size of 2". The following shall be followed:
  - .1 On the cover, identify each binder with the typed or printed title "Operation and Maintenance Manuals," listing also the title of the project, and identifying the subject matter of the contents.
  - .2 Arrange the contents into applicable categories of work, parallel to the sections of the specifications.
  - .3 When multiple binders are used, correlate data into consistent related groupings.
  - .4 *Provide* tabbed fly-leaf for each separate product and system, with typed description of product and major component parts of equipment.
  - .5 If drawings are included, *Provide* with reinforced punched binder tab, bind in with text, folding drawings of a larger size to size of text pages.
  - .6 For each *Product* or system, list names, addresses, and telephone numbers of *Subcontractors* and Suppliers, including a local source of supplies and replacement parts.
  - .7 *Product Data*: mark each sheet to clearly identify specific products and component parts, as well as data applicable to the installation, and delete inapplicable information.
- .8 *As-Built Documents*:
  - .1 Prior to the commencement of the *Work*, the *Consultant* will *Provide* the *Contractor* with a set of *Contract Documents* for the purpose of recording changes in the *Work*, as well as the actual locations of concealed services.
  - .2 Accurately and neatly record deviations from the *Contract Documents* caused by conditions at the *Place of the Work* and changes in the *Work* as the *Work* progresses.
  - .3 Record information by means of red felt-tip marker.
  - .4 Record, without being limited to, the following:
    - .1 Survey of as-built conditions and survey logs prepared by the registered land surveyor responsible for setting out the work and field engineering.
    - .2 Depths of various elements of foundation in relation to survey datum.
    - .3 Horizontal and vertical location of utilities and appurtenances referenced to permanent surface improvement.
    - .4 Other underground installations and services set beneath slabs-on-grade referenced to visible and accessible features of structure.
    - .5 'As-built' elevations of paving, sidewalks, manholes and catchbasins.

- .6 Field changes of dimensions/details.
  - .7 Changes by Change Orders, Change Directives, and Supplemental Instructions.
  - .8 Locations of interior mechanical and electrical equipment and distribution.
  - .9 Elevations and location depths of services. Identify type and size of service and materials used.
  - .10 Specification as-builts: Record as-built *Products*, including manufacturer, manufacturer's model or system number.
- .5 Identify each document as "As-Built Copy." Maintain in good condition in the *Site* office and make available for review by the *Consultant* and the *Owner* upon request.
- .6 In the specifications, legibly mark each item to record actual construction, including manufacturers, trade names, and catalogue number for each product actually installed, particularly optional items and substitute items.
- .7 Mechanical and electrical records shall be kept by the respective *Subcontractors* (who shall receive an extra copy each of the mechanical and electrical Drawings and specifications for this purpose from the *Contractor*), and shall be delivered to the *Contractor* who shall transfer the information to the As-Built Drawings.
- .8 *Contractor* shall *Provide* As-Built Survey once foundations are completed to ensure building is situated as required. Drawing shall be submitted in PDF and CAD Format. *Contractor* shall *Provide* As-Built *Site* survey upon the completion of the project in PDF and CAD format.
- .9 On completion of the construction work, and fifteen (15) Days prior to applying for the review to determine *Substantial Performance of the Work*, the *Contractor* shall submit to the *Consultant* the complete As-Built *Documents*.
- .10 Submit digital scanned copy ("PDF" files) of as-built documents. Submit using digital storage medium or transfer process acceptable to the *Consultant* and the *Owner*.
- .9 *Shop Drawings* and Inspection Reports:
- .1 Fifteen (15) Days prior to applying for the review to determine *Substantial Performance of the Work*, the *Contractor* shall submit to the *Consultant* digital versions ("PDF" files) of all reviewed shop drawings including an inventory of the shop drawings submitted.
    - .1 Submit one copy of each final accepted shop drawing issued for the Work on which have been recorded changes made during fabrication and installation caused by unforeseen conditions
    - .2 Engineered shop drawings shall include copies of the certificate of insurance, the engineer's field review reports, and the engineer's letters of general conformity that were provided as part of the engineered submittal in accordance with Section 01 33 00 appended to the pertinent engineered shop drawing in the shop drawing manual.
  - .2 Fifteen (15) Days prior to applying for review to determine *Substantial Performance of the Work*, the *Contractor* shall submit to the *Consultant* digital versions ("PDF" files) of all inspection and testing reports bound together in one (1) volume and arranged in chronological sequence.
- .10 Warranties:

- .1 Submit copies of bonds, guarantees, warranties and extended warranties together in one report binder, complete with an indexed summary list of warranties and expiration dates. Warranties to be in accordance with Section 01 78 36.
- .11 *Project data*: shall include the following information supplemented by additional required data specified elsewhere in the *Contract Documents*:
  - .1 Maintenance instructions for finished surfaces and materials.
  - .2 Copy of hardware and paint schedules.
  - .3 Names, addresses and phone numbers of *Subcontractors* and *Suppliers*, as applicable.
  - .4 Additional material used in the *Work* listed under various sections showing name of manufacturer and source of supply.
  - .5 Report recording demonstration and instruction provided to *Owner* for operation and maintenance of building systems as described below in this section.
  - .6 Key construction photos.
  - .7 Permits and forms:
    - .1 Workplace Safety & Insurance Board certificate of clearance.
    - .2 Certificates of approval of the *Work* by local building department (if available).
    - .3 Electrical authority certificate of inspection.
- .12 Posted operating instructions
  - .1 Prepare operating instructions in English for posting near equipment and systems. Posted instructions to be glass covered, framed and mounted.
  - .2 Posted instructions to consist of simplified, consolidated equipment, control and power diagrams graphically representing the entire system, including concise instructions on how to start and stop systems, what settings and conditions are to be observed by the operators, and what control adjustments are to be made or maintained by the operator.
  - .3 Posted instructions shall include control diagrams with added specific operating instructions, controls, interlocks, and the like.
  - .4 Posted instructions shall include:
    - .1 HVAC controls for each system;
    - .2 One line schematic diagrams of water supply;
    - .3 One line isometric diagrams of sanitary drainage;
    - .4 One line diagrams of steam distribution, hot and cold water systems, including risers, valves, control devices, etc.

## 1.6 SPARE PARTS AND MAINTENANCE MATERIALS

- .1 At the time of submission of the *Project Record Documents*, or earlier if acceptable to the *Consultant* and the *Owner*, the *Contractor* shall submit to the *Owner* maintenance equipment for the various items, pieces of equipment, systems, or accessories required by the *Contract Documents*.

- .2 At the time of submission of the *Project Record Documents*, or earlier if acceptable to the *Consultant* and the *Owner*, the *Contractor* shall submit to the *Owner* extra materials for the various items, pieces of equipment, systems, or accessories required by the *Contract Documents*.
- .3 Spare parts, maintenance materials, and extra materials provided shall be new, not damaged or defective, and of same quality, manufacture, and manufacturer as of the Products provided in the *Work*. If requested, the *Contractor* shall furnish evidence as to the type, source, and quality of the Products provided.
- .4 Defective Products will be rejected, regardless of previous inspections. The *Contractor* shall replace such Products and such replacement will not be considered or approved as a change in the *Work*.
- .5 Store spare parts and maintenance materials in a manner to prevent damage or deterioration.
- .6 Provide a typed inventory list of maintenance materials prior to *Substantial Performance of the Work* application. List all items, complete with quantities, and storage locations.
- .7 Establish a master list identifying maintenance materials and maintain a log of when materials are turned over to *Owner* and signing authority for acceptance of materials on behalf of *Owner*.

## 1.7 SYSTEMS DEMONSTRATION

- .1 Refer also to requirements of Divisions 21, 22, and 23 and Divisions 26, 27, and 28 with respect to commissioning for control systems, mechanical / electrical systems.
- .2 Perform system demonstration and commissioning work no later than 10 *Working Days* prior to submitting request for *Consultant's* review to determine if *Substantial Performance of the Work* has been achieved.
- .3 Submit required certificates of approval or acceptance from authorities having jurisdiction.
- .4 Meet with other consultants; structural, mechanical, electrical, to coordinate demonstration, instruction, commissioning and completion.
- .5 Review condition of equipment such as lighting, elevators and heating system, which has been used in the course of the *Work* to ensure turning over at completion in "as new condition" with warranties dated and certified from time specified.
- .6 When partial occupancy of uncompleted project is required by *Owner*, coordinate *Owner's* uses, requirements, access, and the like, with *Contractor's* requirements to complete the *Work*.
- .7 Preparation:
  - .1 Submit to both the *Owner* and the *Consultant*, a schedule of time and date for demonstration of each item of equipment and each system at least fifteen (15) Days prior to designated dates.
  - .2 Ensure that the services, apparatuses, and equipment are installed and complete, have been inspected, tested and adjusted, and are all in perfect operating condition.
  - .3 Verify the conditions for demonstration and instructions comply with requirements and that designated personnel are present.
- .8 Demonstration and Instructions:

- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment to *Owner*.
- .2 Instruct *Owner's* personnel in operation, adjustment and maintenance of equipment and systems, using operation and maintenance data provided as the basis for instructions. Arrange and coordinate instruction of *Owner's* staff in care, maintenance and operation of building systems and finishes.
- .3 *Contractor*, manufacturer's representatives, and responsible personnel from *Subcontractors* whose work is being demonstrated shall be present at these demonstrations.
- .4 Instruct *Owner's* representative on use of software required for operation and maintenance of building systems and provide a toll-free telephone number or website address for further assistance to the *Owner*.
- .5 Prepare and insert additional data in the operation and maintenance data manuals when the need for additional data becomes apparent during demonstration or instruction.
- .9 Demonstration and instruction Report:
  - .1 Submit a written reports within five (5) *Working Days* after completion of demonstration, recording that demonstration and instructions have been satisfactorily completed. Report shall include time and date of each demonstration, instruction, and commissioning activity, complete with a list of persons present.
- .10 Correct deficiencies and defects identified during demonstration, instruction, or commissioning.
- .11 Attend 'end-of-work' testing and break-in or start-up demonstration.

## 1.8 SUBSTANTIAL PERFORMANCE AND TAKEOVER PROCEDURES

- .1 A minimum of 60 Working Days prior to the anticipated Substantial Performance date, the *Contractor* (in writing) shall *Provide* a notice letter to the *Owner* of the anticipated Substantial Performance date.
- .2 The *Contractor* shall affirm the Substantial Performance date and *Provide* the *Owner* and the *Consultant* with a Notice Letter confirming the date, a minimum of 20 Working Days prior to the Substantial Performance date.
- .3 Deficiency review:
  - .1 The *Contractor* shall conduct an inspection of the *Work* to identify deficiencies and defects, which shall be repaired as required. When the *Contractor* considers that the *Work* is substantially performed, the *Contractor* shall prepare and submit to the *Consultant* a comprehensive list of items to be completed or corrected and apply for a review by the *Consultant* to establish *Substantial Performance of the Work*. Failure to include an item on the list does not alter the responsibility of the *Contractor* to complete the *Contract*.
  - .2 One week prior to the anticipated Substantial Performance date, the *Consultant*, the *Owner* and the *Contractor* will complete a deficiency walk through to confirm item 3 above. *Consultant* will *Provide* deficiency list with Value of Deficiency work to be complete.
  - .3 *Contractor* assumes prime responsibility for ensuring that items shown and described in the *Contract Documents* are complete. Any deficiency reviews to approve the certificate of *Substantial Performance of the Work* will be immediately cancelled if it becomes obvious to the *Consultant* that extensive deficiencies are outstanding.

- .4 No later than ten (10) *Working Days* after the receipt of the *Contractor's* application, the *Consultant* and the *Contractor* will review the *Work* to identify any defect or deficiencies. If necessary, the *Consultant* will tabulate a list of deficiencies to be issued to the *Contractor* for correction of same.
  - .5 The *Contractor* shall submit to the *Owner* and the *Consultant* a written Substantial Performance Application complete with all required documents. The application for Substantial Performance shall follow OAA/OGCA Take-Over-Procedures.
  - .6 Neither the *Consultant's* review to determine if *Substantial Performance of the Work* has been achieved, nor acceptance of the *Work*, will take place until receipt, by the *Consultant*, of acceptable copies of the closeout submittals required herein and by the *Contract Documents*.
- .4 Certification of Substantial Performance of the Work:
- .1 When the *Consultant* considers that the deficiencies and defects have been completed and that it appears that the requirements of the *Contract Documents* (as may have been amended during the *Work*) have been substantially performed, the *Consultant* will issue a certificate of *Substantial Performance of the Work* to the *Contractor*, stating the date of *Substantial Performance of the Work*.
  - .2 The *Contractor* must obtain the *Owners* approval of the Certificate of Substantial Performance prior to publication.
  - .3 The certificate of *Substantial Performance of the Work* shall be prepared and issued in accordance with the Construction Act.
- .5 Final Inspection for completion of the *Contract*:
- .1 Deficiencies and defects shall be made good before the *Contractor* submits a written request for final review of the *Work* and before the *Contract* is considered complete.
  - .2 When *Contractor* is satisfied that the *Work* is complete, and after the *Contractor* has reviewed the *Work* to verify its completion in accordance with the requirements of the *Contract Documents*, the *Contractor* shall submit a written request for a final review by the *Consultant*, who in turn will notify the *Owner*.
  - .3 If there are any deficiencies identified as a result of this review, they shall be listed by the *Consultant* and submitted to the *Contractor*. This list shall be recognized as the final deficiency list for purposes of acceptance of the *Work* under the *Contract*.
  - .4 Such deficiencies shall be corrected by a date mutually agreed upon between *Consultant* and the *Contractor*, unless a specific date is required by *Contract*, and a further review by the *Consultant* shall be called for by the *Contractor* following his own review to take place within 7 days from date of request.
  - .5 *Contractor* shall thereafter submit invoice for final payment.
  - .6 Money shall be withheld for deficiency work and will be released only when all deficiencies have been completed. No partial payment to be recognized until all work is completed.

## 1.9 WARRANTY PERIOD

- .1 The Warranty Period shall commence following the date of substantial performance for a duration of twelve months in accordance with the Agreement between *Owner* and *Contractor*.

- .2 Contractor shall provide on-going review and attendance to building call-back, maintenance, and repair problems during the warranty periods.
- .3 At the beginning of the 2<sup>nd</sup> last month of the Warranty Period, the *Owner*, *Contractor* and *Consultant*, along with key *Subcontractors* as designated, shall carry out a complete review of building and its systems to determine which deficiencies are to be rectified under the warranty. *Contractor* shall be responsible for timely written notification of *Owner*, and *Consultant* prior to such end of warranty period inspection and any delay in such notification shall extend such warranty period until proper notification is received by *Owner*, and *Consultant*.

## **PART 2 - PRODUCTS**

Not applicable.

## **PART 3 - EXECUTION**

Not applicable.

**END OF SECTION**



## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Related Documents
- .4 1.4 Summary
- .5 1.5 Definitions
- .6 1.6 Closeout Submittals
- .7 2.1 Requirements For Operation, And Maintenance Manuals
- .8 2.2 Operation Data
- .9 2.3 Product Maintenance Data
- .10 2.4 Systems And Equipment Maintenance Data
- .11 3.1 Manual Preparation

### **1.3 RELATED DOCUMENTS**

- .1 The Contract Documents, including but not limited to, the Drawings and Individual Specification Sections and Contractor's Submission Schedule, apply to this Section.

### **1.4 SUMMARY**

- .1 Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - .1 Operation and maintenance manual for systems, subsystems, and equipment.
  - .2 Product maintenance data.
  - .3 Systems and equipment maintenance data.
- .2 Related Sections:
  - .1 Section 01 33 00 – Submittal Procedures
  - .2 Section 01 77 00 – Contract Closeout Requirements
  - .3 Section 01 81 13 – Sustainable Design Requirements
  - .4 Section 01 91 13 – General Commissioning Requirements

### **1.5 DEFINITIONS**

- .1 System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- .2 Subsystem: A portion of a system with characteristics similar to a system.

## **1.6 CLOSEOUT SUBMITTALS**

- .1 Required Manuals: see Section 01 77 00 – Contract Closeout Requirements for additional requirements.
- .2 Format: Submit operations and maintenance manuals in the following format:
  - .1 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to the Design Professional.
    - .1 Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
    - .2 Enable inserted reviewer comments on draft submittals.

## **PART 2 - PRODUCTS**

### **2.1 REQUIREMENTS FOR OPERATION, AND MAINTENANCE MANUALS**

- .1 Organization: Organize the manual into separate sections by CSI number based on the table of contents of the project manual, for each system and subsystem, and a separate section for each piece of equipment not part of a system. The manual shall contain the following materials, in the order listed:
  - .1 Title page.
  - .2 Table of contents.
  - .3 Manual contents:
    - .1 Operation data.
    - .2 Product maintenance data.
    - .3 Systems and equipment data
- .2 Title Page: Include the following information:
  - .1 Subject matter included in manual.
  - .2 Name and address of Project.
  - .3 Name and address of Owner.
  - .4 Date of submittal.
  - .5 Name and contact information for Contractor.
  - .6 Name and contact information for Construction Manager.
  - .7 Name and contact information for Design Professional.
  - .8 Name and contact information for Commissioning Agent.
  - .9 Names and contact information for major consultants to the Design Professional that designed the systems contained in the manuals.
  - .10 Cross-reference to related systems in other operation and maintenance manuals.

- .3 Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
  - .1 If operation or maintenance documentation requires more than one media volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- .4 Manual Contents: Organize into sets of manageable size. Arrange contents by CSI Section number and then by system, subsystem, and equipment.
- .5 Manuals, Electronic Copy: Submit electronic (PDF) copy of the manual, to the Design Professional, concurrent with Action Submittal.

## **2.2 OPERATION DATA**

- .1 Content: In addition to requirements in this Section, include operation data required in individual Specification Section and the following information:
  - .1 System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  - .2 Operating standards.
  - .3 Operating procedures.
  - .4 Operating logs.
  - .5 Wiring diagrams.
  - .6 Control diagrams.
  - .7 Piped system diagrams.
  - .8 Precautions against improper use.
  - .9 License requirements including inspection and renewal dates.
- .2 Descriptions: Include the following:
  - .1 Product name and model number. Use designations for products indicated on Contract Documents.
  - .2 Manufacturer's name.
  - .3 Equipment identification with serial number of each component.
  - .4 Equipment function.
  - .5 Operating characteristics.
  - .6 Limiting conditions.
  - .7 Performance curves.
  - .8 Engineering data and tests.
  - .9 Complete nomenclature and number of replacement parts.
- .3 Operating Procedures: Include the following, as applicable:

- .1 Startup procedures.
- .2 Equipment or system break-in procedures.
- .3 Routine and normal operating instructions.
- .4 Regulation and control procedures.
- .5 Instructions on stopping.
- .6 Normal shutdown instructions.
- .7 Seasonal and weekend operating instructions.
- .8 Required sequences for electric or electronic systems.
- .9 Special operating instructions and procedures.
- 4 D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- 5 E. Piped Systems: Diagram piping as installed and identify color-coding where required for identification.

### **2.3 PRODUCT MAINTENANCE DATA**

- .1 Content: Organize data into a separate section, within the O & M Manual, for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- .2 Source Information: List each product included in section identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- .3 Product Information: Include the following, as applicable:
  - .1 Product name and model number.
  - .2 Manufacturer's name.
  - .3 Color, pattern, and texture.
  - .4 Material and chemical composition.
  - .5 Reordering information for specially manufactured products.
- 4 Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - .1 Inspection procedures.
  - .2 Types of cleaning agents to be used and methods of cleaning.
  - .3 List of cleaning agents and methods of cleaning detrimental to product.
  - .4 Schedule for routine cleaning and maintenance.
  - .5 Repair instructions.

- .5 Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- .6 Warranties and Guarantees: Include copies of warranties and guarantees lists of circumstances and conditions that would affect validity of warranties.
  - .1 Include procedures to follow and required notifications for warranty claims.

## **2.4 SYSTEMS AND EQUIPMENT MAINTENANCE DATA**

- .1 Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- .2 Source Information: List each system, subsystem, and piece of equipment included in a separate section within the O & M Manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- .3 Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  - .1 Standard maintenance instructions and bulletins.
  - .2 Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - .3 Identification and nomenclature of parts and components.
  - .4 List of items recommended to be stocked as spare parts.
- .4 Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  - .1 Test and inspection instructions.
  - .2 Troubleshooting guide.
  - .3 Precautions against improper maintenance.
  - .4 Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - .5 Aligning, adjusting, and checking instructions.
  - .6 Demonstration and training video recording, if available.
- .5 Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
  - .1 Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  - .2 Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

- .6 Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- .7 Warranties: Include copies of warranties and lists of circumstances and conditions that would affect validity of warranties.
  - .1 Include procedures to follow and required notifications for warranty claims.

## **PART 3 - EXECUTION**

### **3.1 MANUAL PREPARATION**

- .1 Operation and Maintenance Documentation shall be provided for review, concurrent, with Action Submittal specified in Individual Specification Section.
  - .1 Correct or modify the manual to comply with the Design Professional's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Design Professional's and Commissioning Authority's comments and prior to commencing demonstration and training.
- .2 Product Maintenance Data: Assemble a complete set of maintenance data, in a separate section, within the O&M Manual, indicating care and maintenance of each product, material, and finish incorporated into the Work.
- .3 Operation and Maintenance Data: Assemble a complete set of operation and maintenance data, in a separate section, within the O&M Manual, indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - .1 Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - .2 Prepare a separate section within the O&M Manual, for each system and subsystem, in the form of an instructional manual for use by operating personnel.
- .4 Manufacturers' Data: Where manual contain manufacturers' standard printed data; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - .1 Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- .5 Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in As-built Drawings to ensure correct illustration of completed installation.
  - .1 Do not use original project record documents as part of operation and maintenance manuals.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 GENERAL REQUIREMENTS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General requirements
- .2 1.2 Section Includes
- .3 1.3 Warranties
- .4 1.4 Extended Warranties

### **1.3 WARRANTIES**

- .1 Refer to GC 12.3 of the Agreement between *Owner* and *Contractor* for the Warranty Periods provisions, and as follows:
  - .1 Warranties shall commence at date of *Substantial Performance of the Work*.
  - .2 Submit warranties for applicable items, signed by the applicable company responsible for each warranty.
  - .3 Submit warranties on form approved by *Owner* including, but not limited to, the following information:
    - .1 Name and address of Project.
    - .2 Warranty commencement date (date of *Substantial Performance of the Work*).
    - .3 Duration of warranty.
    - .4 Clear indication of what is being warranted and what remedial action will be taken under warranty.
    - .5 Authorized signature and seal of company providing each warranty.
- .2 *Owner* shall be named in manufacturer's *Product* warranties. Submit on relevant *Product* manufacturer's standard warranty or guarantee form.
- .3 The *Owner* will give prompt notice in writing to the *Consultant* of any defects noted during the warranty periods(s) and the *Consultant* shall notify the *Contractor* promptly requesting him to remedy such defects.
- .4 A minimum of 30 *Working Days* prior to the expiration of the Warranty Period stipulated in Contract between *Owner* and *Contractor*, the *Owner*, the *Consultant* and the *Contractor* shall conduct an inspection of the *Work*. The *Contractor* shall promptly remedy any defects due to faulty materials or workmanship.
- .5 Use of permanent heating system for temporary heat shall not affect requirement that all warranties start on the date specified in Article A-15 of the Agreement between *Owner* and *Contractor*.
- .6 Prior to application for *Substantial Performance of the Work*, the *Contractor* shall formally assign to the *Owner* all extended warranties given by *Subcontractors* for their *Work* on the project and such *Subcontractors* shall be formally advised of the assignment.

#### 1.4 EXTENDED WARRANTIES

- .1 Extended warranties shall be in accordance with the *Contract* and as follows:
  - .1 Where specifically identified in the *Contract Documents*, extended warranties shall be furnished by individual manufacturer for particular product / system / assembly or by *Subcontractor* for a particular product/system/assembly/section of the specifications.
  - .2 Extended warranties shall include for proper performance of the portion of the *Work* as defined by the scope of the applicable specification section to the extent that the design and *Contract Documents* permit such performance.
  - .3 Extended warranties shall be provided by *Subcontractor* unless warranty is specified to be provided by product manufacturer.
  - .4 The *Owner* shall promptly give the warrantor notice in writing of observed defects and deficiencies which occur during the warranty period.
  - .5 Extended warranties shall commence at date of *Substantial Performance of the Work*.
  - .6 Extended warranties specified shall be in addition to, and run concurrent with, other warranties required by the *Contract Documents*. Manufacturer's disclaimers and limitations on product warranty do not relieve *Contractor* of obligations under requirements of the *Contract Documents*.
  - .7 Submit extended warranty on warrantor's standard form specifically endorsed by the warrantor to the *Owner* and shall include the following information:
    - .1 Name and address of *Project*.
    - .2 Warranty commencement date (date of *Substantial Performance of the Work*).
    - .3 Warranty period.
    - .4 Specific warranty terms as required in applicable portion of *Contract Documents*.
    - .5 Name and title of authorized signing officer and seal of warrantor.

#### PART 2 - PRODUCTS

Not applicable.

#### PART 3 - EXECUTION

Not applicable.

**END OF SECTION**



## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Related Documents
- .4 1.4 Summary
- .5 1.5 Closeout Submittals
- .6 2.1 As-Built Drawings
- .7 2.2 As-Built Specifications
- .8 2.3 As-Built Schedule
- .9 2.4 Record Product Data
- .10 2.5 Miscellaneous Record Submittals
- .11 3.1 Recording And Maintenance

### **1.3 RELATED DOCUMENTS**

- .1 The Contract Documents, including but not limited to, the Drawings and Individual Specification Sections, apply to this Section.

### **1.4 SUMMARY**

- .1 Section includes administrative and procedural requirements for As-built documents, including the following:
  - .1 As-built Drawings
  - .2 As-built Specifications
  - .3 As-built Schedule
  - .4 Record Product Data
  - .5 Miscellaneous record submittals
- .2 Related Sections:
  - .1 Section 01 32 00 – Construction Progress Documentation
  - .2 Section 01 33 00 – Submittal Procedure; Required Submittal List
  - .3 Section 01 77 00 – Contract Closeout Requirements
  - .4 Section 01 78 23 – Operation and Maintenance Manuals
- .3 Administrative and procedural requirements for contract turnover documents, including, but not limited to the following, as provided in Individual Specifications Sections.
  - .1 Sustainable Documents

- .2 Commissioning Documents
- .3 Hazardous Waste Documents

## **1.5 CLOSEOUT SUBMITTALS**

- .1 Required Documents: Section 01 77 00 – Contract Closeout Requirements, describes administrative requirements for submission, number and type of copies required for contract closeout requirements.

## **PART 2 - PRODUCTS**

### **2.1 AS-BUILT DRAWINGS**

- .1 As-built Drawings: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings onsite. Review As-built Drawings and shop drawings monthly with the Owner, for approval.
  - .1 Preparation: Daily mark As-built Drawings to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up As-built Drawings.
    - .1 Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - .2 Accurately record information in an acceptable drawing technique.
    - .3 Record data as soon as possible after obtaining it.
    - .4 Record and check the markup before enclosing concealed installations.
  - .2 Content: Types of items requiring marking include, but are not limited to, the following:
    - .1 Dimensional changes to Drawings.
    - .2 Revisions to details shown on Drawings.
    - .3 Depths of foundations below first floor.
    - .4 Locations and depths of underground utilities.
    - .5 Revisions to routing of piping and conduits.
    - .6 Revisions to electrical circuitry.
    - .7 Actual equipment locations.
    - .8 Duct size and routing.
    - .9 Locations of concealed internal utilities.
    - .10 Changes made by Change Order.
    - .11 Changes made by Bulletin.
    - .12 Changes made following the Owner's written orders.
    - .13 Details not on the original Contract Drawings.
    - .14 Field records for variable and concealed conditions.

- .15 Record information on the Work that is shown only schematically.
- .3 Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up as-built prints.
- .4 Mark as-built sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
- .5 Mark important additional information that was either shown schematically or omitted from original Drawings.
- .6 Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

## **2.2 AS-BUILT SPECIFICATIONS**

- .1 Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
  - .1 Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - .2 Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  - .3 Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  - .4 For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
  - .5 Note related Change Orders, record Product Data, and turnover Drawings where applicable.

## **2.3 AS-BUILT SCHEDULE**

- .1 Final Schedule: Submit to the Owner a final schedule update. The As-built Schedule shall reflect the exact manner in which the project was actually constructed including actual start and finish dates, activities, sequences and logic.
  - .1 The Contractor shall certify the final schedule update as being a true reflection of the way the project was actually constructed.

## **2.4 RECORD PRODUCT DATA**

- .1 Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
  - .1 Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - .2 Include significant changes in the product delivered to the Project site and changes in manufacturer's written instructions for installation.
  - .3 Note related Change Orders, As-built Specifications, and As-built Drawings where applicable.

## **2.5 MISCELLANEOUS RECORD SUBMITTALS**

- .1 Assemble miscellaneous records required by Individual Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- .2 Format: Submit miscellaneous record submittals.
  - .1 Include miscellaneous record submittals directory organized by specification section number and title, electronically linked to each item of miscellaneous record submittals.

## **PART 3 - EXECUTION**

### **3.1 RECORDING AND MAINTENANCE**

- .1 Maintain Change Log: Maintain and submit written change log to the Owner, monthly for review indicating items incorporated in contract turnover documents concurrent with progress of the Work, including modifications, concealed conditions, field changes, product selections, and other notations incorporated.
- .2 Recording: Maintain one copy of each submittal during the construction period for contract turnover document purposes. Post changes and modifications to contract turnover documents as they occur; do not wait until the end of the Project.
- .3 Maintenance of Turnover Documents and Samples: Store turnover documents and Samples in the field office apart from the Contract Documents used for construction. Contract turnover documents are not to be used for construction purposes. Maintain turnover documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to contract turnover documents for the Owner's reference during normal working hours during performance of Contract.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 1Administrative Requirements
- .5 1.5 Submittals
- .6 1.6 Quality Assurance
- .7 3.1 Examination
- .8 3.2 Utility Services and Mechanical / Electrical Systems
- .9 3.3 Selective Demolition, General
- .10 3.4 Selective Demolition Procedures for Specific Materials
- .11 3.5 Protection

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Demolition and removal of selected non-structural portions of building.
  - .2 Removal of surplus materials from the *Place of the Work*.
  - .3 Related mechanical and electrical work and demolition requirements are covered under Divisions 21, 22, and 23 and Divisions 26, 27, and 28 respectively.
- .2 Section excludes:
  - .1 Demolition, removal, remediation, or abatement of designated substances or materials and toxic and hazardous substances.

### **1.4 1ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-demolition meeting:
  - .1 Schedule a pre-demolition meeting following the procedures specified for preinstallation meetings in accordance with Section 01 31 19.
  - .2 Review existing conditions at the Place of the Work thoroughly to establish full extent of items to be removed and items to remain. Commencement of demolition work will be considered to be acceptance of existing conditions at the Place of the Work and removal of such items.
  - .3 Examine adjacent properties to determine extent of protection required.

### **1.5 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 Demolition report:

- .1 Prior to commencement of the work of this section at the Place of the Work, prepare and submit to the municipal building department having jurisdiction over the Place of the Work a report on the proposed demolition methods and procedures for the removal of indicated structures for the safe retention of structures to remain.
- .2 Prepare report under the supervision, and bear the seal and signature, of a professional engineer licensed to practice engineering in the Place of the Work, experienced in this type of engineering, and in accordance with Section 01 33 00.
- .3 Submit a PDF of the demolition report to the Consultant for record purposes only: Consultant shall neither review nor accept any liability for the contents of the report.
- .4 Without limiting the requirements of authorities having jurisdiction, the demolition report shall include:
  - .1 Drawings, diagrams and details showing sequence of demolition work and supporting structures.
  - .2 Description, in detail, of the methods and procedures for working at the base of existing buildings to remain.
  - .3 Schedule of demolition activities indicating the following:
    - .1 Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
    - .2 Interruption of utility services.
    - .3 Coordination for shutoff, capping, and continuation of utility services.
    - .4 Location of temporary street barricades, building interior partitions and means of egress.
  - .4 Written description of methods for removal and temporary bracing of structural members or supporting construction.
- .3 Obtain the demolition permit such that the engineer responsible for the preparation of the demolition report becomes the Engineer of Record for the demolition work. Prepare and submit reports, *Drawings*, and other documents required as part of the municipal permit process prior to, during, and upon completion of the demolition work. Copies of the permit with the name of the Engineer of Record shall be submitted to the *Consultant* prior to the commencement of demolition.
  - .1 If an application has been made, by or on behalf of the *Owner*, to the building department having jurisdiction at the *Place of the Work*, it is a requirement of this *Contract* that the *Contractor* obtain an amendment to this application/permit such that the engineer responsible for the preparation of the demolition report specified in Section 02 41 16 becomes the Engineer of Record for the demolition work.
- .4 Special procedures submittals:
  - .1 Existing conditions documentation:
    - .1 Document existing conditions of adjoining construction and site improvements, including pre-existing damage to finish surfaces that might be misconstrued as damage caused by demolition operations.
    - .2 Comply with Section 01 32 33.

- .3 Submit existing conditions documentation before demolition work begins.

## **1.6 QUALITY ASSURANCE**

### **.1 Qualifications:**

#### **.1 Subcontractor:**

- .1 Shall have 5 years' specialized demolition experience, minimum.
- .2 Shall be able to deploy adequate equipment and skilled personnel to complete work expediently in an efficient and orderly manner.

## **PART 2 - PRODUCTS**

Not applicable.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- .1 Verify that utilities have been disconnected and capped.
- .2 Observe existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- .3 When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Consultant.
- .4 Survey of existing conditions: Record existing conditions by use of photographs in accordance with Section 01 32 33.

### **3.2 UTILITY SERVICES AND MECHANICAL / ELECTRICAL SYSTEMS**

- .1 General Contractor shall disconnect and remove any and all existing services at the pavilion and cap as required.
- .2 Refer to Divisions 21, 22, and 23 and Divisions 26, 27, and 28 respectively.

### **3.3 SELECTIVE DEMOLITION, GENERAL**

- .1 Demolish and remove existing construction only to the extent required by new construction, and as otherwise indicated. Use methods required to complete the work within limitations of governing regulations and as follows:
  - .1 Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
  - .2 Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
  - .3 Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  - .4 Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before

starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.

- .5 Maintain adequate ventilation when using cutting torches.
- .6 Remove decayed, infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
- .7 Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- .8 Dispose of demolished items and materials promptly.
  - .1 Dispose of demolished materials from *Project* site except where noted otherwise and in accordance with authorities having jurisdiction. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - .2 Do not sell demolished material at the *Place of the Work*.
  - .3 Clean existing surfaces specified to receive new applied finishes to assure proper adherence.

### 3.4 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- .1 Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
- .2 Masonry: Demolish/remove in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- .3 Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

### 3.5 PROTECTION

- .1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades and parts of existing building to remain. Make good damage caused by demolition.
- .2 Take precautions to support affected structures and, if safety of building being demolished or adjacent structures or services appears to be endangered, cease operations and notify demolition engineer, Contractor and Consultant.
- .3 Provide temporary weather enclosures in accordance with Section 01 50 00.
- .4 Prevent debris from obstructing active services and drainage systems.
- .5 Protect work to remain against damage. Repair or replace damaged work at no additional cost to the Owner.

**END OF SECTION**



## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Administrative Requirements
- .5 1.5 Submittals
- .6 1.6 Quality Assurance
- .7 1.7 Delivery, Storage, and Handling
- .8 2.1 Performance/Design Requirements
- .9 2.2 Materials
- .10 2.3 Fabrication
- .11 3.1 Erection
- .12 3.2 Field Quality Control

### **1.3 SUMMARY**

- .1 Lateral load-bearing cold-formed metal framing, including but not limited to metal studs, furring at exterior assemblies subject to lateral and loads transferred by exterior cladding materials.

### **1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19.

### **1.5 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Letters of general conformity:
  - .1 Submit professional letters of general conformity for the work of this section.
- .4 Shop drawings:
  - .1 Submit engineered shop drawings, including design, connections and restraint of wall assemblies. Field review requirements to be supplemented to include the following:
    - .1 Checking that mill test reports are properly correlated to materials.
    - .2 Sampling fabrication and erection procedures for general conformity to requirements of the *Contract Documents*.
    - .3 Checking fabricated members against specified member shapes.

- .4 Sample checking of screwed and bolted joints.
- .5 Sample checking that tolerances are not exceeded during fit-up or erection.
- .6 General review of field cutting and alterations required by other sections.
- .2 Include necessary shop details and erection diagrams. Indicate member sizes, locations thicknesses exclusive of coating, coatings and materials. Include connection details for attaching framing to itself and for attachment to the structure. Show splice details where permitted. Indicate dimensions, openings, requirements of related work and critical installation procedures. Show temporary bracing required for erection purposes.
- .3 Indicate design loads and design calculations, including horizontal and vertical reactions at connections to building structure for all load cases.

## 1.6 QUALITY ASSURANCE

- .1 .1 Qualifications:
  - .1 Execute work only by a *Subcontractor* who has adequate equipment and skilled workers to perform it expeditiously and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past 5 years.
  - .2 Aspects of the work of this section related to structural design are required to be prepared by a professional engineer. Refer to Section 01 33 00 for specific details and requirements in this regard.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- .1 *Products* shall be protected from conditions that may cause physical damage or corrosion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE/DESIGN REQUIREMENTS

- .1 Design shall be based on limit states design principles using factored loads and resistances.
- .2 Specified lateral loads shall be in accordance with the building for building classification - 'Post-Disaster Building'.
- .3 Resistances and resistance factors shall be in accordance with the building code and CAN/CSA S136-07.
- .4 Conform to the requirements of fire rated assemblies which have been tested in accordance with CAN/ULC S101-07 and provide indicated fire resistance rating.
- .5 Design bridging to prevent member rotation and member translation perpendicular to the minor axis. Provide for secondary stress effects due to torsion between lines of bridging. Do not rely on collateral sheathing to help restrain member rotation and translation perpendicular to the minor axis. *Provide* bridging at 1525 mm (60") on centre maximum. Space bridging at equal intervals over the span length of the member.
- .6 Design anchorage and splice details for bridging.
- .7 Design for local loading due to anchorage of cladding and interior wall mounted fixtures.
- .8 Maximum flexural deflections under specified lateral loads shall conform to following:
  - .1  $L/360$  unless otherwise indicated.

- .2 Metal framing supporting masonry veneer shall meet the requirements of CSA S304.1-04
- .9 Design components or assemblies to accommodate specified erection tolerances of the structure.
- .10 *Provide* head, sill and jamb members and connections to frame openings larger than 100 mm (3-15/16") in any dimension.
- .11 Limit free play and movement in connections perpendicular to the plane of the framing to  $\pm 0.5$  mm (0.019") relative to the building structure.
- .12 Anchor top and bottom track to the structure at a maximum spacing of 813 mm (32") centre to centre. Closer spacing shall be required in accordance with design requirements.
- .13 Allow for movement of structure. Design end connections to accommodate floor/roof deflections such that framing is not loaded axially.
- .14 Connections between lightweight steel framing members shall be by bolts or sheet metal screws.
- .15 Resistances for sheet metal screws shall be based on manufacturer's lowest bound test values multiplied by appropriate resistance factor, given in CAN/CSA S136-07.
- .16 Lateral load bearing metal framing include:
  - .1 Framing subjected to lateral loads.
  - .2 Steel bridging.
  - .3 Top and bottom track.
  - .4 Head and sill members and jamb framing for openings.
  - .5 Bridging and track connections.
  - .6 Top and bottom track connections to main structure including detailing to accommodate floor deflections.

## 2.2 MATERIALS

- .1 Steel shall conform to requirements of CAN/CSA S136-07 and shall be identified as to specification, type grade and mechanical properties.
  - .1 Minimum base steel thickness exclusive of coating shall be as follows:
    - .1 1.087 mm (0.0428"). Use greater stud thickness if required by the design criteria.
    - .2 Minimum thickness for clip angles shall be 1.367 mm (0.054"). Use greater clip angle thickness if required by the design criteria.
- .2 Metal framing members forming part of exterior building envelope shall have a minimum coating of Z275 galvanizing in accordance with ASTM A924/A924M-16ae1. Other coatings providing equal or better corrosion protection may be used, subject to acceptance of *Consultant*.
- .3 Sheet metal screws shall have a minimum coating thickness of 0.008 mm (0.0003") of zinc. Other coatings providing equal or better corrosion protection may be used, subject to acceptance of *Consultant*.
- .4 Zinc rich paint for touching up damaged metallic coatings shall conform to CAN/CGSB 1.181-M99.
- .5 Isolation strip; at exterior walls: Foam gasket; adhesive backed, closed cell vinyl foam strips, 3.2 mm thick, in width to suit steel stud size.

- .6 Concrete anchors shall have a minimum coating thickness of 0.008 mm (0.00032") of zinc. Other coatings providing equal or better corrosion protection may be used.
- .7 Screws:
  - .1 Steel screws shall be equal to or exceed minimum diameter indicated on shop drawings.
  - .2 Penetration beyond joined materials shall be not less than 3 exposed threads.
  - .3 Thread types and drilling capability shall conform to manufacturer's recommendations.
  - .4 Screws covered by sheathing materials shall have low profile heads.

## 2.3 FABRICATION

- .1 *Provide* cut-outs centred in webs of members to accommodate mechanical and electrical services. Effect of cut-outs on strength and stiffness of members shall be considered.
- .2 Steel thickness exclusive of coating shall be marked on each member by embossing, stamping with indelible ink or by colour coding.

## PART 3 - EXECUTION

### 3.1 ERECTION

- .1 Lateral load-bearing metal framing shall be erected true and plumb within specified tolerances. Temporary bracing shall be employed wherever necessary to withstand loads to which the structure may be subject during erection and subsequent construction. Temporary bracing shall be left in place as long as required for safety and integrity of structure. Erector shall ensure that during erection a margin of safety consistent with the requirements of the building code and CAN/CSA S136-07.
- .2 Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- .3 Erection tolerances:
  - .1 For purposes of this section, camber is defined as deviation from straightness of a member or any portion of a member or any portion of a member with respect to its major axis.
  - .2 For framing, out of plumbness shall not exceed 1/500th of member length. Out of straightness (camber and sweep) shall not exceed 1/1000th of the member length.
  - .3 Metal framing shall seat into top and bottom tracks. Gap between end of stud and web of track shall not exceed 4 mm (0.158").
  - .4 For track, camber shall not exceed 1/1000th of member length.
  - .5 Spacing of metal framing shall not be more than 3 mm (1/8") from design spacing. Cumulative error in spacing shall not exceed requirements of finishing materials.
- .4 Make field measurements necessary to ensure proper fit of members.
- .5 Cutting of members may be by saw or shear. Torch cutting is not permitted.
- .6 Holes that are field cut into lightweight steel framing members shall conform to requirements of Paragraph 2.3.1 and 3.1.5.

### **3.2 FIELD QUALITY CONTROL**

- .1 Conduct quality control in accordance with Section 01 45 00.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Quality Assurance
- .6 1.6 Delivery, Storage, And Handling
- .7 2.1 Performance/Design Requirements
- .8 2.2 Materials
- .9 2.3 Accessories
- .10 2.4 Finishes
- .11 2.5 Fabrication
- .12 2.6 Single Compartment Scullery Sink
- .13 3.1 Examination
- .14 3.2 Installation
- .15 3.3 Field Quality Control
- .16 3.4 Adjusting And Cleaning
- .17 3.5 Protection

### **1.3 SUMMARY**

- .1 *Work* of this section includes metal fabrications and related metals including, but not limited to, the following:
  - .1 Loose steel lintels.
  - .2 Steel angles.
  - .3 Steel columns
  - .4 Steel Brackets
  - .5 Steel Stairs
  - .6 All other items noted on the drawings

### **1.4 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 Submit list of fabrications to be provided as part of the work of this Section.
- .3 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this Section.

- .4 Shop drawings:
  - .1 Submit engineered shop drawings.
  - .2 Include plans, sections and large scale details, and shall indicate components and methods of assembly, materials and their characteristics, fastenings, metal finishes, welds, and their structural characteristics relative to their purpose, and other fabrication information required.
  - .3 Indicate proposed *Site* connections and methods.

## 1.5 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Installers / applicators / erectors: The work of this Section shall be executed only by a *Subcontractor* who has adequate plant, equipment, and skilled tradespersons to perform work expeditiously, and is known to have been responsible for satisfactory installations similar to that required in the *Work* during a period of at least the immediate past 5 years.
  - .2 Licensed professionals: retain a Professional Engineer to design the work of this Section; to prepare, seal and sign shop drawings; and to perform field review. Shop drawings shall show both design and installation requirements.
- .2 Requirements of regulatory agencies: the work of this Section that functions to resist forces imposed by dead and live loads shall conform to requirements of *Authorities Having Jurisdiction*.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Label, tag or otherwise mark metal fabrications supplied for installation by other Sections to indicate its function, location in building and shop drawing designation.
- .2 Protect work from damage during delivery, storage and handling.
- .3 Deliver work to location at the *Place of the Work* designated by *Contractor* and to meet requirements of the construction schedule.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE/DESIGN REQUIREMENTS

- .1 Design, fabricate, and install work of this Section in accordance with the Ontario Building Code and requirements of all other *Authorities Having Jurisdiction*.
- .2 Welding:
  - .1 Weld structural components in steel to conform to requirements of CSA W59-15, and by a fabricator fully certified by the Canadian Welding Bureau to conditions of CSA W47.1-09(2014) and CSA W55.3-08 (R2013) as applicable.
- .3 Design assemblies and connections to withstand own dead load, live loads, super- imposed dead loads, and fabrication forces, without permanent distortions or deformation, to maximum allowable deflection of L/360, within the following construction tolerances:
  - .1 Maximum variation from plumb in vertical lines:
    - .1 3.2 mm (1/8") in 3 m (10 ft)
  - .2 Maximum variation from level:
    - .1 3.2 mm (1/8") in 9 m (30 ft).

- .3 Maximum variation from straight:
  - .1 3.2 mm (1/8") in 3 m (10 ft) under a 3 m (10 ft) straight edge.
- .4 Maximum variation from angle indicated:
  - .1 10 seconds.
- .5 Tolerances shall be non-cumulative.
- .4 Design of metal fabrications to be by a Professional Engineer, except work designed on the structural Drawings. Professional Engineer to be experienced in this type of engineering and in accordance with Section 01 33 00.

## 2.2 MATERIALS

- .1 General:
  - .1 Unless detailed or specified otherwise, standard Products will be acceptable if construction details and installation meet intent of the *Contract Documents*.
  - .2 Include materials, Products, accessories, and supplementary parts necessary to complete assembly and installation of work of this Section.
  - .3 Incorporate only metals that are free from defects that are visible, or that impair strength or durability. Install only new metals of best quality, and free from rust or waves and buckles, and that are clean, straight, and with sharply defined profiles.
  - .4 The Professional Engineer responsible for the production of the shop drawings is responsible for structural design, member sizes, arrangement, connections and anchoring of work of this Section. Coordinate and maintain materials, dimensions, layout and appearance to meet intent of the *Contract Documents*.
- .2 Metals:
  - .1 Steel, structural shapes, plate, bars: hot-rolled, CSA G40.21-04, Grade 300W.
  - .2 Steel, hollow structural sections: hot-formed, seamless, CSA G40.21-04, Grade 350W, Class H.
  - .3 Steel (mild), sheet and strip, hot rolled, ASTM A1011/A1011M-10.
  - .4 Steel, sheet: cold rolled, stretcher levelled, fully pickled, ASTM A1008/A1008M- 11, Grade CS Type A exposed, matte finish, dry, unless otherwise indicated.
  - .5 Steel pipe: ASTM A53 / A53M - 10, Type E or S, Grade A or B, standard weight, Schedule 40 seamless black or AISI MT 1010/1015, or equivalent.

## 2.3 ACCESSORIES

- .1 Fasteners:
  - .1 Fasteners: Exposed fasteners to match the material surface on which they occur.
  - .2 Fasteners for stainless steel to be stainless steel 300 Series or stainless steel 400 Series.
  - .3 Fasteners in contact with aluminum to be stainless steel 300 Series, stainless steel 400 Series, cadmium plated or aluminum.
  - .4 Bolts and anchor bolts: to ASTM A307-14.



- .5 High strength bolts: to ASTM A325-14.
- .6 Use embedded epoxy set anchors for anchorage to concrete at exterior locations exposed to weather, unless otherwise indicated; installation and embedment depth shall be as per manufacturer's instructions, embedment depth shall not be greater than 80% of concrete thickness.
- .7 Other types of fasteners as appropriate to meet design requirements.
- .2 Welding materials:
  - .1 Steel: to CSA W59-15.
- .3 Grout:
  - .1 Epoxy grout; non-shrink, non-expanding:
    - .1 Hilti 'HY-150'.
    - .2 Sika 'Sika AnchorFix 3001'.
    - .3 W.R. Meadows 'REZI-WELD 3/2 EPOXY GROUT/PATCH'.
    - .4 Or equivalent.
  - .2 Cementitious grout: non-shrink, non-expanding to ASTM C1107/C1107M-14a:
    - .1 Sika 'Sika Grout 212' or 'Sika M-Bed Standard'.
    - .2 W.R. Meadows 'Sealtight CG-86 Construction Grout'.
    - .3 Or equivalent.
- .4 Dielectric separator: Best grade, quick drying non-staining alkali resistant bituminous paint to CAN/CGSB 1.108-M89, or membrane type to acceptance of the *Consultant*.

## 2.4 FINISHES

- .1 Shop primer; steel: CISC/CPMA 2-75 or SSPC-Paint 20, Paint Specification No. 20: Zinc-Rich Primers (Type I "Inorganic" and Type II "Organic").
- .2 Shop primer; galvanized steel in pool or arena environments: in accordance with Section 09 91 00.
- .3 Zinc rich paint; steel: Two-component zinc-rich coating, zinc powder to ASTM D520 Type III, SSPC-Paint 20, Type 1 Inorganic or single-component zinc-rich coating to SSPC-Paint, Type 2 Organic, CAN/CGSB 1.181-M99, VOC content <100 g/l to ASTM- D1475.
  - .1 Acceptable Products:
    - .1 Aervoe Industries, Inc. 'Low VOC Cold Galvanize Coating 93% Zinc'.
    - .2 ZRC Worldwide 'ZRC Zero-VOC Galvanizing Compound'.
    - .3 Or equivalent.
- .4 Hot dip galvanizing: for irregular sections, conforming to CAN/CSA G164-M92, minimum zinc coating of 600 g/m<sup>2</sup>. Use air cooling method (no water or chromate dipping treatment permitted).

## 2.5 FABRICATION

### .1 General:

- .1 Fabricate metal fabrications with machinery and tools specifically designed for the intended manufacturing processes and by skilled tradesmen.
- .2 Fit and assemble metal fabrications in shop. When this is not possible, make a trial shop assembly.
- .3 Incorporate anchors at 610 mm (24") on centre or as otherwise required for secure attachment for metal fabrications located in cast-in-place concrete and concrete masonry units.
- .4 Incorporate means for fastenings of other work secured to work of this section.
- .5 Do welding work in accordance with CSA W59-15 as applicable, unless specified otherwise.

### .2 Construction:

- .1 Fabricate with materials, component sizes, metal gauges, reinforcing, anchors, and fasteners of adequate strength to withstand intended use, and within allowable design factors imposed by jurisdictional authorities. Fabricate items from steel unless otherwise noted.
- .2 Ensure that metal fabrications will remain free of warping, buckling, opening of joints and seams, distortion, and permanent deformation.
- .3 Construct items that are part of floor construction, such as gratings and trench covers, to support the same live loads for which surrounding floors are designed unless indicated otherwise.
- .4 Drill drainage holes at exterior exposed tubular fabrications to permit drainage of moisture to exterior of metal fabrications.

### .3 Assembly:

- .1 Accurately cut, machine and fit joints, corners, copes and mitres so that junctions between components fit together tightly and in true planes.
- .2 *Provide* smooth welds with splatter removed where exposed to view.
- .3 Allow for differential movements within assemblies and at junctions of assemblies with surrounding *Work*.
- .4 Field welding of hot dipped galvanized members permitted only when other fastening methods are not possible. Locations of field welds to be clearly identified on reviewed shop drawings.
- .5 Incorporate holes and connections for work installed under other sections.
- .6 Cleanly and smoothly finish exposed edges of materials including holes.
- .7 Cap open ends of sections exposed to view, such as pipes, channels, angles, and other similar work.

### .4 Shop prime painting:

- .1 Clean loose mill scale, rust, dirt, weld flux and spatter from the work after fabrication.

- .2 Prepare and prime paint in accordance with manufacturer's installation instructions. Prepare steel by methods specified in CISC/CPMA 2-75 or SSPC SP3.
- .5 Galvanizing:
  - .1 Galvanize metal fabrications following fabrication.
  - .2 Paint damage galvanized surfaces with zinc rich paint, immediately following damage to galvanized protection. Prepare substrate to remove oil and grease to SSPC-SP1, rust scale to SSPC-SP3, mill scale to SSPC-SP6.
  - .3 Fill vent and drain holes that are exposed in the finished *Work*, unless indicated to remain as weep holes in exterior fabrications, by plugging with zinc solder and filing off smooth.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- .1 Take measurements at the *Place of the Work* to ensure that metal fabrications are fabricated to fit surrounding construction, around obstructions and projections in place, or as indicated, and to suit service locations. The *Contractor* is responsible for confirming all *Site* dimensions.

### **3.2 INSTALLATION**

- .1 Install metal fabrications plumb, true, square, straight, level, and accurately and tightly fitted together and to surrounding work.
- .2 Include in work of this Section anchor bolts, high tensile bolts, washers and nuts, expansion bolts, toggles, straps, sleeves, brackets, clips, and other items necessary for secure installation as required by loading and *Authorities Having Jurisdiction*. Weld to CSA-S16-09.
- .3 Attach metal fabrications to interior concrete and masonry with corrosion resistant expansion bolts to support load with a safety factor of 3.
- .4 Attach metal fabrications to exterior concrete and masonry with non-shrink epoxy cement to support load with a safety factor of 3.
- .5 Insulate between dissimilar metals or between metal, and masonry or concrete with bituminous paint to prevent electrolytic action.
- .6 Where indicated, grout metal posts, pickets, balusters, and the like, in metal sleeves cast into concrete, with non-shrink quick setting epoxy anchor cement, unless detailed otherwise. Fabricate sleeves of 75 mm (3") minimum in depth.
- .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

### **3.3 FIELD QUALITY CONTROL**

- .1 Conduct quality control in accordance with Section 01 45 00.

### **3.4 ADJUSTING AND CLEANING**

- .1 After erection, touch up primed surfaces that are burned, scratched or otherwise damaged with prime paint to match shop paint.
- .2 Clean and repair areas of bare metal and welds on galvanized surfaces with zinc rich paint. Welded area of members to be masked to minimize overpainting of adjacent undamaged

surfaces. Prepare substrate to remove oil and grease to SSPC-SP1, rust scale to SSPC-SP3, mill scale to SSPC-SP6.

- .3 Remove damaged, dented, defaced, defectively finished, or tool marked components and replace with new.

### **3.5 PROTECTION**

- .1 Maintain protection of work of this section from time of installation until final finishes are applied or to final cleanup.
- .2 Protect finished surfaces from damage.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Delivery, Storage, and Handling
- .6 2.1 Wood Materials
- .7 2.2 Wood Treatment
- .8 2.3 Panel Materials
- .9 2.4 Sheathing Materials
- .10 2.5 Fastenings and Hardware
- .11 2.6 Source Quality Control
- .12 3.1 General
- .13 3.2 Curbs, Supports, and Blocking at Roofing Assemblies
- .14 3.3 Equipment Backboard
- .15 3.4 Miscellaneous Plywood Blocking

### **1.3 SUMMARY**

- .1 The work of this section includes, but is not necessarily limited to, the following:
  - .1 Plywood backing panels and wood studs.
  - .2 Wood grounds, nailers, blocking and sleepers.
  - .3 Wood roof blocking.
  - .4 Wood panel sheathing.

### **1.4 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 Shop drawings:
  - .1 Clearly indicate details of construction, profiles, jointing, fastening and other related details.
- .3 Certificates:
  - .1 Pressure treated lumber and plywood shall be accompanied by supplier's certificate of conformance with this specification.

### **1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 When it is required that wood maintain dimensional stability and tolerances to ensure accurate installation of later work, store and install it only in dry areas, and where no further installation of moist materials is contemplated.

## **PART 2 - PRODUCTS**

### **2.1 WOOD MATERIALS**

#### **.1 General requirements:**

- .1 Except as indicated or specified otherwise lumber shall be softwood, S4S, moisture content not greater than 19% at time of installation, in accordance with following standards:

- .1 CSA O141-05.
- .2 NLGA Standard Grading Rules for Canadian Lumber.

#### **.1 Furring, blocking, nailing strips, grounds:**

- .1 Use S2S material.
- .2 Dimension lumber sizes: in compliance with Section 12 of the NLGA.
- .3 Dimension lumber species and grades:
  - .1 Spruce-Pine-Fir.
  - .2 Light framing to NLGA Construction grade, S-Dry.
  - .3 Planks to NLGA No. 2 grade, S-Dry.
  - .4 Boards to NLGA No. 4 Common grade, S-Dry.

- .2 Curbs, nailers, plywood for roofing: Spruce species, NLGA construction grade, sound and free of imperfections or deficiencies making unsuitable for use. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

- .1 Pressure treat with wood preservative.

- .3 Studs and framing: S-P-F Species Group, S-Dry or kiln dried, Stud Grade or No. 2 Grade unless otherwise indicated.

### **2.2 WOOD TREATMENT**

#### **.1 Wood preservative pressure treatment:**

- .1 Wood shall be pressure impregnated with fire-retardant chemicals to CAN/CSA O80 and have flame-spread rating of not more than 25 to CAN/ULC-S102-10 after wood has been subjected to an accelerated weathering test as specified in ASTM D2898-07 for exterior applications.

### **2.3 PANEL MATERIALS**

- .1 Softwood plywood (CSP): to CSA O151-09.
- .2 Douglas Fir plywood (DFP): to CSA O121-08.

### **2.4 SHEATHING MATERIALS**

#### **.1 Exterior sheathing:**

- .1 Exterior grade plywood, thicknesses as follows:
  - .1 Walls: 12.7 mm (1/2") minimum, unless otherwise indicated.

- .2 Roofs: 15.9 mm (5/8") minimum, unless otherwise indicated.

## 2.5 FASTENINGS AND HARDWARE

### .1 General:

- .1 *Provide* fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified in this article for material and manufacture. *Provide* nails or screws, in sufficient length, to penetrate not less than 38 mm (1-1/2") into wood substrate.
- .2 Anchors to concrete and unit masonry: Capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing according to ASTM E488/E488M-15, conducted by a qualified independent testing and inspecting agency.

### .3 Use surface fastenings of following types, except where specific type is indicated.

- .1 To hollow masonry, plaster and panel surfaces use 9 mm (11/32") expansion bolts or other acceptable anchor.
- .2 To solid masonry and concrete use expansion bolts.
- .3 To structural steel use bolts through drilled hole, or welded stud-bolts or power driven self-drilling screws, or welded stud-bolts.
- .4 To steel deck use bolts through drilled hole or power driven self-drilling screws.

### .4 Fastener materials:

- .1 Hot-dip galvanized fasteners: ASTM A153/A153M-09 Class A or B1 G185 (CAN/CSA G164-M92 minimum zinc coating of 600 g/m<sup>2</sup>) and connectors meeting ASTM A653/A653M-11 Class G-185 sheet (CAN/CSA G164-M92 minimum zinc coating of 600 g/m<sup>2</sup>) or better.
- .2 For pressure-preservative-treated wood, use stainless-steel Type 304 fasteners.

### .5 Hardware materials:

- .1 Hot-dipped galvanized to CAN/CSA G164-M92 with minimum zinc coating of 600 g/m<sup>2</sup> or hot-dipped galvanized fasteners complying with ASTM A153/A153M-09, Class A or B1, and connectors complying with ASTM A653/A653M-11, Class G185.
- .2 Sheathing fasteners: Bugle head, corrosion resistant steel, power driven type, minimum length of 3 times thickness of sheathing.
- .3 Sill plate anchors: 15.9 mm (5/8") diameter bolts, spaced not more than 1.6 m (5'-1/4") o.c. Embed anchor bolts 150 mm (6") minimum into foundation wall so that they may be tightened without withdrawal from concrete. Washers: 2.5 times size of bolt and HEX nuts.

## 2.6 SOURCE QUALITY CONTROL

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

## PART 3 - EXECUTION

### 3.1 GENERAL

- .1 Layout work carefully and to accommodate work of others. Cut and fit accurately. Erect in position indicated. Align, level, square, plumb, and secure work permanently in place.
- .2 Bore holes true to line and to same size as bolts. Drive bolts into place for snug fit, and use plates or washers for bolt head and nut bearings. Turn up bolts and lag screws tightly when installed, and again just before concealed by other work or at completion of work.
- .3 Cooperate with work of other sections to ensure that unity of actions will ensure orderly progress to meet construction schedule.
- .4 Include in work of this section rough hardware such as nails, bolts, nuts, washers, screws, clips, and connectors required for complete and proper installations; and operating hardware required on work of this section for temporary use.
- .5 Do not attach work by wood plugs or blocking in concrete or masonry.
- .6 Do not regard nailers, blocking, and such other fastening provision indicated as exact or complete. Install required provisions for fastening, located and secured to suit *Place of the Work* conditions, and adequate for intended support.
- .7 Cut work into lengths as long as practical and with square ends. Erect work plumb, in true planes, and fastened rigidly in place.
- .8 Verify that grounds required for fastening of components and equipment are located correctly and sized for adequate support.
- .9 Secure wall sheathing horizontally perpendicular to studs, with ends staggered, over firm bearing.

### 3.2 CURBS, SUPPORTS, AND BLOCKING AT ROOFING ASSEMBLIES

- .1 Install wood curbs, upstands, supports and blocking and securely attach to structure, trimmed and levelled to receive flashings and applied roofing materials.
- .2 Slope solid wood caps at parapets to *Provide* positive moisture drainage toward roofing membrane unless otherwise indicated.
- .3 *Provide* wood nailers of minimum 38 mm (1-1/2") thick solid wood members for anchorage of fasteners.
- .4 Securely attach wood members to substrate by anchoring and fastening as indicated, complying with the following:
  - .1 Attach each item in the build-up with fasteners or anchors at spacing not exceeding the following:
    - .1 Wood to wood:
      - .1 Screws: 450 mm (18").
      - .2 Nails: 300 mm (12").
    - .2 Wood to metal:
      - .1 Screws: 450 mm (18").
      - .2 Bolts/washers: 1220 mm (48").
  - .3 Wood to concrete/concrete block:



- .1 Tapcon type screws: 450 mm (18").
- .2 Expansion/toggle bolts/washers: 1220 mm (48").
- .2 Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces.
- .3 Size fasteners for embedment into substrate in accordance with manufacturer's installation instructions.
- .5 Select fasteners of size that do not fully penetrate members where opposite side is exposed to view. Make tight connections between members. Install fasteners without splitting wood.

### **3.3 EQUIPMENT BACKBOARD**

- .1 *Provide* backboards for mounting equipment as required. Use 19 mm (3/4") Softwood Plywood.
- .2 Refer to Divisions 21, 22, 23, 26, 27 and 28 for requirements for electrical backboards.

### **3.4 MISCELLANEOUS PLYWOOD BLOCKING**

- .1 *Provide* minimum 19 mm (3/4") softwood plywood blocking for attachment of miscellaneous fitments as indicated.
- .2 Wood blocking within gypsum board metal stud assemblies under work of Section 09 22 00.

**END OF SECTION**

## **PART 1- GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Administrative Requirements
- .5 1.5 Submittals
- .6 1.6 Closeout Submittals
- .7 1.7 Quality Assurance
- .8 1.8 Delivery, Storage, and Handling
- .9 1.9 Field Conditions
- .10 2.1 Performance/Design Requirements
- .11 2.2 General
- .12 2.3 Wood Materials
- .13 2.4 Panel Materials
- .14 2.5 Fasteners and Adhesives
- .15 2.6 Hardware
- .16 2.7 Finishes – Interior Architectural Woodwork
- .17 2.8 Fabrication
- .18 3.1 Preparation
- .19 3.2 Installation
- .20 3.3 Installation – Tolerances
- .21 3.4 Adjusting and Cleaning
- .22 3.5 Protection

### **1.3 SUMMARY**

- .1 *Work* of this section includes architectural woodwork including, but not limited to, the following:
  - .1 Standing and running trim.
  - .2 Cabinetry and hardware.
  - .3 Solid surfacing countertops and fabrications.
  - .4 Wood wall panels.
  - .5 Factory and *Site* finishing of architectural woodwork.

### **1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination:

- .1 Coordinate with other work for satisfactory and expeditious completion of the work of this section. Coordinate with partition accessories, electrical, communications, and finish components to ensure that proper provisions are made for the installation of the work of this section and for work by others.
- .2 Where woodwork is to be fitted to other construction, check actual dimension of other construction by accurate field measurements before manufacturing woodwork; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delays in the *Work*.
- .3 *Provide* forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted in the work of this section and set in place. Instruct applicable *Subcontractors* as to their locations.
- .4 *Provide* cut-outs for raceways, sleeves, grommets and other manufactured accessories which are required for the work of this section and for work by others.

## 1.5 SUBMITTALS

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data for each type of *Product* and process proposed for use in the work of this section and incorporated into items of architectural woodwork.
- .3 Shop drawings:
  - .1 Submit shop drawings for the work of this section complying with the Architectural Woodwork Standards, Edition 1, 2009 requirements.
  - .2 Indicate quality standards and grades.
  - .3 Include full scale drawings of all exposed-to-view edge conditions.
  - .4 Include plans, sections and large scale details, and indicate components and methods of assembly, fastenings, and other fabrication information required for the work of this section. Indicate assembly joint lines.
  - .5 Include materials and their characteristics and finishes as applicable including the following:
    - .1 Panel core and material types, thicknesses, compliance with specified standards, special treatments.
    - .2 Adhesive types to be used and locations.
    - .3 Finishing requirements including Architectural Woodwork Standard finish system number, sheen, and required application steps.
  - .6 Submit coordination drawings indicating locations of concealed grounds, cut- outs, plates, and other required fabrications.
  - .7 Show relation to adjoining construction, details of outside and inside corners and door openings.
- .4 Verification samples:
  - .1 Submit samples for purpose of verification of compliance with specified requirements.

- .2 Submit 3 sets of 200 mm x 200 mm (8" x 8") samples, or 200 mm (8") long as applicable, of each specified *Product*, material and finish, including but not limited to the following:
  - .1 Shop finished materials, showing each type of finish and colour.
  - .2 Samples of each specified *Product*, in each specified colour and finish.

## 1.6 CLOSEOUT SUBMITTALS

- .1 Submit closeout submittals in accordance with Section 01 77 00.
- .2 Operation and maintenance data:
  - .1 Submit maintenance and cleaning instructions for finishes requiring specific care, noting particularly those procedures or materials which will cause damage to finished surfaces to be included in maintenance manuals.

## 1.7 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Manufacturers:
    - .1 Architectural woodwork shall be manufactured by a firm having a minimum of 5 years' experience on work of similar size and quality.
    - .2 Shall be a member in good standing of the Architectural Woodwork Institute or the Architectural Woodwork Manufacturers Association of Canada or the Woodwork Institute.
    - .3 Fabricator solid surfacing: Fabrication to be performed by a solid surface manufacturer's certified fabricator Submit certification letter prepared by the solid surfacing manufacturer.
  - .2 Installers / applicators / erectors: engage an installer who has successfully completed 2 architectural woodwork projects similar in scope, materials and design to this project within the last 5 years.
- .2 Quality standard:
  - .1 *Work* shall be in accordance with the Architectural Woodwork Standards, Edition 2, 2014, Premium Grade, or the highest grade available for performance and appearance characteristics of materials in Sections 3 – 5 used that apply to *Product* fabrication and installation requirements governed by Sections 6 – 12.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- .1 Protect architectural woodwork during transit, delivery, storage and handling to prevent damage, spoilage, and deterioration.
- .2 Do not deliver woodwork until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate architectural woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified under paragraph Field Conditions.
- .3 The *Contractor* shall be solely responsible to make certain that architectural woodwork is not delivered until the building and storage areas are sufficiently dry so that the architectural woodwork will not be damaged by excessive changes in moisture content. The *Contractor* shall coordinate the delivery of the woodwork with the architectural woodwork manufacturer.

## 1.9 FIELD CONDITIONS

### .1 Environmental conditions:

- .1 During storage and installation: Obtain and comply with Architectural Woodwork Standard's for optimum temperature and relative humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained. Woodwork shall be acclimatized for a minimum of 72 hours prior to commencing woodwork installation.
- .2 During finishing: Comply with Architectural Woodwork Standard's temperature and humidity requirements before, during, and after application of finishes.
- .3 During service life of woodwork: Obtain and comply with woodwork manufacturer's advice for optimum temperature and humidity conditions for woodwork. Note that building humidity control is not in operation 24 hours per Day or 365 Days per year and system is intermittent during winter and summer months. As a result, fabrication of wood components should anticipate major changes in humidity levels.

## PART 2 – PRODUCTS

### 2.1 PERFORMANCE/DESIGN REQUIREMENTS

- .1 Casework integrity shall meet the minimum acceptance levels in accordance with SEF 8- 1999 as outlined in the Architectural Woodwork Standards, Edition 2, 2014 and additional or greater loading capacities as specified throughout the Architectural Woodwork Standards.
- .2 Maximum allowable adjustable shelf lengths shall comply with shelves assembly rules per the Architectural Woodwork Standards, Edition 2, 2014 based on shelf thickness indicated or scheduled.
- .3 Welding:
  - .1 Weld components in steel to conform to requirements of CSA W59-15, and by a fabricator fully certified by the Canadian Welding Bureau to conditions of CSA W47.1-09(2014) and CSA W55.3-08 (R2013) as applicable.
  - .2 Weld components in aluminum to conform to requirements of CSA W59.2-M1991 (R2013), and by a fabricator certified by the Canadian Welding Bureau to conditions of CSA W47.2-12.
  - .3 Weld stainless steel components to conform to requirements of CSA W59-15 and ANSI/AWS D1.6/D1.6M as applicable, and by a fabricator fully certified by the Canadian Welding Bureau to conditions of CSA W47.1-09(2014).

### 2.2 GENERAL

- .1 Single-source manufacturing and Installation responsibility: Engage a qualified manufacturer to assume undivided responsibility for woodwork specified in this section, including fabrication, finishing, and installation.

### 2.3 WOOD MATERIALS

#### .1 Lumber:

- .1 Hardwood for concealed blocking and framing: Economy grade, any species that, when painted, will not show any defects.
- .2 Moisture content: *Provide* kiln-dried (KD) lumber with moisture content range between 6% to 12% for interior architectural woodwork. Maintain temperature and relative humidity during

fabrication, storage and finishing operations so that moisture content values for woodwork at time of installation do not exceed 5% to 10%.

.3 Solid hardwood painted finish.

.1 Species:

.1 White Birch.

.2 Cut:

.1 Rift.

.2 Wood veneers:

.1 Allowable wood veneer face grade characteristics shall comply with Architectural Woodwork Standards, Edition 2, 2014 referenced grade and referenced standards.

.1 Species

.1 White Birch.

.2 Veneer cut:

.1 Rotary.

.3 Veneer leaf matching:

.1 Random.

.2 Edgeband exposed panel edges with 6 mm (1/4") thick solid hardwood trim, unless otherwise indicated.

## 2.4 PANEL MATERIALS

.1 Panel material schedule; except where indicated otherwise in the *Contract Documents*:

.1 Thickness: 19 mm (3/4") minimum.

.2 Core panels:

.1 At veneered work: MDF, except at shelving use veneer core plywood.

.2 Plywood backing; countertops, backsplashes, and where indicated: Veneer core plywood with Type II adhesive, sanded good one side or good two sides (when both sides exposed or to receive applied finish materials) plywood, with no added urea-formaldehyde used in composition.

.3 Maximum moisture content at time of installation: 10% to 12%.

.2 Plywood:

.1 Veneer core plywood non telegraphing grain:

.1 Softwood plywood: to ANSI/HPVA HP-1-2009.

.2 Douglas Fir plywood: to US Plywood Standard APA PS-1-09.

.3 Medium density fibreboard (MDF):

.1 To ANSI A208.2-2009, 720 kg/m3 (45 lbs/ft3) minimum density and as follows:

- .1 Grade:
  - .1 Grade 130.
- .2 Formaldehyde emission: F21 for panel thicknesses greater than 8mm (5/16") and F13 for panels equal to or thinner than 8 mm (5/16").

## 2.5 FASTENERS AND ADHESIVES

- .1 Wood screws: FF-S-111D Amendment 1 (1989), type, size, material and finish as required for the condition of use.
- .2 Nails: FED FF-N-105, type, size material and finish as required for the condition of use.
- .3 Anchors: Type, size material and finish as required for the condition of use.
- .4 Fastening devices shall be set or countersunk flush with surface of framing member. No exposed fasteners permitted. Where accepted by the *Consultant*, exposed fasteners shall be flat head hex socket cap screws and matching joint connector sex bolts (also known as Chicago screws or post and screw) by Murakoshi, distributed by Richelieu or equivalent, Spaenaur Joint Connector bolt with decorative head, hex drive series; finish as selected by the *Consultant*.
- .5 At butt joints in railing caps and counter surfaces, employ assembling bolts to ensure tight structural joint.
- .6 Adhesives: Type II water resistant, except use Type I waterproof in wet environments.

## 2.6 HARDWARE

- .1 Casework hardware; to be furnished and installed by the architectural woodwork manufacturer.
  - .1 As far as practical, use one manufacturer's products for all Products specified, indicated, or scheduled.
  - .2 All costs associated with the Products of this Section are not covered by a cash allowance and shall be included in the *Contract Price*.
  - .3 Cabinet and auxiliary hardware: Where casework hardware is not specified or indicated on the Drawings or scheduled, casework hardware shall comply with ANSI/BHMA Standards, latest edition, minimum grades, loading and other basic rules per the Architectural Woodwork Standards, Edition 1, 2009.
  - .4 Stainless steel hat and coat hook: Specified under Section 10 28 00 for installation as part of the work of this section
  - .5 Wall Panel Hanging System: Monarch Hanging System as manufactured by:  
  
Monarch Metal Fabrication, 1700 Ocean Ave Suite 2,  
Ronkonkoma, NY 11779  
  
Phone: (631) 750-3000  
Fax: (631) 563-8976  
  
Please note that this system is available through Lee Valley Tools under the product 'Z-Clips'  
<https://www.leevalley.com/en-ca/shop/hardware/fasteners/clips/41869-z-clips>.  
  
The preferred system depth is 6mm (1/4").

## 2.7 FINISHES – INTERIOR ARCHITECTURAL WOODWORK

- .1 Paint and stain finish, as indicated or scheduled: in accordance with Section 09 91 00.

## 2.8 FABRICATION

- .1 Fabricate woodwork to dimensions, profiles, and details indicated with openings and mortises pre-cut, where possible, to receive hardware and other items of work.
- .2 Complete fabrication, assembly, finishing, hardware application, and other work before shipment to maximum extent possible. Trial fit in shop and disassemble components only as necessary for shipment and installation. Where necessary, *Provide* ample allowance for scribing, trimming, and fitting. Reassemble with concealed fasteners.
- .3 *Provide* woodwork, solid tops and other indicated materials with pre-cut openings, where possible, for hardware, appliances, plumbing fixtures, electrical work, telephone cut-outs and similar items. Locate openings accurately and *Provide* proper size and shape. Smooth edges of cut-outs and, where located in countertops, seal edges of cut-outs with a water-resistant coating.
- .4 *Provide* lumber framing for architectural woodwork, complete with all bracing and fastening devices as required for a rigid installation, and as required to sustain the imposed loads.
- .5 Reinforcing shown is minimum. *Provide* additional reinforcing as required to ensure a rigid assembly. Take responsibility for the stability of furniture and fitments.
- .6 Do fabrication from field measurements with provisions for scribing as required to meet built-in conditions.
- .7 *Provide* balancing sheets as required, and specified, complying with the Architectural Woodwork Standards, Edition 1, 2009.
- .8 *Provide* surface mount blocking & strapping necessary to support the work of this section. Such blocking shall not be exposed upon completion of work.
- .9 Prefinish work at the factory, except where specified or indicated otherwise.
- .10 Solid wood edging: No end grain shall be visible; mitre external corners; house internal corners.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- .1 Condition woodwork to average prevailing humidity conditions in installation areas before installing.
- .2 Ensure that environmental conditions have been provided as requested and specified.
- .3 Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.
- .4 *Provide* all grounds, nailers and other required fabrications which are to be built into other work when required.
- .5 Ensure that wall and ceiling variations are not in excess of 6.4 mm (1/4") in 3658 mm (144") and that floors are not in excess of 12.7 mm (1/2") in 3658 mm (144") of being plumb, level, flat, straight, square, of the correct size. Variations shall be corrected prior to installation of work of this section.



- .6 Report conditions contrary to requirements preventing proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- .1 Install woodwork to comply with Architectural Woodwork Standards, Edition 1, 2009 for same grade specified in Part 1 of this section for type of woodwork involved.
- .2 Install woodwork plumb, level, true, and straight with no distortions.
- .3 Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- .4 Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fastener heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork and matching final finish where transparent finish is indicated.
- .5 Complete the finishing work specified in this section to whatever extent not completed at shop or before installation of woodwork.
- .6 Plastic wood:
  - .1 Install plastic wood in accordance with manufacturer's instructions and recommendations.
  - .2 Install with the following minimum expansion/contraction gaps, wider as recommended by manufacturer:
    - .1 Width-to-width: 9.5 mm (3/8").
    - .2 End-to-end: 3.2 mm (1/8").
    - .3 Perimeter and abutting solid objects: 6.4 mm (1/4").
  - .3 Screw-down installation: Use manufacturer's recommended screws, exterior grade. Install screws at least 25 mm (1") in from board edges.

### **3.3 INSTALLATION – TOLERANCES**

- .1 Install to a tolerance of 3 mm in 2400 mm (1/8" in 8'-0") for plumb and level (including tops) and with no variations in flushness of adjoining surfaces unless otherwise acceptable in accordance with the Architectural Woodwork Standards, Edition 1, 2009.

### **3.4 ADJUSTING AND CLEANING**

- .1 Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair, replace woodwork.
- .2 Clean, lubricate, and adjust hardware.
- .3 Clean woodwork on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

### **3.5 PROTECTION**

- .1 Protect architectural woodwork during remainder of construction period to ensure that work will be without damage or deterioration at time of acceptance.

- .2 *Provide* final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure that woodwork is without damage or deterioration at time of *Substantial Performance of the Work*.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Quality Assurance
- .6 2.1 Insulation Materials
- .7 2.2 Accessory Materials
- .8 3.1 General Installation Requirements
- .9 3.2 Examination
- .10 3.3 Installation – General
- .11 3.4 Installation – Rigid Insulation Application
- .12 3.5 Installation – Spray Foam Insulation
- .13 3.6 Field Quality Control
- .14 3.7 Protection

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Rigid insulation; below grade insulation at vertical conditions.
  - .2 Rigid insulation; below grade insulation at horizontal conditions.
  - .3 Spray insulation.

### **1.4 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section.
  - .2 Submit data and installation instructions for materials and prefabricated devices, providing descriptions sufficient for identification at the *Place of the Work*.
  - .3 Submit data from manufacturer's or independent laboratory indicating compatibility and adhesive results of proposed materials.
- .3 Samples: Submit representative samples of each specified insulation material, insulation clips, adhesives, fasteners, tapes and other material for review.

## 1.5 QUALITY ASSURANCE

- .1 Qualifications: Execute work of this section using a *Subcontractor* who has adequate plant, equipment and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past 5 years.

## PART 2 - PRODUCTS

### 2.1 INSULATION MATERIALS

- .1 Insulation Type 3; rigid, below grade insulation at vertical conditions:
  - .1 Extruded polystyrene, closed-cell, smooth skin, to CAN/ULC S701-11, Type 4, 30 psi compressive strength.
  - .2 Acceptable Products:
    - .1 'Styrofoam SM' as manufactured by Dow Chemical.
    - .2 'Celfort 300' as manufactured by Owens Corning.
    - .3 Or equivalent.
  - .2 Rigid insulation; below grade insulation at horizontal conditions:
    - .1 Extruded polystyrene, closed-cell, smooth skin, to CAN/ULC S701-11, Type 4.
    - .2 Compressive Strength, ASTM D1621-10, 275 kPa (40 psi) minimum (measured at 5% deformation or at yield, whichever occurs first).
    - .3 Acceptable Products:
      - .1 'Styrofoam Highload 40' as manufactured by Dow Chemical.
      - .2 'Foamular 400' as manufactured by Owens Corning.
      - .3 Or equivalent.
  - .3 Spray Insulation:
    - .1 Spray-applied rigid polyurethane foam to CAN/ULC-S705.1 and conforming to CDPH v1.1-2010 (GREENGUARD Children & Schools)
      - .1 Compressive Strength: 222kPa
      - .2 Density: 30.4 kg/m<sup>3</sup> minimum
      - .3 Flame spread rating: less than 500 to CAN/ULC-S102,
      - .4 Air leakage of less than 0.001 L/s/m<sup>2</sup> at 75Pa to CAN/ULC-S705.1, per 25mm thickness,
      - .5 Water Vapour Permeance: 86.6 ng/Pa.s.m<sup>2</sup>
      - .6 Long Term Thermal Resistance (LTTR) of minimum;
        - .1 1.05m<sup>2</sup> °C/W per 25mm thickness.
      - .7 Acceptable Products;
        - .1 Insulthane Extreme, by Elastochem Specialty Chemicals Inc.

- .2 Heatlok Soy 200 PLus, by Demilec Inc.
- .3 WALLTITE ECOv.3, by BASF Canada
- .2 Primers: in accordance with manufactures recommendations for surface conditions.

## **2.2 ACCESSORY MATERIALS**

- .1 Adhesive: solvent based polymer modified liquid applied membrane, compatible with insulation to be applied, type as manufactured for the attachment of insulation. Acceptable *Product*: Bakor Airbloc 21 or 230-21 or equivalent.
- .2 Insulation fasteners: Impaling clip of galvanized steel with washer retainer, to be adhered to surface to receive board insulation with adhesive, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
- .3 Batt insulation restraint: Zinc coated woven wire and mechanical fasteners.

## **PART 3 - EXECUTION**

### **3.1 GENERAL INSTALLATION REQUIREMENTS**

- .1 Comply with requirements of Section 01 45 00.
- .2 Install materials in accordance with manufacturer's installation instructions.

### **3.2 EXAMINATION**

- .1 Take measurements at the *Place of the Work* to ensure that work is fabricated to fit structure; surrounding construction; around obstructions and projections in place, or as indicated; and to suit locations of services.
- .2 Verify that backup construction is aligned for proper installation of work before commencing erection.
- .3 Verify that all surfaces to receive spray-in-place insulation are clean and free of all frost, oil, rust, or deleterious materials.
- .4 Verify that all environmental conditions required for successful application of materials, can be met.
- .5 Report in writing, any defects in surfaces or conditions which may adversely affect the installation or performance of the products provided under this section.

### **3.3 INSTALLATION – GENERAL**

- .1 Surfaces to receive insulation shall be dry and free of dew, frost, voids, loose material, oil, grease, asphalt curing compounds and other matter detrimental to bond of adhesive. Adhesive shall be compatible with waterproofing on walls.
- .2 Apply adhesives, and install insulation in accordance with manufacturer's printed recommendations. Apply at rate as required to prevent displacement of insulation boards during construction operations.
- .3 Butt joints tightly and offset vertical joints to form an unbroken thermal envelope. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.

- .4 Apply insulation to ensure total and complete coverage of surfaces indicated to be insulated, and in direct contact with such surfaces. Unless otherwise specified, apply insulation in single layer of thickness indicated.
- .5 Ensure integrity and continuity of insulation at juncture with different types of materials and seal in an acceptable manner.
- .6 Do not enclose insulation until it has been reviewed and accepted by the *Consultant*.

### **3.4 INSTALLATION – RIGID INSULATION APPLICATION**

- .1 Below grade insulation:
  - .1 Adhere rigid insulation to face of below grade perimeter walls with adhesive.
  - .2 Perimeter below grade application: extend boards minimum 600 mm (24") vertically below bottom of finish floor slab, installed on face of perimeter foundation walls.
- .2 Below grade insulation; underslab:
  - .1 Install in accordance with insulation manufacturer's written specifications and in accordance with requirements of 3.3 – General Installations of this section.

### **3.5 INSTALLATION – SPRAY FOAM INSULATION**

- .1 Preparation
  - .1 Mask all adjacent surfaces not to receive spray-in-place insulation which may be damaged or stained by insulation installation.
  - .2 Apply primers where recommended by insulation manufacturer.
- .2 Application
  - .1 Apply insulation to clean surfaces in accordance with CAN/ULC-S705.2 and manufacturer's printed instructions.
  - .2 Apply insulation in consecutive passes not less than 13mm and not more than 50mm thick, for a total thickness scheduled herein.
  - .3 Finished surface of foam insulation shall be free of voids and imbedded foreign objects.
  - .4 Avoid overspray of adjacent areas and surfaces.
  - .5 Finished installation shall be inspected and approved by Consultant prior to concealment

### **3.6 FIELD QUALITY CONTROL**

- .1 Conduct quality control in accordance with Section 01 45 00.

### **3.7 PROTECTION**

- .1 Comply with the manufacturer's printed recommendations respecting protection.
- .2 Protect polystyrene insulation from extended exposure to sunlight.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 References
- .5 1.5 Administrative Requirements
- .6 1.6 Submittals
- .7 1.7 Closeout Submittals
- .8 1.8 Performance Requirements
- .9 1.9 Quality Assurance
- .10 1.10 Mock-Ups
- .11 1.11 Delivery, Storage And Handling
- .12 1.12 Site Conditions
- .13 1.13 Warranty
- .14 2.1 Manufacturer
- .15 2.2 Materials
- .16 2.3 Mixes
- .17 2.4 Source Quality Control
- .18 3.1 Examination
- .19 3.2 Preparation
- .20 3.3 Coordination
- .21 3.4 Installation
- .22 3.5 Site Quality Control
- .23 3.6 Cleaning And Protection

### **1.3 SUMMARY**

- .1 This Section includes requirements for supply and installation of a continuous insulation (ci) cladding system applied to concrete, masonry or gypsum sheathing substrates, complete with air and moisture barrier, adhesive, continuous insulation, mesh reinforcement, base coat, primer and finish coating.

### **1.4 REFERENCES**

- .1 American Society for Testing and Materials
  - .1 ASTM C1382 Standard Test Method for Determining Tensile Adhesion Properties of Sealants When Used in Exterior Insulation and Finish Systems (EIFS) Joints

- .2 ASTM C1481 Standard Guide for Use of Joint Sealants with Exterior Insulation and Finish Systems (EIFS)
- .3 ASTM D4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
- .4 ASTM E283 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
- .5 ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- .6 ASTM E2178 Standard Test Method for Air Permeance of Building Materials
- .7 ASTM E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- .2 Underwriters Laboratories of Canada (ULC)
  - .1 ULC S101 Standard Methods of Fire Endurance Tests of Building Construction and Materials
  - .2 ULC S114 Standard Method of Test for Determination of Non-Combustibility in Building Materials
  - .3 ULC S134 Standard Method of Fire Test of Exterior Wall Assemblies
  - .4 ULC S701 Annex A, Standard for Thermal Insulation, Polystyrene Boards and Pipe Covering
  - .5 ULC S716.1 Standard for Exterior Insulation and Finish Systems (EIFS) – Materials and Systems
  - .6 ULC S716.2 Standard for Exterior insulation and Finish Systems (EIFS) – Installation
  - .7 ULC S716.3 Standard for Exterior Insulation and Finish Systems (EIFS) – Design Application
- .3 Building Codes
  - .1 Ontario Building Code (OBC), 2012
- .4 Product Evaluations and Listings
  - .1 Canadian Construction Materials Centre (CCMC): Evaluation Report 12416-R, StoTherm ci Lotusan, StoTherm ci Classic, StoTherm ci Essence
  - .2 Intertek Listing STO/WEIFS 25-01 StoTherm ci and StoTherm ci XPS: wall assembly tested per CAN/ULC S134 and compliant with Article 3.1.5.5 of the National Building Code of Canada, 2010 and 2015
  - .3 Intertek Listing STO/WEIFS 15-01 StoTherm Classic NC and StoTherm Lotusan NC: Non Load Bearing Wall Assembly tested per CAN/ULC S101 and compliant with Clause 3.2.3.8.(1)(b) of the National Building Code of Canada, 2010.
- .5 Canadian Standards Association (CSA)
  - .1 CAN/CSA-A3001 - Cementitious Materials for Use in Concrete
- .6 Industry Publications
  - .1 EIFS Council of Canada EIFS Practice Manual Version



.7 Proprietary Publications

- .1 StoGuard® Air Barrier Installation Manual
- .2 Sto Canada Installation Guide
- .3 StoTherm EIFS Reference Guide: Repair and Maintenance

## 1.5 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

- .1 Coordinate the Work of this Section with the installation of substrate. Sequence work so that installation of ci cladding system coincides with installation of substrate materials without causing delay to the Work. Comply with ci cladding system manufacturer's written recommendations for sequencing construction operations with other Work.

.2 Pre-Installation Conference:

- .1 Conduct on-site pre-installation conference in accordance with Section 01 31 19 – Project Meetings before installing ci cladding system and in conjunction with installation of mock-up attended by Contractor, Consultant, Owner, ci Cladding System Contractor, Adjacent Trades and ci Cladding System Manufacturer's Representative to:
- .3 Review methods and procedures related to installation, including manufacturer's written instructions.
- .4 Coordinate sequence of installation in connection with adjacent trades.
- .5 Examine substrate conditions for compliance with manufacturer's installation requirements.
- .6 Review temporary protection measures required during and after installation.

## 1.6 SUBMITTALS

- .1 Provide requested information in accordance with Section 01 33 00 Submittals Procedures.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Product Data:

- .1 Submit manufacturer's product data for each type of product specified and manufacturer's guide details.

.2 Samples for Initial Selection:

- .1 Submit one (1) sample panel, 150 mm x 150 mm (6" x 6") for each colour and texture, for review by the Consultant, on backing of manufacturer's choice.

.3 Samples for Verification:

- .1 Submit two (2) samples 300 mm x 300 mm (12" x 12") for colour and texture verification for each finish specified in this Section prior to ordering products from ci cladding system manufacturer.

- .3 Informational Submittals: Provide the following submittals when requested by the Consultant:

- .1 Evaluation reports and listings:

- .1 Provide CCMC Evaluation Report as required to confirm the ci cladding system is in compliance with ULC 716.1.

## **1.7 CLOSEOUT SUBMITTALS**

- .1 Operation and Maintenance Data: Submit manufacturer's written instructions for cleaning solutions, materials and procedures. Include name of original installer and contact information in accordance with Section 01 78 23 Operation and Maintenance Data.
- .2 Provide specific warning of any maintenance practice or materials that may damage or disfigure the finished Work.
- .3 Provide a complete list of repair and replacement parts with cuts and identifying numbers.
- .4 Include:
  - .1 Finish coat colour batch numbers.
  - .2 Identification of each type of reinforcing mesh used.
  - .3 Identification of adhesive, base coat and finish coat products used.

## **1.8 PERFORMANCE REQUIREMENTS**

- .1 Design Criteria:
  - .1 Design Professional shall provide sufficient details on drawings to demonstrate compliance with National Building Code Canada Division C Sentence 2.2.5.2.(1) and ULC S716.3.
- .2 Moisture Control:
  - .1 Prevent the accumulation of water into or behind the ci cladding system, either by condensation or leakage into the wall construction, in the design and detailing of the wall assembly.
  - .2 Provide corrosion-resistant flashing to protect exposed elements and to direct water to the exterior, including: above window and door heads, beneath window and door sills, at floor lines (when or as deemed necessary by the design professional), at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, and at the base of the wall.
- .3 Air Leakage Prevention:
  - .1 Prevent excess air leakage in the design and detailing of the wall assembly. Provide continuity between air barrier components in the wall assembly.
  - .2 At expansion joints, back joints with transition membrane.
  - .3 Seal ci cladding system terminations with sealant in conformance ASTM C1382.
- .4 Grade Condition:
  - .1 Ensure use of Sto Armor Mat or the Sto IMPACT fortification system for increased impact resistance of system to 2000 mm (6.5') minimum above grade and in other locations indicated on architectural drawings.
- .5 Sloped Surfaces (trim, shapes, build-outs, and other projecting architectural features):

- .1 Avoid the use of ci cladding system on weather-exposed horizontal and low slope surfaces such as ledges, sills, and other projecting architectural features unless supported by framing or other structural support and protected with metal coping or flashing.
  - .1 Build out trim from ci cladding system surface with insulation board. All EPS trim and projecting architectural features must have a minimum 1:2 (27 deg) slope along their top surface.
  - .2 All EPS horizontal reveals must have a minimum 1:2 (27 deg) slope along their bottom surface. Increase slope for northern climates to prevent accumulation of ice/snow and water on surface.
  - .3 Where EPS trim or bottom surface of reveal projects more than 50 mm (2") from the face of the wall plane, protect the top surface with waterproof base coat. Limit EPS trim thickness to a maximum of 100 mm (4").
- .2 Joints and Accessories:
  - .1 Provide expansion joints in the ci cladding system where building movement is anticipated (refer to ULC S716.3, clause 13.1.1):
    - .1 at expansion joints, deflection joints, or other movement joints in the substrate or supporting construction,
    - .2 where the system is to be installed over dissimilar construction or substrates,
    - .3 at changes in building height, or any other areas of anticipated building movement or stress lines in the construction,
    - .4 at floor lines in wood frame construction or other construction types where vertical shrinkage is expected to occur,
    - .5 at cold or control joints in concrete, masonry, or concrete masonry.
  - .2 Back expansion joints, deflection joints, and other movement joints with transition membrane to provide a secondary seal at the joint location.
  - .3 Provide minimum 13 mm (1/2") wide joints where the system abuts windows, doors and other through wall penetrations.
  - .4 Provide appropriate sealant tested in accordance with ASTM C1382 at ci cladding system terminations.
  - .5 Indicate location of joints, size of joints, and joint design on architectural drawings.
- .3 Performance Criteria:
  - .1 Continuous Insulation: Expanded polystyrene insulation board compliant with ULC S701, Type 1 requirements.
- .4 Air and Moisture Barrier:
  - .1 Material Air Leakage Resistance, ASTM E2178: less than 0.02 L/s·m<sup>2</sup> @ 75 Pa (0.004 cfm/ft<sup>2</sup> @ 1.57 lb/ft<sup>2</sup>)
  - .2 Assembly Air Leakage Resistance, ASTM E2357: less than 0.2 L/s·m<sup>2</sup> @ 75 Pa (0.04 cfm/ft<sup>2</sup> @ 1.57 lb/ft<sup>2</sup>)
- .5 ci Cladding System

- .1 Compliant with CAN/ULC S716.1.
- .2 Listed by CCMC as a cladding system [CCMC ER No. 12416-R].

## **1.9 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Provide proof of qualifications when requested by Consultant:
- .2 Contractor:
  - .1 Execute Work of this Section using qualified personnel skilled in installation of work of this Section, having a minimum of three (3) years proven experience of installations similar in material, design, and extent to that indicated for this Project. Installation shall comply with ULC S716.2 in conjunction with manufacturer's installation guide and EIFS Practice Manual.

## **1.10 MOCK-UPS**

- .1 Sample Installation:
  - .1 Construct a sample installation to verify selections made under sample submittals and to demonstrate aesthetic effects and to set quality standards for materials and execution of Work in accordance with Section 01 45 00 Quality Control.
  - .2 Construct mock-up of typical cladding/window assembly with specified tools and materials and test air and water infiltration resistance in accordance with ASTM E283 and ASTM E331 respectively, through independent testing agency.
  - .3 When tested to ASTM E283, verify that the assembly meets the air leakage requirements for an air barrier system of 0.2 L/s/m<sup>2</sup> at 75 Pa (0.04 cfm/ft<sup>2</sup> at 1.57 psf)
  - .4 When tested to ASTM E331, verify that no water passes inbound of the air barrier system.
  - .5 Establish and conduct field water spray test method to verify no leakage of window assembly into the wall.
  - .6 Conduct ci cladding adhesion testing in accordance with frequency deemed by design professional or owner's quality assurance agent.
  - .7 Conduct wet sealant adhesion testing in accordance with sealant manufacturer's field quality control test procedure.
  - .8 Notify Consultant a minimum of seven (7) days prior to testing.
  - .9 Once reviewed by Consultant, acceptable sample installation can form a permanent part of the Work, and will form the basis for acceptance for the remainder of the project.

## **1.11 DELIVERY, STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements:
  - .1 Deliver and store packaged materials in their original containers with manufacturer's labels and seals intact.
- .2 Store as recommended by manufacturer in a weatherproof enclosure, and protect materials during handling and application to prevent damage.

- .3 Protect EPS insulation materials from prolonged UV exposure, keep away from sources of heat, sparks, flame, flammable or volatile materials. Store on a clean, flat surface, off the ground in a dry area.
- .4 Store reinforcing mesh cartons on side (not upright) in dry area protected from sunlight.
- .5 Protect coatings (pail products) from freezing and temperatures in excess of 32 deg C (90 deg F) and store away from direct sunlight.
- .6 Protect portland cement based materials (bag products) from extreme heat (32 deg C [90 deg F]), moisture, humidity and freezing. Store under cover, off the ground, and in a dry location.
- .7 Handle all products as directed on labeling.

## **1.12 SITE CONDITIONS**

- .1 Ambient Conditions:
  - .1 Proceed with installation when ambient and substrate temperature conditions are within limits permitted by manufacturer and when substrates are free from dirt or wetness arising from frost, condensation, or other causes detrimental to adhesion.
- .2 Temperature Range:
  - .1 Above 4 deg C (40 deg F) during application and for 24 hours minimum after set of ci cladding system components and finish materials.
  - .3 Provide supplementary heat for installation in temperatures less than 4 deg C (40 deg F) such that material temperatures are maintained as indicated above. Prevent concentration of heat on uncured ci cladding system and vent fumes and other products of combustion to the outside to prevent contact with ci cladding system.
  - .4 Prevent uneven or excessive evaporation of moisture from ci cladding system during hot, dry or windy weather. Do not install ci cladding system materials if ambient temperatures are expected to rise above 38 deg C (100 deg F) within a 24-hour period.
  - .5 Provide protection of surrounding areas and adjacent surfaces from application of materials.

## **1.13 WARRANTY**

- .1 Provide manufacturer's standard limited warranty.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURER**

- .1 Approved Continuous Insulation cladding system specified herein:

Sto Canada Ltd.

1821 Albion Road

Unit 1-2

Etobicoke, ON M9W 5W8

Phone: 416 855-0460

URL: [www.stocanada.com](http://www.stocanada.com)

## 2.2 MATERIALS

- .1 Fluid Applied Air and Moisture Barrier consisting of the following multiple compatible components:
  - .1 One component, ready-mixed flexible air and moisture barrier, compatible for application on wood or gypsum sheathing, concrete, and concrete masonry substrates.
    - .1 Basis-of-Design Material: Sto Gold Coat by Sto Canada.
  - .2 Sheathing joint treatment:
    - .1 One component quick-drying air and moisture barrier material to seal sheathing joints, seams, cracks and transitions in above grade wall construction.
      - .1 Basis-of-Design Material: Sto RapidGuard by Sto Canada.
  - .3 Rough opening protection:
    - .1 One component quick-drying air and moisture barrier material for rough opening protection.
      - .1 Basis-of-Design Material: Sto RapidGuard by Sto Canada.
  - .4 Tape for rough opening protection:
    - .1 Self-adhering rubberized asphalt tape for rough opening protection in metal frame construction.
      - .1 Basis-of-Design Material: StoGuard Tape by Sto Canada.
  - .5 Primer for use with StoGuard Tape.
    - .1 Basis-of-Design Material: StoGuard Primer by Sto Canada.
  - .6 Transition Membrane:
    - .1 Flexible air barrier membrane, 0.64 mm (25 mils, 0.025") thick, designed to detail transition areas and achieve continuity of the air barrier assembly, and functions as a secondary weather seal at joints in construction.
      - .1 Basis-of-Design Material: StoGuard Transition Membrane by Sto Canada.
- .2 Continuous Insulation:
  - .1 Sto EPS ProD Insulation Board with geometrically defined drainage cavity manufactured in accordance with CAN/ULC S701, thickness as indicated on drawings, minimum 50 mm (2"), and not to exceed 165 mm (6-1/2"), nominal dimensions 610 mm X 1220 mm (24" x 48"), nominal density 16 kg/m<sup>3</sup> (1 lb/ft<sup>3</sup>), RSI 0.65 K·m<sup>2</sup>/W (R-3.7 F·ft<sup>2</sup>·h/Btu) at 25 mm (1") thick.
  - .2 Insulation Adhesive:
    - .1 One component polyurethane spray foam adhesive.
      - .1 Basis-of-Design Material: Sto TurboStick by Sto Canada
  - .3 Standard Base Coat:
    - .1 One component polymer modified factory-blended portland cement base coat
      - .1 Basis-of-Design Material: Sto Element by Sto Canada

- .4 Fortification Base Coat:
  - .1 Ready mixed one component acrylic-based reinforcing plaster
    - .1 Basis-of-Design Material: Sto Armat Classic Plus
- .5 Detail Reinforcing Mesh:
  - .1 Nominal 143 g/m<sup>2</sup> (4.2 oz/yd<sup>2</sup>), flexible, symmetrical, interlaced open-weave glass fibre mesh treated with alkaline resistant coating for compatibility with Sto materials used for standard back wrapping and aesthetic detailing.
    - .1 Basis of Design Material: Sto Detail Mesh by Sto Canada.
- .6 Standard Reinforcing Mesh:
  - .1 Nominal 153 g/m<sup>2</sup> (4.5 oz./yd<sup>2</sup>), symmetrical, interlaced open-weave glass fibre mesh treated with alkaline resistant coating for compatibility with Sto materials.
    - .1 Basis of Design Material: Sto Mesh by Sto Canada
- .7 High Impact Reinforcing Meshes:
  - .1 Nominal 425 g/m<sup>2</sup> (15.0 oz./yd<sup>2</sup>), symmetrical, interlaced open-weave glass fibre mesh.
    - .1 Basis of Design Material: Sto Armor Mat by Sto Canada.
- .8 Primer: Acrylic based low VOC primer:
  - .1 Smooth Primer Basis of Design Material: Sto Primer Smooth by Sto Canada.
- .9 Finish Coat
  - .1 Acrylic based low VOC textured wall finish:
    - .1 Basis of Design Material: Stolit Lotusan by Sto Canada with Lotus-Effect technology for highest water repellency and resistance to soiling.
    - .2 Standard Finish Textures: 1.0 - Fine Finish.
    - .3 Colour: to be selected by the Consultant from the manufacturers full range product line.
- .10 Related wall assembly components:
  - .1 Flashing: In accordance with Section 07 62 00.
  - .2 Joint Sealants: In accordance with Section 07 92 00

## 2.3 MIXES

- .1 Mix materials in accordance with written instructions.
  - .1 Use only clean potable water, free of salts, other contaminants or deleterious materials to mix adhesive/base coat.
  - .2 Use clean, rust-free, high-speed mixer to stir finish to uniform consistency. Add small amounts of clean potable water to aid workability.
  - .3 Use of antifreeze agents, accelerators, rapid binders or other additives is not permitted.

- .4 Mix only as much material as can readily be used.

## **2.4 SOURCE QUALITY CONTROL**

- .1 Consistent with ULC S716.2, ensure ci cladding system components, air and moisture barrier system, adhesive, base coat, primer, and finish coat materials are supplied by Sto Canada.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- .1 Verification of Conditions:
  - .1 Verify that substrate conditions which have been previously installed under other sections or contracts meet design tolerances and are acceptable for product installation in accordance with Sto Canada Installation Guide prior to installation of ci cladding system.
- .2 Inspect surfaces to determine conditions as follows:
  - .1 Contamination from algae, chalkiness, dirt, dust, salts, efflorescence, form oil, fungus, grease, laitance, mildew or other foreign substances.
  - .2 Surface absorption and chalkiness.
  - .3 Surface cracks: Measure and record location.
  - .4 Damage and deterioration.
  - .5 Moisture content and moisture damage: Use moisture meter to determine if surface is dry enough to receive the fluid applied air and moisture barrier.
  - .6 Inform Owner and Consultant of unacceptable conditions immediately upon discovery.
  - .7 Proceed with installation after verification and correction of surface conditions.

### **3.2 PREPARATION**

- .1 Protect adjacent surfaces from damage or overspray resulting from ci cladding system work.
  - .1 Cover adjacent surfaces, fixtures, equipment, landscaping and other components to protect from over spraying.
- .2 Remove loose or damaged materials by [water blasting] [sandblasting] [wire brush].
- .3 Resurface, patch or level surfaces to required tolerance and smoothness in accordance with written instructions.
- .4 Ensure foundation waterproofing material and roof membrane materials are correctly terminated to properly transition with the fluid applied air/moisture barrier on the wall for air barrier continuity and waterproofing integrity.

### **3.3 COORDINATION**

- .1 Provide coordination such that earth grade terminates a minimum 200 mm (8") below the ci cladding system, minimum 50 mm (2") above finished grade (pavers/sidewalk). Provide increased clearance in freeze/thaw climate zones.
- .2 Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuous air barrier and continuous moisture protection.



- .3 Provide protection of rough openings before installing windows, doors, and other penetrations through the wall, and provide sill flashing.
- .4 Coordinate installation of air and moisture barrier components with window and door installation to provide weatherproofing of the structure and to prevent moisture infiltration and excess air infiltration.
- .5 Provide head flashing immediately after windows, doors, and similar elements are installed.
- .6 Provide diverter flashings wherever water can enter the wall assembly to direct water to the exterior, for example, at lower-to-higher wall intersections.
- .7 Install splices or tie-ins from the air/moisture barrier over back leg of flashings and similar details to form a shingle lap that directs incidental water to the exterior.
- .8 Install copings and sealant immediately after installation of the ci cladding system when coatings are dry, and such that, where sealant is applied against the ci cladding system surface, it is applied against the base coat or primed base coat surface.
- .9 Schedule work such that the air/moisture barrier is exposed to weather no longer than 30 days.
- .10 Attach penetrations through ci cladding system to structural support and provide airtight and water tight seals at penetrations.

### 3.4 INSTALLATION

- .1 Install in accordance with the manufacturer's written instructions and the contract documents over plumb, true, and level, clean prepared substrate.
- .2 Air and Moisture Barrier Application:
  - .1 Prepare surfaces to receive transition membrane at expansion joints and openings through substrate in accordance with manufacturer's written instructions.
  - .2 Locate surface defects such as knots in plywood sheathing, joint treatment of wall sheathing, fasteners, and cracks in concrete masonry units. Remove loose or bond-inhibiting material, including dust, dirt, mould and efflorescence.
  - .3 For static and non-structural cracks up to 13 mm (1/2") wide, apply and tool joint and seam filler to fill the crack.
  - .4 Install air and moisture barrier components over substrates in accordance with manufacturer's written instructions.
  - .5 Allow 24 hours minimum before adhering insulation to air and moisture barrier and not more than 30 days.
  - .6 Protect installed products from rain and freezing until dry.
- .3 Insulation Installation:
  - .1 Wrapping terminations: Where water is expected to drain, pre-wrap insulation board at terminations with base coat and mesh prior to installation to create Starter Boards. Where drainage is not intended pre-wrap or backwrap insulation board.
    - .1 Pre-wrapping: Embed mesh of sufficient width around the edge of the insulation board to cover minimum 65 mm (2.5") on the back and front of the board. Adhere a 230 mm wide (9") strip of detail mesh with adhesive to the substrate at locations where the pre-wrapped insulation starter boards are butted together. Ensure the length is adequate to

wrap 65 mm (2.5") to the substrate plus the thickness of the insulation plus 65 mm (2.5") onto the face of the insulation.

- .2 Backwrapping: Adhere mesh approximately 65 mm (2.5") onto the substrate at all system terminations (windows, doors, expansion joints, etc.). Ensure the length is adequate to wrap around the insulation board edge and to cover a minimum of 65 mm (2.5") on the outside surface of the insulation board.
- .2 Application of spray foam adhesive and installation of insulation:
  - .1 Apply a total of eight (8) ribbons of adhesive uniformly to the back of the insulation board. Apply end ribbons 2 cm (3/4") from each end and apply two (2) ribbons in each section of the board between the drainage grooves with ribbons of adhesive 13-15 cm (5-6") apart. Prevent adhesive from getting into drainage grooves.
  - .2 Install the insulation boards after the adhesive "tacks" and before it "skins" in a running bond pattern with joints offset from sheathing joints a minimum of 200 mm (8"). Apply light pressure across the entire surface of the boards with a straight edge to ensure good adhesive contact with the substrate and to keep board joints flush.
- .3 Application of portland cement adhesives and installation of insulation:
  - .1 Apply ribbons of adhesive uniformly to the back of the insulation board between the drainage grooves with a 13 mm x 13 mm (1/2" x 1/2") U-notched trowel with the notches spaced 65 mm (2-1/2") on centre. Prevent adhesive from getting into the drainage grooves.
  - .2 Install the insulation immediately after the application of the adhesive in a running bond pattern with joints offset from sheathing joints a minimum of 200 mm (8"). Apply firm uniform pressure across the entire surface of the boards to ensure good adhesive contact with the substrate.
- .4 Install pre-wrapped starter boards using vertical ribbons of adhesive at the bottom of the wall and at other terminations where drainage is intended such as floor lines. Secure with blocking or mechanical fasteners to support the subsequent rows of boards installed above.
- .5 Install pre-wrapped or back-wrapped boards at other terminations such as windows, doors, and fixture penetrations, allowing for a minimum 13 mm (1/2") wide joint width. At dissimilar construction allow for a minimum 19 mm (3/4") wide joint and as dictated by expected joint movement. At expansion joints terminate boards so they coincide with the edges of the joint and joint width is the same as in the supporting construction.
- .6 Install boards tight to adjacent boards, free of gaps or voids.
- .7 Install pre-wrapped corner boards in an 'L'-shape around openings to avoid alignment of insulation joints with corners of openings.
- .8 Prevent adhesive from getting between boards.
- .9 Fill gaps between boards with wedges of insulation or fill with spray foam adhesive.
- .10 Allow adhesive to dry twenty-four (24) hours minimum prior to rasping. Allow longer drying periods during cool weather until boards are firmly held in place by the adhesive.
- .11 Install trim, shapes, or build-outs directly to the base layer of insulation board with spray foam or portland cement-based adhesive. Avoid gaps between trim and the base layer of

insulation board. If gaps exist fill with the spray foam adhesive and rasp flush with the surface.

- .12 Once all insulation boards are firmly adhered, including trim, rasp the entire insulation board surface to produce a smooth, even surface.

.4 Standard Base Coat Installation:

- .1 Reinforce first 2000 mm (6.5') minimum above grade and other designated areas with Sto Armor Mat reinforcing mesh. Reinforce the entire wall surface, including trim, with Sto Armor Mat reinforcing mesh if Sto IMPACT is required (or use the two layer standard mesh application noted above – one initial layer and the second layer installed when field mesh is installed).
  - .1 Install Sto Armor Mat reinforcing mesh at locations indicated. Tightly butt reinforcing mesh. Do not overlap mesh joints.
  - .2 Using stainless steel trowel, apply base coat over surface of insulation board in areas with Sto Armor Mat reinforcing mesh.
  - .3 Apply horizontally or vertically in strips of approximately 1016 mm (40") and immediately embed Sto Armor Mat reinforcing mesh into wet base coat.
  - .4 Trowel smooth to ensure mesh colour is not visible and allow to dry.

.5 Fortification Base Coat Installation:

- .1 Apply fortification layer using standard reinforcing mesh over the Armor Mat reinforced insulation board surface, including trim.
  - .1 Depending on complexity of trim work, detail these areas first by embedding mesh (standard mesh or detail mesh) in fortification base coat and lap mesh minimum 65 mm (2.5") from trim onto base layer of insulation board.
  - .2 Using stainless steel trowel apply fortification base coat over surface of insulation board.
  - .3 Work in strips of approximately 1016 mm (40").
  - .4 Immediately embed reinforcing mesh in wet fortification base coat by troweling from the centre to the edges of the mesh.
  - .5 Trowel smooth so no mesh colour is visible to a uniform wet thickness of 3.5-4.0 mm (9/64-5/32").
  - .6 Overlap mesh seams, backwrapped areas, and detail areas where mesh laps from trim onto base layer of insulation board minimum 65 mm (2.5").
  - .7 Avoid wrinkles in mesh.
  - .8 Reinforce corners of openings with a "butterfly" of detail reinforcing mesh placed diagonally at the corner and embedded in base coat.
  - .9 Reinforce inside and outside corners with standard reinforcing mesh wrapped in each direction a minimum of 200 mm (8") embedded in base coat.
  - .10 Allow fortification layer to completely dry before proceeding to the next step.

.6 Finish Coat:

- .1 Prime reinforced base coat prior to application of finish coat.
  - .1 Allow primer to completely dry prior to applying finish coat.
- .2 Mix small amount of mixing water with finish coat materials to aid workability.
- .3 Apply finish coat to primed base coat using trowel, to thickness recommended by ci cladding system manufacturer.
- .4 Shade work to prevent rapid setting of finish.
- .5 Provide equipment, materials and work crew of sufficient size to ensure a continuous operation without cold joints.
- .6 Apply finish in continuous application.
  - .1 Work to a wet edge.
  - .2 Work to an architectural break in wall.
- .7 Do not install different batches of finish coat side-by-side.
- .8 Do not install finish coat in joints to receive sealants.

### **3.5 SITE QUALITY CONTROL**

- .1 Schedule site visits by design professional, owner's consultant, or third party quality assurance agent to conduct tests and review work as follows:
- .2 Testing:
  - .1 ci cladding system adhesion ASTM D 4541 at once per 700 m2
  - .2 Window water spray tests at three per elevation.
  - .3 Sealant field adhesion tests on each elevation
- .3 Site visits by Owner's building envelope consultant:
  - .1 At project pre-installation meeting.
  - .2 Upon completion of preparatory work upon which this Section depends, but before installation begins.
  - .3 Two times during progress of work at 25% and 60% of completion.
  - .4 Upon completion of work and cleaning is carried out.

### **3.6 CLEANING AND PROTECTION**

- .1 Provide protection of installed materials from water infiltration into or behind the system. Provide protection of installed primer and finish coat from dust, dirt, precipitation, freezing, and continuous high humidity until fully dry.
- .2 Provide sealant tested in accordance with ASTM C1382 with backer material at ci cladding system terminations to protect against air, water and insect infiltration. Provide weeps at floor lines, window and door heads, and other areas to conduct incidental water to the exterior.
- .3 Progress Cleaning:

- .1 Leave work area clean at the end of each work-day, ensuring safe movement of passing pedestrians.
- .4 Final Cleaning:
  - .1 At completion of installation, clean all surfaces so they are free of foreign matter using cleaners recommended by material manufacturer.
- .5 Refer to Sto Repair and Maintenance Guide for detailed information on cleaning, repairs, recoating, resurfacing and refinishing, or re-cladding.
- .6 Waste Management:
  - .1 Co-ordinate recycling of waste materials and packaging at appropriate facility, diverting waste from landfill. Installer shall be responsible for ensuring waste management efforts are practiced.
  - .2 Clean pails with water prior to recycling.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Quality Assurance
- .6 2.1 Sheet Vapour Barrier
- .7 2.2 Accessories
- .8 3.1 Installation
- .9 3.2 Attachment
- .10 3.3 Exterior Surface Openings
- .11 3.4 Perimeter Seals
- .12 3.5 Lap Joint Seals
- .13 3.6 Electrical Boxes
- .14 3.7 Field Quality Control

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Above-grade vapour barrier.

### **1.4 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section.
- .3 Samples:
  - .1 Submit sample of proposed Products for review by the *Consultant*.

### **1.5 QUALITY ASSURANCE**

- .1 Qualifications: *Provide* work of this Section, executed by competent installers with minimum 5 years' experience in application of Products, systems and assemblies specified and with approval and training of *Product* manufacturers.
- .2 Mock-up:
  - .1 Construct 10 m<sup>2</sup> (100 ft<sup>2</sup>) area of typical installation for each type of *Product*.
    - .1 Construct mock-up of sheet vapour barrier installation including one lap joint, one inside corner and at one electrical box. Mock-up may be part of finished work.

- .2 Locate at the *Place of the Work* as part of final installation. Space installation to include exterior wall panel incorporating window and insulation.
- .3 Do not proceed until mock-up has been reviewed by the *Consultant*.
- .4 When accepted, mock-up will demonstrate minimum standard of quality required for this work.

## **PART 2 - PRODUCTS**

### **2.1 SHEET VAPOUR BARRIER**

- .1 Polyethylene film: CAN/CGSB 51.34-M86 (amended 1988), Type 1, 0.15 mm (6 mil) thick, with a water vapour permeance of not greater than 45 ng/(P•s•m<sup>2</sup>), flame spread rating of less than 150 to CAN/ULC-S102-10.

### **2.2 ACCESSORIES**

- .1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 75 mm (3") wide.
- .2 Lap sealant; butyl sealant: CGSB 19.21-M87.
  - .1 Acceptable products:
    - .1 Pecora 'BA98'.
    - .2 Tremco 'Acoustical Sealant'.
    - .3 QuietSeal 'Acoustic Sealant QS-350'.
    - .4 Or equivalent.
- .3 Staples and fasteners: minimum 6.4 mm (1/4") leg.
- .4 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- .1 Ensure services are installed and inspected prior to installation of sheet vapour barrier.
- .2 Install sheet vapour barrier on interior side of insulation at exterior wall and ceiling assemblies prior to installation of gypsum board to form continuous application.
- .3 Use sheets of largest practical size to minimize joints.
- .4 Inspect sheets for continuity. Repair punctures and tears with sealing tape before work is concealed.

### **3.2 ATTACHMENT**

- .1 Seal vertical joints in sheet vapour barrier over framing by lapping no fewer than two studs.
- .2 Fasten sheet vapour barrier to framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 400 mm (16") o.c.

### **3.3 EXTERIOR SURFACE OPENINGS**

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

### **3.4 PERIMETER SEALS**

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

### **3.5 LAP JOINT SEALS**

- .1 Seal lap joints of sheet vapour barrier as follows:
  - .1 Attach first sheet to substrate.
  - .2 Apply continuous bead of sealant over solid backing at joint.
  - .3 Lap adjoining sheet minimum 150 mm (6") and press into sealant bead.
  - .4 Install fasteners through lapped sheets at sealant bead into wood substrate.
  - .5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

### **3.6 ELECTRICAL BOXES**

- .1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:
  - .1 Install moulded box vapour barrier or double wrap boxes with film sheet providing minimum 305 mm (12") perimeter lap flange.
  - .2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

### **3.7 FIELD QUALITY CONTROL**

- .1 Conduct quality control in accordance with Section 01 45 00.

**END OF SECTION**



## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 References
- .5 1.5 Submittals
- .6 1.6 Quality Assurance
- .7 1.7 Delivery, Storage, and Handling
- .8 1.8 Field Conditions
- .9 1.9 Extended Warranty
- .10 2.1 Performance/Design Requirements
- .11 2.2 Materials – General
- .12 2.3 Sheet-Applied, Vapour Impermeable Self-Adhesive Air / Vapour Barrier Membrane System
- .13 2.4 Sheet-Applied, Vapour Permeable Sheathing Membrane Air Barrier System
- .14 3.1 Installation – General
- .15 3.2 Installation – Sheet Applied, Vapour Impermeable, Self-Adhesive Membrane
- .16 3.3 Field Quality Control

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Sheet-Applied Self-Adhesive Air / Vapour Barrier Membrane.

### **1.4 REFERENCES**

- .1 Definitions:
  - .1 Air barrier material: A building material that is designed and constructed to *Provide* primary resistance to airflow through air barrier system.
  - .2 Air barrier system: The collection of air barrier materials and auxiliary materials applied to substrate, including joints and junctions to abutting construction, to control air movement through the building envelope.

### **1.5 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section.
- .3 Compatibility statement:

- .1 Submit manufacturer's compatibility statement validating compatibility of air barrier system materials with substrates and adjacent materials.

## 1.6 QUALITY ASSURANCE

- .1 Qualifications: *Provide* the work of this Section, executed by competent installers with a minimum of 5 years' experience in application of Products, systems and assemblies specified and with approval and training of *Product* manufacturers.
- .2 Mock-up:
  - .1 Construct minimum 10 m2 (100 ft2) area of each typical wall assembly installation for each type of *Product*.
  - .2 Locate at the *Place of the Work* as part of final installation.
  - .3 Do not proceed until mock-up has been reviewed by the *Consultant*.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Package materials and identify on attached labels the manufacturer, contents and material specification number.
- .2 Store flammable solvent-base liquids away from excessive heat and open flame. Primer contains solvent. Do not use near open flame.
- .3 Store surface conditioner at temperature above 5°C to facilitate handling.
- .4 Store roll materials on end.

## 1.8 FIELD CONDITIONS

- .1 *Provide* forced air circulation during curing period for enclosed applications.
- .2 Low temperature application:
  - .1 Perform adhesion test for membrane when ambient temperature is below -5°C.
  - .2 Proceed with work when temperature is (or predicted) to fall below -5°C ambient temperature only with the mutual documented agreement of inspection and testing company, manufacturer and applicator.
- .3 Do not perform installation during rainy or inclement weather or on wet or frost covered surfaces.
- .4 *Provide* temporary protection of the applied membrane to prevent mechanical damage or damage from spillage of oil or solvents.

## 1.9 EXTENDED WARRANTY

- .1 The work of this Section shall meet the specified building envelope performance requirements during the warranty period.

## PART 2 – PRODUCTS

### 2.1 PERFORMANCE/DESIGN REQUIREMENTS

- .1 Air barrier system shall perform as continuous air barrier and as liquid-water drainage plane flashed to discharge to exterior of building envelope incidental condensation or water penetration.

- .2 At wall and roof cladding transitions, air barrier system shall perform as continuous air barrier and as liquid-water drainage plane flashed to discharge to exterior of building envelope incidental condensation or water penetration by creation of unobstructed drainage plane that extends across the cladding transition or by flashing to discharge to exterior of building envelope incidental condensation or water penetration.
- .3 Air barrier system shall accommodate substrate movement, construction material changes, and transitions at perimeter conditions without deterioration which permits air and water leakage exceeding the following specified limits and requirements, or interruption of the drainage plane:
  - .1 Air permeance of air barrier material: Maximum 0.02 L/s.m<sup>2</sup> at 75 Pa (0.004 cfm/ft<sup>2</sup> at 1.57 psf) to ASTM E2178-13.
  - .2 Rate of air leakage of air barrier system: Maximum 0.15 L/s.m<sup>2</sup> at 75 Pa (0.030 cfm/ft<sup>2</sup> at 1.57 psf) to ASTM E283-04(2012).
  - .3 Water vapour transmission for air / vapour barriers: Maximum 5.7 ng/Pa.m<sup>2</sup>.s. (0.1 perms).
  - .4 Water vapour transmission for vapour permeable air vapour barriers: Minimum 570 ng/Pa.m<sup>2</sup> s. (10 perms).
  - .5 Air barrier membrane system structural performance while maintaining air barrier performance for air leakage: Air barrier system shall transfer wind loads to structure and shall resist 100% of design wind load in accordance with the Ontario Building Code.
  - .6 Low temperature performance: Minimum -30°C (-22°F).
  - .7 Compatibility: Air barrier system materials shall be compatible with substrate and adjacent materials with material manufacturers and show no performance deterioration during service conditions.
  - .8 Self-sealability: ASTM D1970/D1970M-15.
- .4 Air barrier system shall be joined in an airtight and flexible manner to air barrier material of adjacent building envelope air barrier systems, allowing for relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between the following unless otherwise applicable:
  - .1 Foundation and walls.
  - .2 Walls and openings (windows, doors, louvres, and other wall penetrations).
  - .3 Wall and roof systems.
  - .4 Wall and roof over unconditioned space.
  - .5 Walls, floor and roof across construction, control, and movement joints.
  - .6 Walls, floors and roof to utility, pipe and duct penetrations.

## 2.2 MATERIALS – GENERAL

- .1 Single source responsibility: Materials shall be sourced from one manufacturer including sheet membranes, air barrier sealants, primers, mastics and adhesives.

## **2.3 SHEET-APPLIED, VAPOUR IMPERMEABLE SELF-ADHESIVE AIR / VAPOUR BARRIER MEMBRANE SYSTEM**

- .1 Description: Composite preformed modified bituminous membrane system consisting of SBS modified asphalt for low temperature flexibility and polyethylene scrim reinforcing, with physical properties as follows:
  - .1 Single source responsibility: Components required for complete air barrier system and through wall flashing membrane behind the opaque wall assemblies to be obtained from single manufacturer. Coordinate with Section 07 27 00.
  - .2 Thickness: 1.0 mm (40 mils)
  - .3 Application temperature: in accordance with product installation instructions.
  - .4 Primer: in accordance with product installation instructions.
  - .5 Termination and penetration sealing mastic: in accordance with product installation instructions.
  - .6 Acceptable product systems:
    - .1 Henry Company 'Bakor Blueskin SA' and 'Blueskin SA LT'.
    - .2 Carlisle Coatings & Waterproofing 'CCW 705'.
    - .3 Grace Construction Products 'Perm-A-Barrier Wall Membrane'.
    - .4 IKO 'AquaBarrier AVB' and AquaBarrier AVB Low Temp'.
    - .5 Soprema 'Sopraseal Stick 1100 Summer Grade' and Sopraseal Stick 1100 Winter Grade'.
    - .6 Tremco 'ExoAir 110 and 110LT'.
    - .7 W.R. Meadows 'Air Shield' and 'Low Temperature Air Shield'.
    - .8 Or equivalent.

## **2.4 SHEET-APPLIED, VAPOUR PERMEABLE SHEATHING MEMBRANE AIR BARRIER SYSTEM**

- .1 Description: Flexible sheet material with high vapour permeability to CAN/CGSB 51.32- M77, for breather type sheathing membranes.
- .2 Air barrier tape: as per manufacturer's printed installation instructions.
- .3 Fasteners:
  - .1 For steel frame construction: as per manufacturer's printed installation instructions, rust resistant screws with 50 mm (2") diameter plastic cap.
  - .2 For wood frame construction: as per manufacturer's printed installation instructions, nails with large heads or plastic washers. Wide staples with a 25 mm (1") minimum crown may be used if applied on wood sheathing.
- .4 Acceptable Products:
  - .1 Dupont 'Tyvek CommercialWrap'.
  - .2 Fabrene Inc. 'Air-Gard XL'.

- .3 Dow 'Styrofoam WeatherMate Plus'.
- .4 Fiberweb 'Typar Metrowrap'.
- .5 Or equivalent.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION – GENERAL**

- .1 Surfaces to receive air barrier systems shall be smooth, dry and free from conditions that will adversely affect execution, permanence, or quality of the work of this Section.
- .2 Air barrier system shall be continuous in the building envelope. Lap and seal air barrier systems in accordance with product manufacturer's installation instructions to construction, control, and expansion joints, across junctions between different building assemblies, and around penetrations through the building assembly.
- .3 Wrap into jamb, head and sill of building envelope window openings, door openings, and other openings with air barrier system membrane by returning membrane to inside face of opening unless otherwise indicated.
- .1 Coordinate air / vapour barrier terminations of work of this section with air / vapour barrier membrane in Section 08 41 00.

### **3.2 INSTALLATION – SHEET APPLIED, VAPOUR IMPERMEABLE, SELF-ADHESIVE MEMBRANE**

- .1 Apply self-adhering membrane continuous to prepared and primed substrate in an overlapping shingle fashion to shed moisture towards exterior and in accordance with manufacturer's recommendations and written instructions. Stagger vertical joints 200 mm (8").
- .2 Align and position self-adhering membrane, remove protective film and press firmly into place. Ensure minimum 50 mm (2") overlap at end and side laps. Promptly roll laps and membrane with a counter top roller to affect the seal.
- .3 At the end of each *Day's* work seal the top edge of the membrane where it meets the substrate using liquid air seal mastic. Trowel apply a feathered edge to seal termination and shed water.
- .4 Seal projections with application of liquid air seal mastic.
- .5 Apply self-adhering membrane continuous across junctions between different building assemblies, and around penetrations through the building assembly. *Provide* 100 mm (4") overlap unless otherwise indicated, or required by manufacturer's installation instructions.
- .6 Inspect membrane for punctures, misaligned seams and fishmouths, apply additional layer of membrane over affected area, extending minimum of 150 mm (6") beyond damaged area in all directions.

### **3.3 FIELD QUALITY CONTROL**

- .1 Conduct quality control in accordance with Section 01 45 00.
- .1 Perform pull adhesion tests for project substrates in accordance with ASTM D4541-09e1.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 References
- .5 1.5 Administrative Requirements
- .6 1.6 Submittals
- .7 1.7 Closeout Submittals
- .8 1.8 Quality Assurance
- .9 1.9 Delivery, Storage, And Handling
- .10 1.10 Site Conditions
- .11 1.11 Warranty
- .12 2.1 Manufacturers
- .13 2.2 Performance / Design Criteria
- .14 2.3 Materials
- .15 2.4 Accessories
- .16 2.5 Finish
- .17 2.6 Fabrication
- .18 3.1 Examination
- .19 3.2 Air Barrier Membrane Application
- .20 3.3 Insulation
- .21 3.4 Cladding System Installation
- .22 3.5 Metal Cladding Installation Tolerances
- .23 3.6 Field Quality Control
- .24 3.7 Adjusting And Cleaning
- .25 3.8 Protection

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Prefinished metal siding system

### **1.4 REFERENCES**

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

- .2 ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
- .3 ASTM D4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films CSA G164 - Hot Dip Galvanizing Of Irregularly Shaped Articles
- .4 CSA S136 - North American Specification For The Design Of Cold-Formed Steel Structural Members.
- .5 CSSBI 20M - Standard for Sheet Steel Cladding for Architectural, Industrial and Commercial Building Applications.
- .6 CSSBI 23M - Standard for Residential Steel Cladding
- .7 UL 1897 - Uplift Tests for Roof Covering Systems
- .8 CAGBC Canadian Green Building Council - Leadership in Energy and Environmental Design (LEED) Green Building Rating System

## **1.5 ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-installation Meetings:
  - .1 Pre-installation Meeting: Refer to Section 01 31 00. Two (2) weeks before starting work of this Section, arrange a site meeting attended by the Consultant, the Contractor, Subcontractors affected by the work for which the pre-installation meeting is being conducted, manufacturer's representative and Inspection and testing company as applicable.
    - .1 Discuss surface conditions, application procedures, suitability of materials and alternative recommendations.
- .2 Coordination:
  - .1 Coordinate with installers of wall mounted items, equipment, and mechanical and electrical work so that installation will not subvert the integrity of the cladding system.
  - .2 Coordinate interface, transition, lapping, flashings and compatibility of membranes with work of Section 07 27 00
- .3 Sequencing:
  - .1 Sequence work to permit installation of materials in conjunction with related materials and seals.

## **1.6 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 Product Data Sheets:
  - .1 Submit manufactures Product Data Sheets for all Products proposed for use in the work of this Section.
- .3 Samples:
  - .1 Submit 2 – 610 x 610 mm (24" x 24") long size samples of siding profile, each colour and profile specified.
  - .2 Colour Samples: 63.5 mm x 124 mm (2.5" x 4-7/8") chips or 305 mm (12") sample cut from finished product.

- .3 Samples to be reviewed by Consultant prior to fabrication
- .4 Shop Drawings:
  - .1 Submit engineered shop drawings in accordance with Section 01 31 00.
  - .2 Provide engineered shop drawings signed and stamped by a professional engineer licensed in the province of the work. Ensure that the proposed systems comply with the requirements of the Building Code, and with the seismic requirements for the project location.
    - .1 Submit shop drawings for each item showing:
      - .1 Indicate dimensions, siding profiles, attachment methods, trim and closure pieces, fascia, material finishes and colours, and related work.
      - .2 Provide installation sequence.
      - .3 Indicate methods to achieve watertight assembly, including sealants, penetration seals, drainage path of moisture from within assembly to exterior of envelope

## **1.7 CLOSEOUT SUBMITTALS**

- .1 Operation and Maintenance Data:
  - .1 Submit maintenance and cleaning instructions for systems for incorporation into the maintenance manuals.

## **1.8 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Manufacturer:
    - .1 Manufacturer has fabricated product of types under this Section, for projects of similar size and scope, for a continuous period of not less than five (5) years before award of Subcontract, has personnel and plant equipment capable of fabricating product of the types specified and has a written quality control system in place.
  - .2 Installer Qualification:
    - .1 Execute the work of this Section only by a Contractor who has adequate equipment and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified in the recent past.
  - .3 Licensed Professional:
    - .1 Retain a Professional Engineer experienced with providing engineering services of the kind indicated, including documentation confirming that engineer is licensed in the jurisdiction in which Project is located.

## **1.9 DELIVERY, STORAGE, AND HANDLING**

- .1 Delivery and Acceptance Requirements:
  - .1 Deliver packaged materials in original containers with labels intact until time of use.
- .2 Storage and Handling Requirements:
  - .1 Store components and materials indoors in accordance with panel manufacturer's recommendations and protect from elements and moisture.



- .2 Protect prefinished steel during fabrication, transportation, site storage and erection, in accordance with Manufactures Installation Guidelines.

#### **1.10 SITE CONDITIONS**

- .1 Existing Conditions:
  - .1 Take measurements at the Place of the Work to ensure that the work of this section is fabricated to fit structure, surrounding construction, around obstructions and projections in place.
  - .2 Verify that backup construction is solid for a secure attachment and aligned for proper installation of prefinished metal siding system before commencing erection.
  - .3 Comply with CSSBI's installation requirements.

#### **1.11 WARRANTY**

- .1 Warrant work of this section in accordance with Section 01 78 36
- .2 Special Finish Warranty:
  - .1 Provide a manufacturer's written warranty:
    - .1 Furnish siding manufacturer's written warranty covering failure of factory-applied exterior finish within the warranty period.
  - .2 Period:
    - .1 Forty (40) years from the date of purchase of the Product. The values below are based on normal environments and exclude any aggressive atmospheric conditions.
    - .2 Weather XL - Silicone Modified Polyester (SMP):
      - .1 The Product will not chip, crack, peel or otherwise lose adhesion for a period of forty (40) years following the original date of purchase of the Product.
      - .2 The colour will not chalk in excess of number eight (8) rating as determined by ASTM D4214 Method D659, and the colour will not change more than five (5.0) Hunter  $\Delta E$  units as determined by ASTM Method D-2244 for a period of thirty (30) years from installation or thirty and half (30.5) years from the date of purchase.

### **PART 2- PRODUCTS**

#### **2.1 MANUFACTURERS**

- .1 Acceptable Manufacturer:
  - .1 Vicwest Inc., head office located at 5050 S Service Rd #200, Burlington, ON L7L 5Y7, phone number (905) 825-2252, <https://vicwest.com/>

#### **2.2 PERFORMANCE / DESIGN CRITERIA**

- .1 Design, fabricate and install work of this Section in accordance with the Ontario Building Code or other applicable codes, requirements or governing authorities.
- .2 Design to CAN/CSA S136-16 and building code.

- .3 Design for expansion and contraction of component materials of the Work produced by an exterior surface temperature range of -35°C to +60°C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.
- .4 Design siding system to accommodate and withstand the following without permanent deformation or damage to, or failure of, siding system:
  - .1 Deflection of siding system due to wind loads shall not exceed L/90 of the span for walls.
  - .2 Design expansion joints to accommodate movement within siding system, and between siding system and building structure.
  - .3 Siding system dead loads, ice loads, and wind loads, and combinations thereof, in accordance with the building code.
    - .1 Design wind loads shall be based on 1/50 hourly wind pressure values as indicated in building code and greater values as require to maximum allowable deflection without permanent deformation.
- .5 Design to allow positive drainage of condensation occurring within siding system to exterior of building envelope or drainage outlet.
- .6 Design to allow positive drainage of water to exterior of building envelope or drainage outlet.
- .7 Design meal systems to the Architectural Sheet Metal Manual by SMACNA unless otherwise indicated.
- .8 Design wall system and secondary support structure to accommodate the specified erection tolerances of the structure.
- .9 Design system to meet tolerances specified.

## 2.3 MATERIALS

- .1 Approved Products:
  - .1 Bellara Steel Siding by Vicwest Inc.
  - .2 Substitutions: in accordance with Section 01 25 00.
- .2 Prefinished Steel Siding, concealed fastener system for exterior application and as follows:
  - .1 Non-combustible material that meets the acceptance criteria of ULC-S135.
  - .2 Metal sheet: Zinc coated (galvanized) sheet steel to the requirements of ASTM A653/A653M with a minimum metallic coating designation Z275 (G90).
  - .3 Preformed metal thickness: 0.46 mm (26 gauge) base steel nominal thickness.
  - .4 Exposed preformed steel profile:
    - .1 Siding Length: 3657.6 mm (12')
    - .2 Coverage Width: 133.4mm (5.25")
    - .3 Profile Total Size: 185.9 mm x 15.5 mm (7.32" x 0.61")
  - .5 Colour:

- .1 Provide full range from the Expressence and Weather XL options for the Architects selection.
- .2 Samples shall be provided of the color finishes and shall be reviewed by the Architect and Owner.
- .3 Thermally broken façade substructure:
  - .1 System shall provide façade substructure with the following attributes:
    - .1 Thermally broken.
    - .2 Meet requirements of the building code for non-combustible construction.
    - .3 Adjustable to permit façade alignment tolerances.
    - .4 Corrosion resistant performance.
    - .5 Suitable for rear ventilated rain screen façade design.
  - .2 Z-girt and sub-girts: Preformed Z275 galvanized metal sheet, 1.22 mm (18 gauge) minimum base steel nominal thickness, notched for drainage, to ASTM A653/A653M-13, Grade A.
  - .3 Z-girt shall be prepainted black for added corrosion resistance.
  - .4 Thermally broken spacer systems:
    - .1 Subject to compliance with the requirements of the Contract Documents, provide one of the following product systems:
      - .1 Engineered Assemblies 'T-Clip Thermally Broken Façade Substructure'.
      - .2 Exterior Technologies Group 'TAC System Thermal Spacer'.
      - .3 Cascadia Windows & Doors 'Cascadia Clip'.
      - .4 IsoClip 'Thermal Isolation Clip'.
      - .5 SFS 'NVELOPE System Brackets'
  - .4 Insulation: Rigid in accordance with Section 07 21 00
  - .5 Air barrier membrane: In accordance with Section 07 27 00.
  - .6 Exposed sealants: In accordance with Section 07 92 00.
  - .7 Gaskets: soft, pliable, cold weather grade, PVC foam, extruded profile for outer sheet.

## 2.4 ACCESSORIES

- .1 Accessories and hardware: As required to meet specified requirements.
- .2 Fasteners:
  - .1 #8 Self-drilling, No. 2 Pt., Pan head screws to steel subgirts
  - .2 Screw length as required:
    - .1 Minimum 3 thread past the steel support material.
  - .3 Do not over torque fastener.

- .3 Trim and Flashing: Material, finish and colour to match prefinished metal siding.
- .4 Provide standard trims and flashings as per manufacturer to match siding.
- .5 Provide additional flashing complying with Section 07 62 00 where indicated.

## **2.5 FINISH**

- .1 Weather XL - Silicone Modified Polyester (SMP): Colour selected by Consultant from manufacturer's range.
  - .1 Acceptable Products:
    - .1 Sherwin Williams WeatherXL.
- .2 Expressence - PVDF Coating Finish: Colour as selected by Consultant from manufacturer's range.
  - .1 Acceptable Products:
    - .1 Sherwin Williams Expressence.

## **2.6 FABRICATION**

- .1 Factory fabricate all components of the system, ready for field installation.
- .2 Construct panel lines, breaks, and angles sharp and true, and surfaces free from warp and buckle.
- .3 Allow for structural movements within the systems, and to accommodate thermal expansion and contraction between panels and structural members.
- .4 Ensure the metal panels are free of steel contamination from rollers.
- .5 Fabricate siding panel systems to prevent entry of water into building and from collection within system assembly.
- .6 Join intersecting parts together to provide tight, accurately fitted joints with adjoining surfaces in true planes.
- .7 Fabricate formed and notched metal closures to close-off flutes at exterior. Seal also with neoprene foam filler.
- .8 Cooperate with applicable sections to ensure coordination required for proper installation of work of this section in conjunction with and incorporated with other work.
- .9 Prefinished metal panel terminations shall not have a raw metal edge or exposed fasteners.

## **PART 3 – EXECUTION**

### **3.1 EXAMINATION**

- .1 Verification of Conditions:
  - .1 Take measurements at the *Place of the Work* to ensure that the work of this Section is fabricated to fit structure, surrounding construction, and obstructions and projections in place.
  - .2 Verify that backup construction is aligned for proper installation of prefinished metal panel system before commencing erection.

- .3 Report all discrepancies to the Consultant before beginning the Work on the wall system.
- .4 Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 AIR BARRIER MEMBRANE APPLICATION**

- .1 Install in accordance with manufacturer's written installation requirements and in accordance with Section 07 27 00.
- .2 Surfaces must be smooth, clean dry and free from loose contaminants. Brushing and/or scraping of block and concrete surfaces may be required to adequately prepare surface.
- .3 Apply primer for membrane work.
- .4 Wrap openings with membrane returning to inside face of openings.
- .5 Ensure air barrier seals into adjacent systems for complete air barrier to building envelope.
- .6 Seal around materials penetrating membrane in accordance with manufacturer's written requirements.

### **3.3 INSULATION**

- .1 Install insulation in accordance with manufacturer's written installation requirements and in accordance with Section 07 21 00.
- .2 Cut backs of pieces as required to fit over projecting anchors, fastenings or similar protrusions. Fit boards with tight joints around obstructions, openings, corners, and structural members.
- .3 Apply insulation to ensure total and complete coverage of surfaces indicated to be insulated, and in direct contact with such surfaces.
- .4 Use largest possible dimensions to reduce number of joints.

### **3.4 CLADDING SYSTEM INSTALLATION**

- .1 Comply with manufacturer's written installation Guidelines, reviewed shop drawings and project drawings.
- .2 Erect systems complete with flashings forming part of the system, clips, fasteners, closures and sealant to meet the design criteria as specified for fabrication.
- .3 Erect panels in straight lines, that are true, level, square, and plumb to comply with installation tolerances.
- .4 Attachment system:
  - .1 Allow for free and noiseless vertical and horizontal thermal movement due to expansion and contraction for material temperature range. Buckling of panels, opening of joints, under stress on fasteners, failure to sealants or any other detrimental effects due to thermal movement is not permitted. Allow for ambient temperature at time of fabrication, assembly, and erection procedures.
- .5 Anchor cladding securely per engineering recommendations and in accordance with reviewed shop drawing to allow for necessary thermal movement.
- .6 Where steel siding contacts dissimilar metals, protect against galvanic action.
- .7 Fasten metal siding to supports with fasteners at each location indicated on reviewed shop drawings, at spacing and with fasteners recommended by manufacturer.

- .8 Place trim and flashing as indicated per details on the reviewed shop drawings.
- .9 Install sealants at junctions with adjoining work, and where shown on the drawings in accordance with Section 07 92 00 – Sealants and to provide a watertight installation
- .10 Cut, flash, and apply sealant to system penetrations. Seal around materials penetrating metal cladding watertight.
- .11 Install various components within cladding assembly to provide positive controlled drainage of moisture to exterior of building envelope or drainage outlet.
- .12 Conceal fasteners.
- .13 Do not install component parts that are observed to be defective, including warped, bowed, dented, and broken members.
- .14 Obtain panel symmetry whenever possible relative to openings in both vertical and horizontal plane.
- .15 Break form metal flashings to profile required, in maximum lengths.
- .16 Install head and sill flashings to profiles required, in maximum lengths.
- .17 Apply sealant to face of supports for top and bottom closure flashings and at supports for perimeter closure flashings and returns.
- .18 Do not cut, trim, weld or braze component parts during erection in a manner that would damage finish, decrease strength or result in a visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.
- .19 Separate dissimilar metals and use gasketed fasteners where needed to eliminate the possibility of corrosive or electrolytic action between metals.
- .20 Protect surface of metals in contact with concrete, mortar, plaster or other cementitious surface with isolation coating.

### **3.5 METAL CLADDING INSTALLATION TOLERANCES**

- .1 Maximum variation from plane or location shown on reviewed shop drawings: 20 mm (3/4")/10 m (32.8') of length and up to 30mm (1-1/6")/100 m (328') maximum.
- .2 Maximum offset from true alignment between two adjacent members abutting end to end or side-by-side, in line: 1 mm (0.039").
- .3 Flatness: Maximum deviation from flatness shall be 3.2 mm (1/8") in 1520 mm (5') on panel in any direction for assembled units.

### **3.6 FIELD QUALITY CONTROL**

- .1 Conduct quality control in accordance with Section 01 45 00.

### **3.7 ADJUSTING AND CLEANING**

- .1 After erection, touch up coatings removed or damaged during erection.
- .2 Remove damaged, dented, defaced, defectively finished, or tool marked components and replace with new.

- .3 Wash down exposed interior and exterior surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths. Wipe interior surfaces clean as part of final clean-up.
- .4 Remove excess sealant with recommended solvent.

### **3.8 PROTECTION**

- .1 The *Consultant* will advise the *Contractor* of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering.

**END OF SECTION**

**PART 1 – GENERAL****1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

**1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Administrative Requirements
- .5 1.5 Submittals
- .6 1.6 Closeout Submittals
- .7 1.7 Quality Assurance
- .8 1.8 Delivery, Storage, and Handling
- .9 1.9 Field Conditions
- .10 1.10 Extended Warranty
- .11 2.1 Roofing System Manufacturer
- .12 2.2 Performance/Design Requirements – General
- .13 2.3 Performance/Design Requirements – Fire Protection
- .14 2.4 Roofing Membrane and Flashing Sheets
- .15 2.5 Auxiliary Roofing Membrane Materials
- .16 2.6 Asphalt Materials
- .17 2.7 Substrate Boards
- .18 2.8 Air and Vapour Barriers
- .19 2.9 Roof Insulation
- .20 2.10 Insulation Accessories
- .21 2.11 Fasteners and Restraints
- .22 2.12 Expansion Joints
- .23 3.1 Examination
- .24 3.2 Preparation
- .25 3.3 Method of Installation
- .26 3.4 Substrate Board (Sheathing/Underlay)
- .27 3.5 Application of Primer
- .28 3.6 Air and Vapour Barrier
- .29 3.7 Asphalt Application
- .30 3.8 Insulation Application – Conventional Roofing
- .31 3.9 Cover Board
- .32 3.10 Installation of Reinforced Gussets
- .33 3.11 Roofing Details
- .34 3.12 Installation of Torch-Applied Cap Sheet Membrane



- .35 3.13 Installation of Torch-Applied Cap Sheet Flashing Membrane
- .36 3.14 Waterproof Expansion Joint Installation
- .37 3.15 Metal Flashings
- .38 3.16 Field Quality Control
- .39 3.17 Adjusting and Cleaning

### 1.3 SUMMARY

- .1 Section includes:
  - .1 Two-ply styrene-butadiene-styrene (SBS) modified bituminous membrane roofing; as follows:
    - .1 Exposed membrane roofing system.
    - .2 Roofing insulation.
    - .3 Air and vapour barrier.
    - .4 Associated roofing accessories and products.

### 1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
  - .1 Coordinate with installation of air barrier at walls to ensure complete continuity of air barrier system for building. Roofing air barrier membrane to lap by 75 mm (3") minimum and terminate with wall system air barrier membrane.
  - .2 The manufacturer shall meet with the necessary parties at the *Site* to review and discuss project conditions as it relates to the integrity of the roofing assembly.

### 1.5 SUBMITTALS

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for each type of product indicated.
- .3 Shop drawings; general details:
  - .1 Include plans, elevations, sections, details, and attachments to other work for the following:
    - .1 Base flashings, cants, and membrane terminations.
    - .2 Tapered insulation, including slopes.
    - .3 Crickets, saddles, and tapered edge strips, including slopes.
    - .4 Insulation fastening patterns.
- .4 Certificates:
  - .1 Installer certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

- .2 Manufacturer certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in Subsection 2.2 "Performance Requirements" below.
  - .1 Submit evidence of compliance with performance requirements.
- .5 Roofing manufacturer's warranty and design criteria:
  - .1 Submit copy of completed roofing manufacturer's pre-installation notification form at least 10 *Working Days* prior to commencement of roofing installation.
  - .2 Submit copy of roofing manufacturer's warranty specimen and warranty design criteria for roofing system prior to commencement of roofing installation.
- .6 Samples:
  - .1 Submit samples complete with manufacturer's labels intact, of materials to be used for work of this Section prior to commencement of work. Allowing ample time for review and acceptance by the *Consultant* and roofing inspection company. Do not proceed with work until samples are accepted.

## 1.6 CLOSEOUT SUBMITTALS

- .1 Submit closeout submittals in accordance with Section 01 77 00.
- .2 Operation and maintenance data:
  - .1 Submit manufacturer's maintenance instructions for incorporation into the operation and maintenance manuals.

## 1.7 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Manufacturers: Company specializing in manufacturing the Products specified in this section, with a minimum of 10 years' experience.
  - .2 Installers / applicators / erectors: *Provide* work of this section, executed by competent installers with minimum 5 years' experience in application of Products, systems and assemblies specified and with approval and training of *Product* manufacturers.
    - .1 *Work* of this Section shall be installed by a *Subcontractor* that is a member in good standing of the Canadian Roofing Contractors Association (CRCA) and Ontario Industrial Roofing Contractors Association (OIRCA), who has been a member for at least 5 years.
    - .2 Roofing *Subcontractor* must be approved by the membrane manufacturer for the warranty program specified. Submit *Subcontractor's* certification letter prepared by the membrane manufacturer.
- .2 Execute work of this Section only under full time supervision of qualified *Subcontractor's* site supervisor.
- .3 Mock-up:
  - .1 Prepare a 10 m<sup>2</sup> (100 ft<sup>2</sup>) mock-up of the work of this Section. Incorporate materials and methods of fabrication and installation identical with project requirements.

- .2 Install mock-up at roof area location directed by the *Consultant*. Retain accepted mock-up of sufficient size and scope to show typical pattern of seams, fastening details, edge construction, and workmanship.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver roofing materials to the *Site* in original containers with seals unbroken and labelled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.
- .2 Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- .3 Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.
- .4 Handle materials carefully to preclude damage. Follow manufacturer's written recommendations.
- .5 Package materials and identify on attached labels the manufacturer, brand, contents, weight as applicable, and *Product* and specification numbers.
- .6 Protect edges of roll goods from damage during handling, and store rolls on end to prevent flattening.
- .7 Do not store roofing materials on roof. Store them in a dry area protected from inclement weather while roofing installation is not in progress. Store above materials under opaque, breathable and waterproof tarpaulins or in sheds.
- .8 Prevent compression of insulation panels at any point and breakage of edges and corners. Discard wet, cupped, bowed, or otherwise damaged insulation from *Place of the Work*.
- .9 Protect edges and corners of precast concrete paving slabs to prevent damage.

## 1.9 FIELD CONDITIONS

- .1 Weather limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

## 1.10 EXTENDED WARRANTY

- .1 *Provide* Ontario Industrial Roofing Contractors Association (OIRCA) 2 year warranty for labour, materials, and workmanship.
- .2 Warrant work of this section in accordance with Section 01 78 36 for a period of 1 year.
- .3 In addition, roofing manufacturer shall *Provide* total system warranty including the following:
  - .1 Roofing membrane manufacturer will issue a written document in the *Owner's* name, valid for duration listed below, for the repair of leaks in the roofing membrane to restore the roofing system to dry and watertight condition, to the extent that membrane manufacturing or installation defects caused water infiltration. Include copy of required warranty with close out documentation.
  - .2 Warranty shall cover entire cost of the repair(s) required to maintain dry and watertight roofing system during the full warranty duration.

- .3 Warranty shall include for labour, materials, and workmanship.
- .4 Warranty shall be non-prorated with no dollar limit (NDL) for duration of warranty.
- .5 10 year warranty duration.

## **PART 2- PRODUCTS**

### **2.1 ROOFING SYSTEM MANUFACTURER**

- .1 General:
  - .1 Single source responsibility: each roofing component to be by one manufacturer.
- .2 Acceptable roof system manufacturers: Subject to compliance with requirements, *Provide* products by one of the following:
  - .1 Firestone Building Products.
  - .2 GAF Materials Corporation.
  - .3 IKO Industries.
  - .4 Siplast.
  - .5 Soprema.
  - .6 Or equivalent.

### **2.2 PERFORMANCE/DESIGN REQUIREMENTS – GENERAL**

- .1 Roofing system: The roofing system shall include roofing system materials required to achieve roofing membrane manufacturer's warranty.
- .2 Roofing materials, components, and assemblies shall resist environmental and wind (uplift) loads, and effects of those loads in accordance with the Ontario Building Code.
- .3 General performance: Installed roofing system and base flashings shall withstand wind uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing system and base flashings shall remain watertight.
- .4 Material compatibility: *Provide* roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- .5 Roofing system: Prevent water from entering building and roofing assembly through roofing membrane.
- .6 Roofing system design:
  - .1 Roofing system assemblies shall have been successfully tested by a qualified testing agency to resist project roofing uplift pressures in accordance with the Ontario Building Code.
  - .2 Roofing system shall meet roofing system manufacturer's 145 kph (90 mph) wind speed requirements or equivalent FM Class 60 Windstorm Classification for wind uplift pressures, and to cladding design wind loads indicated in wind study report, as applicable.

- .7 Roof covering classification: Roof assembly shall have a Class C classification as determined in conformance with CAN/ULC S107-10 "Standard Methods of Fire Tests of Roof Coverings".
- .8 Air barrier system shall accommodate substrate movement, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding the following specified limits and requirements:
  - .1 Air permeance of air barrier material: Maximum 0.02 L/s m<sup>2</sup> at 75 Pa (0.004 cfm/ft<sup>2</sup> at 1.57 psf) to ASTM E2178-13.
  - .2 Rate of air leakage of air barrier system: Maximum 0.15 L/s m<sup>2</sup> at 75 Pa (0.030 cfm/ft<sup>2</sup> at 1.57 psf) to ASTM E283-04 (2012).
  - .3 Water vapour transmission for air / vapour barriers: Maximum 5.7 ng/Pa.m<sup>2</sup>.s. (0.1 perms).
  - .4 Pull-off strength of liquid or sheet applied membrane and laps: Cohesive or substrate failure permitted when tested to specified wind load. Air barrier system shall transfer wind load to structure and shall resist 100% of design wind load or minimum of 2.15 kPa (45 psf), whichever is greater.
  - .5 Low temperature flexibility: to -30°C (-22°F) to CGSB 37-GP-56M-1985.
- .9 Air barrier system shall be joined in an airtight and flexible manner to air barrier material of adjacent building envelope air barrier systems, allowing for relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between the following unless otherwise applicable:
  - .1 Walls and openings.
  - .2 Across construction, control, and expansion joints.
  - .3 Penetrations.
- .10 Solar Reflectance: roof shall have a minimum SRI of 78.

## 2.3 PERFORMANCE/DESIGN REQUIREMENTS – FIRE PROTECTION

- .1 At the end of each *Working Day*, use a heat detector gun or equipment as recommended by membrane manufacturer to spot smouldering or concealed fire. Schedule the *Work* to ensure workers are still on location at least 2 hours after torch application.
- .2 Never apply the torch directly to any wood surfaces. Conform with fire safety recommendations of the manufacturer and the CRCA.
- .3 Throughout roofing installation, maintain the *Place of the Work* in a clean condition and have one approved ABC fire extinguisher within 6 m of each roofing torch. Torches must never be placed near combustible or flammable Products.

## 2.4 ROOFING MEMBRANE AND FLASHING SHEETS

- .1 Roof membrane base sheet and base sheet flashing: CGSB 37.56, SBS-modified asphalt membrane sheet.
  - .1 Reinforcement:
    - .1 180 gm/m<sup>2</sup> non-woven polyester.
  - .2 Thickness:

- .1 3 mm (0.160") minimum.
- .2 Roofing membrane cap sheet and cap sheet flashing: CGSB 37.56, SBS-modified asphalt membrane sheet with non-woven polyester reinforced elastomeric bitumen, protected by coloured granules.
  - .1 Reinforcement:
    - .1 180 gm/m<sup>2</sup> non-woven polyester.
  - .2 Thickness:
    - .1 4 mm (0.140") minimum.

## 2.5 AUXILIARY ROOFING MEMBRANE MATERIALS

- .1 General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing system.
- .2 Mastic sealant: Polyisobutylene, plain or modified bitumen, non-hardening, non-migrating, non-skinning, and non-drying.
- .3 Metal flashing sheet: Metal flashing sheet is specified in Section 07 62 00.
- .4 Miscellaneous accessories: *Provide* miscellaneous accessories recommended by roofing manufacturer.
- .5 Aggregate surfacing: gravel with no foreign material, ASTM D1863/D1863M- 05(2011) e1, water washed, dry, free of dirt and dust, hard, dry, clean, and graded in sizes from 9 mm to 12 mm.

## 2.6 ASPHALT MATERIALS

- .1 Asphalt primer: CGSB 37-GP-9Ma-1983.
- .2 Roofing asphalt: CAN/CSA A123.4-04, Type 2 or Type 3.

## 2.7 SUBSTRATE BOARDS

- .1 Substrate board: ASTM C1177/C1177M-08, glass-mat, water-resistant gypsum substrate, factory primed.
  - .1 Thickness:
    - .1 12.7 mm (1/2").
  - .2 Acceptable Products:
    - .1 Georgia Pacific 'Dens Deck Prime'.
    - .2 Or equivalent.

## 2.8 AIR AND VAPOUR BARRIERS

- .1 Glass fibre sheet: ASTM D2178/D2178M-15, Type IV, asphalt-impregnated, glass-fibre felt (to be used in conjunction with asphalt).
- .2 Aluminized bitumen sheet: Air / vapour barrier membrane shall be manufactured by coating an aluminum foil with oxidized bitumen. Water vapour resistance: 16 ng/Pa.s.m<sup>2</sup>. Both surfaces lightly sanded.

- .3 SBS modified bitumen membrane, reinforced with a fibreglass mat in conformance with Prefabricated membrane, complying with CGSB 37-GP-56M-1985.

## 2.9 ROOF INSULATION

- .1 General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- .2 Rigid polyisocyanurate insulation board, inorganic felt faced:
  - .1 Description: Closed-cell polyisocyanurate foam core integrally laminated to heavy, durable and dimensionally stable inorganic coated-glass facers, CAN/ULC S704-03 Type 2 and Class 3, HCFC free, 138 kPa (20 psi) minimum compressive strength (at 10% deformation), CAN/ULC-S126-06, LTTR value to CAN/ULC S770-00.
  - .2 Board size:
    - .1 1220 mm x 1220 mm (4 ft x 4 ft).
  - .3 Tapered insulation: *Provide* factory-tapered insulation boards fabricated to slope of 1:48 (1/4 inch per 12 inches) unless otherwise indicated.
  - .4 *Provide* preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated, and no less than 1:48 (1/4 inch per 12 inches) in addition to roof structure slope or to tapered insulation slope as applicable.

## 2.10 INSULATION ACCESSORIES

- .1 General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with roofing assembly.
- .2 Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate and acceptable to roofing manufacturer.
- .3 Insulation adhesive:
  - .1 Modified asphaltic insulation adhesive: Insulation manufacturer's recommended modified asphaltic, asbestos-free, cold-applied adhesive formulated to attach roof insulation to substrate or to another insulation layer.
- .4 Cant strips:
  - .1 Insulation cant strips; perlite: ASTM C728-13, perlite insulation board, cut to *Provide* 45 degree transition from horizontal to vertical surfaces.
- .5 Cover board:
  - .1 Cover board; cellulose fibreboard: Asphalt treated and coated fiberboard to CAN/ULC S706-02, 12.7 mm (1/2") thick.
    - .1 Thickness: 12.7 mm (1/2").
- .6 Substrate joint tape: 150 mm (6") wide, coated, glass fibre.

## 2.11 FASTENERS AND RESTRAINTS

- .1 General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing system.
- .2 Factory-coated steel fasteners and plates complying with corrosion-resistance provisions in FM 4470, designed for fastening roofing components to substrate, tested by manufacturer for required pullout strength and wind uplift resistance, and acceptable to roofing manufacturer.
- .3 Termination bars: Pre-punched aluminum bar 25 mm (1") wide x 1.5 mm (1/16") thick x 3048 mm (10 ft) long with 6.4 mm (1/4") x 9.5 mm (3/8") slotted holes on 200 mm (8") centres.

## 2.12 EXPANSION JOINTS

- .1 Description:
  - .1 Manufactured from a proprietary copolymer with internal polyester reinforcement, monolithic seam vulcanization.
  - .2 Movement and fabrication: Tri-directional movement capability, joint waterproofing system shall be factory fabricated in one piece for the entire contiguous expansion joint or where length of joint exceeds manufacturer's shipping and handling guidelines shall be lapped and vulcanized by manufacturer's mechanics on site, repair of damaged materials shall be performed by manufacturer's mechanics.
  - .3 Compatible with adhesives and membranes associated with expansion joint construction in accordance with manufacturer's installation instructions.
  - .4 Warranted by manufacturer to cover full warranty duration specified in this Section.
  - .5 Hydrostatic pressure limit: Working pressure in column of water shall perform under static limit not to exceed 10 m (33 ft).
- .2 Acceptable Products; to suit type of roofing assembly and movement design requirements:
  - .1 Situra Inc. 'RedLINE'.
  - .2 Situra Inc. 'FlamLINE'.
  - .3 Or equivalent.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 Examine substrates, areas, and conditions, with roofing installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
  - .1 Verify that roof openings and penetrations are in place and curbs are set and braced.
  - .2 Verify that blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
  - .3 Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 05 31 23.
  - .4 Proceed with installation only after unsatisfactory conditions have been corrected.



### **3.2 PREPARATION**

- .1 Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing manufacturer's written instructions. Remove sharp projections.

### **3.3 METHOD OF INSTALLATION**

- .1 Prepare surfaces and complete waterproofing work in conformance with roofing manufacturer's printed installation instructions.
- .2 Install roofing elements on clean and dry surfaces, in conformance with manufacturer's instructions and recommendations.
- .3 Roofing work must be completed in a continuous fashion as surfaces are readied and weather conditions permit.
- .4 Seal seams that are not covered by a cap sheet membrane in the same *Day*. Do not install cap sheet when moisture is present at/in the base sheet seams.
- .5 Whenever membranes are torch-applied, a continuous and even bead of molten bitumen must be visible as the membrane is unrolled and torched.
- .6 Lay roofing membrane free from wrinkles, air pockets, fishmouths, tears, and prominent lap joints. Full bond cap sheet to base sheet. Seams shall be lapped and fully bonded.
- .7 Prior to installation of base sheet and cap sheet, allow sheet to relax after unrolling. Relax time to be as recommended by manufacturer based on concurrent ambient temperature.
- .8 Extend roofing to outer edges of roof and up vertical surfaces at least 200 mm (8") above horizontal roofing, and full height beneath counter flashing and top of curb flashing.
- .9 Complete roofing up to line of termination for each *Day's* work.

### **3.4 SUBSTRATE BOARD (SHEATHING/UNDERLAY)**

- .1 Lay substrate board with tightly butted joints. Stagger end joints of adjacent board by 1/2 the board width.
- .2 Ensure substrate board is immediately protected with membrane.
- .3 Adhere substrate board to plywood deck.
- .4 Tape all seams in substrate board prior to the installation of the air / vapour barrier. Use 150 mm (6") wide strips of self adhering base sheet to prevent leakage into the building.

### **3.5 APPLICATION OF PRIMER**

- .1 Roofing substrates surfaces shall receive a coat of primer at a rate required by roofing manufacturer's printed installation instructions.
- .2 Surfaces to be primed must be free of rust, dust or any residue that may hinder adherence.
- .3 Cover primed surfaces with roofing membrane as soon as possible (same *Day* coverage for self-adhesive membranes).

### **3.6 AIR AND VAPOUR BARRIER**

- .1 Built-up two-ply asphalt and fibreglass felt: Install two glass-fibre felt plies lapping each felt 483 mm (19 inches) over preceding felt. Embed each felt in a solid mopping of hot roofing asphalt.

Glaze-coat completed surface with hot roofing asphalt. Apply hot roofing asphalt within plus or minus 14°C (25°F) of equiviscous temperature.

- .2 Completely seal air and vapour barrier at terminations, obstructions, and penetrations to prevent air movement into roofing.

### 3.7 ASPHALT APPLICATION

- .1 Asphalt Heating: Heat roofing asphalt and apply within plus or minus 14°C (25°F) of equiviscous temperature unless otherwise required by roofing system manufacturer. Do not raise roofing asphalt temperature above equiviscous temperature range more than one hour before time of application. Do not exceed roofing asphalt manufacturer's recommended temperature limits during roofing asphalt heating. Do not heat roofing asphalt within 14°C (25°F) of flash point. Discard roofing asphalt maintained at a temperature exceeding finished blowing temperature for more than 4 hours.
- .2 Apply asphalt at EVT and do not spread more than 1830 mm (6 ft) of hot asphalt in front of each roll and reduce distance accordingly during cold weather. Ensure hot asphalt in kettle is in constant use and circulation to avoid distillation.
- .3 Apply asphalt at minimum rate of 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>) and as specified herein for aggregate surfacing flood coat.

### 3.8 INSULATION APPLICATION – CONVENTIONAL ROOFING

- .1 Comply with up roofing manufacturer's written instructions for installing roof insulation.
- .2 Adhesively applied insulation: Install insulation adhesive in accordance with roofing manufacturer's installation instructions.
- .3 Stagger and offset vertical joints from preceding insulation boards, 305 mm (12").
- .4 Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- .5 Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- .6 Install only as much insulation as can be covered with membrane roofing in the same *Day*.
- .7 Install insulation boards with edges in moderate contact without forcing and fill gaps greater than 6 mm (1/4") with insulation.
- .8 Cut insulation to fit to blocking, upstands, and penetrations through roof; fill gaps greater than 6 mm (1/4") with insulation.
- .9 Reduce thickness of insulation at roof drains by 13 mm (1/2") for a distance of 610 mm (24") from centre drain.
- .10 Install tapered insulation under area of roofing to conform to slopes indicated.
  - .1 Apply insulation adhesive to underside and immediately bond tapered insulation to substrate.
  - .2 Apply hot roofing asphalt to underside and immediately bond tapered insulation to substrate.
- .11 Protect and keep insulation dry (in new condition). Do not install insulation which is not in dry condition.

### 3.9 COVER BOARD

- .1 Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 300 mm (12") in each direction. Loosely butt cover boards together. Tape joints if required by roofing manufacturer.
  - .1 Apply insulation adhesive to underside and immediately bond cover board to substrate.
  - .2 Apply hot roofing asphalt to underside and immediately bond cover board to substrate.

### 3.10 INSTALLATION OF REINFORCED GUSSETS

- .1 Install reinforcing gussets on inside and outside corners of base sheet flashing membrane.
  - .1 *Provide* self-adhesive base sheet flashing membrane gussets, adhered over base sheet membrane flashing into intersecting corner, with edges of gusset sealed with a bead of compatible mastic.

### 3.11 ROOFING DETAILS

- .1 Install as indicated on the Drawings and with various roofing details illustrated in roofing manufacturer's printed installation instructions.

### 3.12 INSTALLATION OF TORCH-APPLIED CAP SHEET MEMBRANE

- .1 Once base sheet, base sheet flashing, and stripping are applied and do not show defects, and installation has been reviewed by the roofing system manufacturer and the inspection and testing company, cap sheet can then be laid.
- .2 Cap sheet shall be unrolled starting from lowest point of roof. Cap sheet shall be rerolled from both ends prior to torching. Care must be taken to ensure alignment of first roll (parallel with edge of roof).
- .3 Cap sheet shall be torch welded on to base sheet membrane. During this application, both surfaces shall be simultaneously melted, forming an asphalt bead that shall be pushed out in front of cap sheet. Maintain a consistent 3 mm (1/8") wide asphalt bead at seams.
- .4 Avoid overheating.
- .5 Base sheet and cap sheet seams shall be staggered a minimum of 305 mm (12").
- .6 Overlap side laps by 75 mm (3") and end laps by 150 mm (6").
- .7 Make sure 2 membranes are properly welded without unwelded areas. Torch welding speed varies depending on weather. In cold conditions, it slows down, in warm and dry conditions, it speeds up.
- .8 After installation of cap sheet, check lap seams on cap sheet.

### 3.13 INSTALLATION OF TORCH-APPLIED CAP SHEET FLASHING MEMBRANE

- .1 Cap sheet flashing shall be laid in strips one metre wide. Side laps shall be 75 mm (3") and shall be staggered a minimum of 100 mm (4") from cap sheet laps and base sheet laps, in order to avoid excessive thickness.
- .2 Draw parallel chalkline at termination line of cap sheet flashing at horizontal roof deck surface. Sink surface granules into bed of hot bitumen with torch and round-nosed trowel in area between

chalk line and base of upstand or parapet, as well as over any granulated vertical surfaces to be overlapped.

- .3 Cap sheet flashing shall be torch welded directly on its base sheet, proceeding from bottom to top. Torching shall soften the two membranes and ensure a uniform weld, as described under "Cap Sheet Installation". When allowed by support, cap sheet top edge shall be nailed on 305 mm (12") centres.

### **3.14 WATERPROOF EXPANSION JOINT INSTALLATION**

- .1 Install all components of the system in accordance with the manufacturer's printed instructions.
- .2 The system is to be wholly encapsulated between the plies of the modified bitumen membrane in a roofing system.

### **3.15 METAL FLASHINGS**

- .1 Install metal flashings in accordance with Section 07 62 00.

### **3.16 FIELD QUALITY CONTROL**

- .1 Conduct quality control in accordance with Section 01 45 00 and as follows:
  - .1 Inspection and testing:
    - .1 Prior to installation of cap sheet membrane, base sheet membrane installation shall be reviewed by manufacturer and inspection and testing company, who shall each submit field review reports to the *Consultant*.
    - .2 Independent inspection and testing company shall perform:
      - .1 Inspections and *Provide* inspection reports.
      - .2 Tests and *Provide* test reports:
      - .3 Core cuts (if requested).
  - .2 Manufacturer's field review to be in accordance with Section 01 45 00.

### **3.17 ADJUSTING AND CLEANING**

- .1 Remove applicator's equipment and debris as work progresses, and at completion of the work of this Section in accordance with Sections 01 77 00.
- .2 Remove bituminous markings from finished surfaces.
- .3 Repair or replace defaced or disfigured finishes caused as a result of the work of this Section.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Quality Assurance
- .6 1.6 Delivery, Storage, and Handling
- .7 2.1 Prefinished Aluminum Flashing
- .8 2.2 Prefinished Metal Finishes
- .9 2.3 Accessories
- .10 2.4 Fabrication
- .11 3.1 Flexible Flashing Underlayment Installation
- .12 3.2 Roof Flashing Installation
- .13 3.3 Installation of Roof Accessories
- .14 3.4 Installation Tolerances
- .15 3.5 Field Quality Control
- .16 3.6 Adjusting and Cleaning
- .17 3.7 Protection

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Supply and installation of prefinished metal (aluminum) flashings.

### **1.4 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 Shop drawings:
  - .1 Submit shop drawings including the following:
    - .1 Plans, elevations, sections, and attachment details.
    - .2 Detail fabrication and installation layouts, expansion-joint locations, and key details. Distinguish between shop and field assembled work.
    - .3 Include identification of material, thickness, weight, and finish for each item and location in the work.
    - .4 Include details for forming, including profiles, shapes, seams, and dimensions.
    - .5 Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.

- .6 Include details of termination points and assemblies.
  - .7 Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contracting from fixed points.
  - .8 Include details of roof penetrations flashing.
  - .9 Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counter flashings as applicable.
  - .10 Include details of special conditions.
  - .11 Include details of connections to adjoining work.
- .3 Samples:
- .1 Submit full-size samples of each specified flashing material formed to detailed profile including corner, curb, cap, and parapet flashing, and coping including lock-joints and hold-down clips.
  - .2 Submit 2 - 50 mm x 50 mm (2" x 2") samples of each type of sheet metal material, colour and finish.

## 1.5 QUALITY ASSURANCE

- .1 Qualifications:
- .1 Installers / applicators / erectors: *Provide* work of this section, executed by competent installers with a minimum of 5 years' experience in application of Products, systems and assemblies specified and with approval of *Product* manufacturers.
  - .1 *Work* of this section shall be installed by a *Subcontractor* that is a member in good standing of the Canadian Roofing Contractors Association (CRCA).
  - .2 *Work* of this section shall be installed by a *Subcontractor* that is a member in good standing of the Canadian Roofing Contractors Association (CRCA) and Ontario Industrial Roofing Contractors Association (OIRCA), who has been a member for at least 5 years.
  - .3 Sealant shall be applied by a *Subcontractor* of recognized standing, having preferably not less than 5 years of proven experience in this type of work, and who has the necessary equipment and skilled mechanics to carry out the work of this section satisfactorily and can substantiate this to satisfaction of the *Consultant*.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Keep materials and equipment free from debris, ice, snow and contaminants. Allow air to circulate around metal components, sheets and break shapes.
- .2 Protect holes, and reglets from water and ice during freezing weather.

## PART 2- PRODUCTS

### 2.1 PREFINISHED ALUMINUM FLASHING

- .1 Aluminum flat sheet: Flat aluminum sheet to ASTM B209-14, to the following minimum thickness and alloy:
  - .1 Painting quality: 3003H14 or 3105H14 to ANSI H35.1/H35.1M-2013.
  - .2 Minimum thickness:

.1 0.81 mm (0.032").

## 2.2 PREFINISHED METAL FINISHES

.1 *Provide* the following finish to exposed prefinished metal (steel/aluminum as applicable):

.1 Type 1; Finish: factory prefinished CSSBI 10000 Series.

.1 10000 Series (Polyvinylidene Fluoride - PVDF) will not visibly (within 10 metres to the unaided naked eye) crack, chip, or peel (lose adhesion) for thirty-five (35) years from date of application. This does not include minute fracturing that may occur during the normal fabrication process. 10000 Series (Polyvinylidene Fluoride - PVDF) will not chalk in excess of a number eight (8) rating, in accordance with ASTM D4214-07(2015) method D659 at any time for thirty-five (35) years from date of installation (35.5 yrs from application); will not change colour more than five (5.0) Hunter ΔE units as determined by ASTM D2244-15.

.2 Colour to later selection by the *Consultant* from the manufacturer's full range.

## 2.3 ACCESSORIES

.1 Isolation coating: to CAN/CGSB-1.108, bituminous type.

.2 Sealants: in accordance with Section 07 92 00, colour as selected by the *Consultant* from the manufacturer's full range.

.3 Cleats: of matching metal to flashing material, continuous, and of greater thickness than flashing material. Joints in cleats shall not coincide with joints in perimeter edge metal. Allow a 12.7 mm (1/2") gap between pieces.

.4 Fasteners:

.1 Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.

.2 General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head:

.1 Exposed screws: 38 mm (1-1/2") long minimum at 450 mm (18") on centre maximum. Heads matching colour of sheet metal using plastic caps or factory-applied coating. *Provide* metal-backed EPDM washer under heads of exposed fasteners.

.2 Blind fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.

.3 Cleat fasteners: Corrosion-resistant barbed angular ring or screw shank nail; length to achieve approximately 32 mm (1-1/4") penetration into nailer; fasten at 150 mm (6") on centre.

.3 Fasteners for prefinished aluminum sheet: Aluminum or Series 300 stainless steel.

.4 Fasteners and plates to meet the requirements of Factory Mutual 4470 Standard for wind uplift and corrosion resistance.

.5 Flexible flashing membrane; standard temperature grade for use at locations where membrane is protected by material with insulating properties:

.1 Description:

- .1 Thickness: 1 mm (40 mils) minimum.
- .2 Self-adhesive grade rubberized membrane backed by high density polyethylene.
- .3 Primer for substrate.
- .2 Acceptable Products:
  - .1 Bakor 'Blueskin Roof RF200'.
  - .2 Grace 'Ice & Water Shield'.
  - .3 Soprema 'LASTOBOND SHIELD'.
  - .4 Or equivalent.

## 2.4 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable SMACNA "Architectural Sheet Metal Manual (Seventh Edition) details and as indicated.
- .2 Form pieces in 3048 mm (10 ft) maximum lengths. Make allowance for expansion at joints.
- .3 Sealed joints: Form non-expansion but movable joints in metal to accommodate sealant.
- .4 Expansion provisions: Form expansion joints of intermeshing hooked flanges, not less than 25.4 mm (1") deep, filled with sealant concealed within joints.
  - .1 Joints that *Provide* expansion and contraction capabilities should be located near the corners within approximately 610 mm (24") from each direction of the corner measured from the interior side.
- .5 Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" and by FMG Loss Prevention Data Sheet 1-49 for application, and of greater thickness of metal being secured.
- .6 Hem exposed edges on underside 12.7 mm (1/2"). Mitre and seal corners with sealant.
- .7 At parapets, *Provide* 25.4 mm (1") minimum overlap between bottom of wood blocking or flashing anchorage support and edge of drip or termination of flashing.
- .8 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .9 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.
- .10 *Provide* 25.4 mm (1") minimum overlap between bottom of wood blocking or flashing anchorage support and edge of drip or termination of flashing.

## PART 3 - EXECUTION

### 3.1 FLEXIBLE FLASHING UNDERLAYMENT INSTALLATION

- .1 Apply primer to concrete masonry and precast concrete substrates.
- .2 Install in a consecutive weatherboard method starting at bottom or base of wall and working up.
- .3 *Provide* minimum of 50 mm (2") side laps and 75 mm (3") end laps.
- .4 Cut to manageable lengths, position membrane for alignment, remove protective poly- film and firmly apply pressure to assure adhesion.



- .5 Eliminate wrinkles or gaps, roll entire membrane surface (including seams) with a counter top or "J-roller" to ensure full contact and adhesion.
- .6 Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, duct work, electrical and other apparatus extending through the air barrier membrane and around the perimeter edge of membrane terminations.
- .7 Flashing membrane shall be applied in weatherboard fashion starting at bottom of base of wall and working up, in and around the full perimeter of openings, to *Provide* water tight protection and according to the following procedures:
  - .1 Apply the first strip horizontally immediately below the sill, cut it sufficiently long to extend past each side of the window, so that it projects even with the vertical jamb flashing to be applied later. Turn sill flashing up 50 mm (2") at ends of sill.
  - .2 Sill flashing shall overlap wall membrane. Overlap jamb at head flashing membrane in the same manner.

### 3.2 ROOF FLASHING INSTALLATION

- .1 Install sheet metal work in accordance with SMACNA's "Architectural Sheet Metal Manual (Seventh Edition)".
- .2 *Provide* watertight flashing installing capable of resisting specified uplift pressures in accordance with roofing specifications, thermally induced movement and exposure to weather.
- .3 *Provide* minimum 10% slope for drainage towards roof at parapet locations, with minimum 2% sloped to drain at remaining flashing locations.
- .4 *Provide* continuous cleats for attachment of flashings at exterior face of wall and cleats for interior face of wall.
- .5 *Provide* radius (3-piece) copings for curved wall condition unless otherwise indicated.
- .6 Prefabricate corner copings in 610 mm (24") x 610 mm (24") sections.
- .7 Concealed fastenings and cleats, from view except where exposed flashings are accepted by the *Consultant* prior to installation.
- .8 Flash joints using S-lock forming tight fit over hook strips/cleats; unless otherwise indicated.
- .9 Install surface mounted flared joint true and level, and caulk top of reglet with sealant at reglets.
- .10 Insert metal flashings to other materials and flashings to form weather-tight junction.
- .11 *Provide* prefinished metal flashing over equipment curbs which are covered with roofing membrane.
- .12 Turn top edge of flashing into recessed reglet or mortar joint where indicated, to minimum depth of 25 mm (1"). Wedge flashing securely into joint. Seal flashing at reglet and cap flashing with sealant.
- .13 Expansion provisions: *Provide* for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 3048 mm (10 ft) and *Provide* uniform joint spacing with no joints allowed within 610 mm (24") of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 25.4 mm (1") deep, filled with sealant concealed within joints.

- .14 *Provide* vapour permeable synthetic building paper separation between galvanized steel and treated wood where applicable.
- .15 Install flexible flashing membrane in accordance with the manufacturer's printed installation instructions.

### **3.3 INSTALLATION OF ROOF ACCESSORIES**

- .1 Incorporate devices to which roofing and flashing may be secured.
- .2 Install work to ensure that roofing and flashings will be properly applied to maintain building envelope weather-tight.

### **3.4 INSTALLATION TOLERANCES**

- .1 Installation tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 6 mm in 6 m (1/4 inch in 20 feet) on slope and location lines as indicated and within 3.2 mm (1/8") offset of adjoining faces and of alignment of matching profiles.

### **3.5 FIELD QUALITY CONTROL**

- .1 Conduct quality control in accordance with Section 01 45 00.
  - .1 The work of this Section will be inspected and tested in conjunction with inspection and testing of roofing work.

### **3.6 ADJUSTING AND CLEANING**

- .1 Remove deposits, stains or protections and wash metals left unpainted and exposed to view as recommended by manufacturer of metal or paint finish.

### **3.7 PROTECTION**

- .1 The *Consultant* will advise the *Contractor* of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Quality Assurance
- .6 1.6 Delivery, Storage, and Handling
- .7 2.1 Materials
- .8 2.2 Cementitious Fireproofing (Wet-Mix)
- .9 3.1 Preparation
- .10 3.2 Application
- .11 3.3 Field Quality Control
- .12 3.4 Protection

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Sprayed fire-resistive materials.

### **1.4 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 ULC or cUL design number, brand names and descriptive catalogue data of Products to be used in the work of this section.
  - .2 Include complete test report in cases where references are not published by testing laboratories, and where authority having jurisdiction has approved significant changes from tested assembly on basis of an engineering study; study calculations shall accompany report.

### **1.5 QUALITY ASSURANCE**

- .1 Qualifications: *Provide* work of this section, executed by competent installers with minimum 5 years' experience in application of Products, systems and assemblies specified and with approval and training of *Product* manufacturers.
- .2 Materials and applied systems shall have full acceptance by the Authority Having Jurisdiction.

### **1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 Store fireproofing materials in weathertight enclosure raised clear of the ground so they are protected from moisture.

- .2 Store materials in original undamaged sealed container with manufacturer's labels and seals intact to show the approval of Underwriters' Laboratories of Canada.
- .3 Discard any material which has come into contact with moisture prior to actual use.

## **PART 2 – PRODUCTS**

### **2.1 MATERIALS**

- .1 Materials shall be listed in accordance with CAN/ULC S101-07 achieve required fire protection rating.
- .2 Products shall be asbestos free.
- .3 Water, bonding agents, binders, accessories, cleaning solvents, aggregates and sealers shall be in accordance with base material manufacturer's recommendation.
- .4 Metal lath or non-metallic fibre mesh: as recommended by applied fireproofing manufacturer for application to painted surfaces.

### **2.2 CEMENTITIOUS FIREPROOFING (WET-MIX)**

- .1 Description: Wet-mix spray-applied fire resistive materials (SFRM) consisting factory mixed dry formulation of gypsum or Portland cement binders and lightweight mineral or synthetic aggregates mixed with water to form slurry for conveyance and application.
- .2 Acrylic fireproofing adhesive and sealer: Vinyl acrylic copolymer emulsion of fine particle size, films retain high degree of flexibility and elongation.
- .3 Acceptable Products; standard density:
  - .1 AD Fire Protection Systems 'Southwest Fireproofing Type 5GP'.
  - .2 Grace Construction Products 'Monokote MK-6'.
  - .3 Isolatek International 'Cafco 300'.
  - .4 Or equivalent.
- .4 Acceptable Products; medium density:
  - .1 A/D Fire Protection Systems Inc. 'Southwest Fireproofing Type 5MD'.
  - .2 Grace Construction Products 'Z-106 G'.
  - .3 Isolatek International 'Cafco 400'.
  - .4 Or equivalent.

## **PART 3- EXECUTION**

### **3.1 PREPARATION**

- .1 Review locations of exposed/non-exposed fireproofed surfaces with the *Consultant* prior to application.
- .2 Prepare substrate in accordance with the printed instructions of the manufacturer of the sprayed fireproofing material to achieve required fire protection.
- .3 Mechanically fasten metal lath or non-metallic fibre mesh to painted surfaces to receive applied fireproofing in accordance with manufacturer's recommendations.

- .4 Apply medium coat of sealer to fireproofing in surfaces of indicated SFRM to prevent dust particles from becoming airborne.

### **3.2 APPLICATION**

- .1 Apply sprayed-applied fireproofing in accordance with the printed instructions of the manufacturer of the sprayed fireproofing material, and as specified herein and in accordance with ULC or cUL design number.
- .2 Apply by the contour method in one or more coats of sufficient thickness to achieve the fire ratings as required.
- .3 Repair sprayed-applied fireproofing damaged by others after completion of the work of this Section. Costs for damage shall be borne by the responsible party. Coordinate work with other Sections.
- .4 Install the sprayed-applied fireproofing so that any movement of building structure acting alone or together does not tear, rupture, delaminate, puncture or perforate spray-applied fireproofing.

### **3.3 FIELD QUALITY CONTROL**

- .1 Conduct quality control in accordance with Section 01 45 00.
- .2 Manufacturer's field review to be in accordance with Section 01 45 00.

### **3.4 PROTECTION**

- .1 Protect during installation any adjacent finished surfaces from contamination and damage due to the work under this section.
- .2 Protect completed work, vulnerable corners, edges and surfaces liable to be damaged due to construction activities. *Provide* wood cover strips and sheet material as required to prevent damage.
- .3 Method and materials to effect protection are subject to review by the *Consultant*.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Administrative Requirements
- .5 1.5 Submittals
- .6 1.6 Quality Assurance
- .7 1.7 Delivery Storage, and Handling
- .8 1.8 Field Conditions
- .9 2.1 Manufacturers
- .10 2.2 Performance/Design Requirements
- .11 2.3 Materials
- .12 3.1 Manufacturer's Instructions
- .13 3.2 Preparation
- .14 3.3 Installation
- .15 3.4 Identification
- .16 3.5 Field Quality Control

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Materials installed in cavities, joints, around penetrations, and openings in floors, walls, partitions, and other building components to restrict the spread of fire and smoke.
- .2 Section excludes:
  - .1 Firestopping and smoke seals, for mechanical, electrical and communications penetrations of fire resistant assemblies, and firestopping and smoke seals within their respective assemblies.

### **1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.
- .2 Coordination:
  - .1 Coordinate with other Sections to assure that pipes, conduit, cable, and other items that penetrate fire rated construction, have been permanently installed prior to installation of firestop assemblies.
  - .2 Schedule the *Work* to assure that penetrations and other construction that conceals penetrations are not erected prior to the installation of firestop and smoke seals.

## 1.5 SUBMITTALS

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data: Submit data and installation instructions for Products and prefabricated devices, providing descriptions sufficient for identification at the *Place of the Work*.
  - .1 Materials list of Products proposed for use in the work of this Section;
  - .2 Listing agency's detailed drawing showing opening, penetrating items, and firestopping materials, identified with listing agency's name and number or designation, fire rating achieved, and date of listing.
  - .3 Manufacturer's specifications, detail sheets, and other data needed to prove compliance with the specified requirements;
  - .4 Certificates: Submit manufacturer's certification that installed firestopping and smoke seal Products are suitable for the use indicated and comply with specified requirements.
  - .5 Submit fire resistance rating test listings for firestopping and smoke seal systems.
  - .6 Manufacturer's engineering judgment identification number and shop drawing details when no ULC, c-UL or other Canadian listed assembly is available for an application. Engineered judgment must include both project name and *Subcontractor's* name who will install firestop system as described in shop drawing.
- .3 Shop drawings:
  - .1 Submit drawings indicating fire resistance rated assembly number, required temperature, hose stream, and flame rating, material thicknesses, installation methods and materials of firestopping and smoke seals, primers, supports, damming materials as applicable, reinforcements, anchorages, fastenings and methods of installation for each condition to be encountered.
  - .2 Designate on shop drawings static through penetrations and dynamic joint systems, relative positions, expansion and control joints in rated slabs and walls, firestopping details at receptacles and similar poke-through devices and surrounding permanent materials. Identify re-entry locations.
- .4 Manufacturers' instructions:
  - .1 Manufacturer of the Products proposed for use in the work of this Section shall prepare a firestopping manual scheduling the products to be used for each assembly and installation required in the *Work*.
  - .2 Manual shall include manufacturer's *Product* data sheets as specified under paragraph 1.3.2.
  - .3 Firestopping manual shall be submitted within 4 weeks of the *Contract* award.

## 1.6 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 *Provide* work of this Section, executed by competent installers with minimum 5 years' experience in application of Products, systems and assemblies specified and with approval, training and certification of *Product* manufacturers.
    - .1 Submit proof of manufacturer's installer certification for each installer of firestopping and smoke sealant systems.

- .2 Manufacturer's willingness to sell its firestopping Products to the *Contractor* or to a *Subcontractor* or installer engaged by the *Contractor* does not in itself confer qualification on the buyer.
- .2 Applicator shall designate a single individual as project foreperson who shall be present at the *Place of the Work* at all times when the work of this Section is being performed.
- .2 Regulatory requirements:
  - .1 Firestop systems shall be listed in accordance with CAN/ULC-S115-05 and tested assemblies shall achieve a fire resistance rating in accordance with the Ontario Building Code.
  - .2 Proposed firestopping and smoke seal materials and methods shall conform to applicable governing codes having local jurisdiction.

## 1.7 DELIVERY STORAGE, AND HANDLING

- .1 Deliver the materials to the *Place of the Work* in the manufacturer's unopened containers, containing the classification label, with labels intact and legible at time of use.
- .2 Store materials in accordance with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.
- .3 Do not use damaged or adulterated materials and materials exceeding their expiry date.

## 1.8 FIELD CONDITIONS

- .1 Comply with manufacturer's instructions relative to temperature and humidity conditions, before, during and after installation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- .1 General: Manufacturers of firestopping and smoke seal system Products and installation specialists for the work of this section are limited to applicable assemblies as required for the *Work* and having listing mark on packaging.
- .2 Acceptable manufacturers for work of this section:
  - .1 3M Canada Inc.
  - .2 A/D Fire Protection Systems Inc.
  - .3 Dow Corning.
  - .4 Hilti Canada Corp.
  - .5 Nuco – Self-Seal Firestopping Products.
  - .6 Tremco Canada Ltd.
  - .7 Or equivalent.

### 2.2 PERFORMANCE/DESIGN REQUIREMENTS

- .1 *Provide* firestop and smoke seal systems consisting of a material, or combination of materials installed to retain the integrity of fire-rated construction by effectively impeding the spread of flame, smoke, and/or hot gasses through penetrations, blank openings or gaps, membrane



penetrations, construction joints, or at perimeter fire containment in or adjacent to fire-rated barriers.

- .2 *Provide* also smoke sealants applied over firestopping materials or combination smoke seal/firestop seal material to form air tight barriers to retard the passage of gas and smoke.
- .3 *Provide* fire-resistance rating equivalent to the rating of the adjacent floor, wall or other fire separation assembly.
- .4 *Provide* firestopping and smoke sealant system assemblies as practical and as required to coordinate with the schedule and sequencing of the *Work*.
- .5 Confirm locations of exposed/non-exposed firestopping/smoke seal surfaces with the *Consultant* prior to application.
- .6 *Provide* movement capability at movement joints in accordance with design requirements for movement joint.

## 2.3 MATERIALS

- .1 Single source responsibility for firestopping and smoke seal materials:
  - .1 Obtain firestopping and smoke seal materials from single manufacturer for each different *Product* required.
  - .2 Manufacturer shall instruct applicator in procedures for each material.
- .2 Firestopping and smoke seal systems shall conform to the following:
  - .1 VOC content not to exceed 250 grams per litre minus water.
  - .2 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gasses in compliance with requirements of CAN/ULC- S115-05 and not to exceed opening sizes for which they are intended.
  - .3 *Provide* firestopping materials and systems with fire-resistance rating not less than the fire-resistance rating of applicable adjacent assembly.
  - .4 Listed in accordance with CAN/ULC-S115-05.
  - .5 For services that penetrate a fire separation or a membrane forming part of an assembly required to have a fire-resistance rating, *Provide* firestop system with "F" rating as required by the Ontario Building Code.
  - .6 For combustible pipe penetrations through a fire separation required to have a fire-resistance rating, *Provide* firestop system with "F" rating as required by the Ontario Building Code.
  - .7 For services that penetrate a fire wall or a horizontal fire separation that is required to have a fire-resistance rating, *Provide* firestop system with "FT" rating as required by the Ontario Building Code.
  - .8 For joints in fire-separations, *Provide* firestop system as required by the Ontario Building Code.
  - .9 Products shall be compatible with abutting dissimilar membranes, architectural coatings, finishes at floors, walls and ceilings. Check with requirements of the *Contract Documents* and manufacturer of selected materials being installed.

- .3 Smoke sealants for overhead and vertical joints shall be non-sagging; sealants for floors shall be self-levelling.
- .4 Smoke sealants at vertical through penetrations in areas with floor drains shall be waterproof type.
- .5 Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems).
- .6 Metal deck/wall penetration conditions with sprayed fireproofing: spray-on fire-rated firestop mastic.

## **PART 3 - EXECUTION**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: Comply with manufacturer's written *Product* data including *Product* technical bulletins, *Product* installation instructions and *Product* packaging instructions.

### **3.2 PREPARATION**

- .1 Examine sizes, anticipated movement and conditions to establish correct thickness and installation of back-up materials.
- .2 Clean bonding surfaces to remove deleterious substances including dust, paint, rust, oil, grease, moisture, frost and other foreign matter which may otherwise impair effective bonding.
- .3 Prime and mask adjacent surfaces. Mask areas adjacent to sprayed firestopping to limit firestopping overspray to area not greater than 25 mm (1") of minimum required.
- .4 Remove insulation from insulated pipe and duct where such pipes or ducts penetrate a fire separation unless listed assembly permits such insulation to remain within assembly, or where mechanical trades have installed special fire rated insulated sleeves.
- .5 Secure pipe, conduit, cable, and other items that penetrate firestopping and smoke seal systems.

### **3.3 INSTALLATION**

- .1 Mix and apply firestopping, gas and smoke seals in accordance with manufacturer's written instructions and tested designs to achieve required flame rated seal, to prevent the passage of gas and smoke and, where specifically designated, the passage of fluids.
- .2 *Provide* temporary forming and packing as required and other accessories in accordance with manufacturers' written instructions. Apply materials with sufficient pressure to properly fill and consolidate the mass to seal openings.
- .3 *Provide* fill materials for through-penetration firestop systems by techniques to achieve the following results:
  - .1 Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
  - .2 Install materials so that they contact and adhere to substrates formed by openings and penetrating items.
- .4 *Provide* joint fillers to *Provide* support of firestop materials during application and at the position required to produce the cross-sectional shapes and depths of installed firestop material relative to joint widths that allow optimum sealant movement capability and develop fire-resistance required.

- .5 For materials that will remain exposed after completing the *Work*, finish to *Provide* smooth, uniform surfaces. Tool or trowel exposed surfaces.
- .6 Seal joints to ensure an air and water resistant seal, capable of withstanding compressions and extensions due to thermal, wind or seismic joint movement.
- .7 Notify the *Consultant* when random completed installations are ready for review, as directed by the *Consultant*, prior to concealing or enclosing firestopping and as applicable, smoke seals.
- .8 Remove temporary forming and dams only after materials have gained sufficient strength.

### 3.4 IDENTIFICATION

- .1 Identify through-penetration firestopping and smoke seal systems with pressure- sensitive, self-adhesive, printed vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestopping system installation where labels will be visible to anyone seeking to remove penetrating items or firestopping and smoke seal systems. Include the following information on labels:
  - .1 The words: "Warning: Through-Penetration Firestopping system – Do Not Disturb";
  - .2 Applicator's name, address and phone number;
  - .3 Designation of applicable testing and inspection agency;
  - .4 Date of installation;
  - .5 Manufacturer's name for firestopping and smoke seal system materials.

### 3.5 FIELD QUALITY CONTROL

- .1 Quality control to be in accordance with Section 01 45 00.
- .2 Field tests and inspections:
  - .1 Inspection consultant to review installation of the work of this section and to perform random tests to verify its completion in accordance with the requirements of the *Contract Documents*.
  - .2 Give at least 48 hours' notice before operations commence, and arrange for a pre-job conference with the *Contractor*, *Subcontractor*, inspection and testing company, manufacturer, and the *Consultant* present.
  - .3 Inspection and testing company shall examine penetration firestopping in accordance with ASTM E2174-09 and ASTM E2393-10a as applicable. Inspection and testing company shall examine firestopping and shall determine, in general, that firestopping has been installed in accordance with the requirements of the *Contract Documents* and the tested and listed firestop system.
  - .4 Representatives of the manufacturer(s) shall have access to the *Work*. *Contractor* shall *Provide* assistance and facilities for such access in order that the manufacturer(s) representative(s) may properly perform its function.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Quality Assurance
- .6 1.6 Field Conditions
- .7 1.7 Extended Warranty
- .8 2.1 Sealants
- .9 2.2 Accessories
- .10 3.1 Manufacturer's Recommendations
- .11 3.2 Preparation
- .12 3.3 Masking
- .13 3.4 Installation
- .14 3.5 Adjusting and Cleaning

### **1.3 SUMMARY**

- .1 Section includes:
- .2 Exterior building sealants.
- .3 Interior building sealants.

### **1.4 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 Submit manufacturer's and *Product* name for each sealant which will be used in the *Work* prior to commencing the *Work*.
- .3 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this Section.
- .4 Test sealant in contact with samples of materials to be sealed to verify adhesion will be achieved and no staining of the material will result. Prepare sample joints at the *Place of the Work* of each type of sealant for each joint condition.
  - .1 Submit test results to the *Consultant* prior to application of sealants.
- .5 Test sealant in contact with samples of porous materials to be sealed to ensure that no staining of the material will result in accordance with ASTM C1248-08 (2012).
  - .1 Submit test results to the *Consultant* prior to application of sealants.

- .6 Submit 2440 mm (96") long sealant joint mock-up.
- .7 Submit "wet sample" sealant colour samples for each sealant *Product* and colour.

## 1.5 QUALITY ASSURANCE

- .1 Qualifications: *Provide* work of this Section, executed by competent installers with minimum 5 years' experience in application of Products, systems and assemblies specified and with approval and training of *Product* manufacturers. Installer to comply with quality assurance articles referenced in ASTM C1193-13 for installation of joint sealants.
- .2 Conduct quality control in accordance with Section 01 45 00.

## 1.6 FIELD CONDITIONS

- .1 Verify substrates and ambient air temperature at the *Place of the Work* before, during and after application to ensure compliance with manufacturer's recommendations. Surfaces shall be frost-free, dust-free, clean and completely dry at time of installation.
- .2 Weather Conditions: In accordance with manufacturer's instructions, do not apply silicone joint sealants in snow, rain, fog or mist, or when such conditions are expected. Allow joint surfaces to attain dry conditions as recommended by manufacturer before sealant application.
- .3 Sealant and substrate materials: Conform to sealant manufacturer's specifications and recommendations. Keep organic sealant materials heated to at least 16°C when working at temperatures below 10°C.

## 1.7 EXTENDED WARRANTY

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01 78 36.
- .2 Repair or replace joint sealants which fail to perform as air tight and water-tight joints; or fail in joint adhesion, cohesion, abrasion resistance, weather resistance, or general durability; or appear to deteriorate or become unserviceable or causing an objectionable appearance resulting from either defective or non-conforming materials and workmanship or in any other manner not clearly specified by submitted manufacturer's data as an inherent quality of the material for the exposure indicated.
- .3 Defects shall include, but are not limited to:
  - .1 Staining from abutting materials or filler.
  - .2 Migrating, bleeding into, or staining abutting materials.
  - .3 Unsightly surface deformation by causes other than movement.
  - .4 Excessive colour change, chalking, or dust pick-up.
  - .5 Failing adhesively or cohesively where maximum elongation is less than 25% of designed width of exposed joints.
  - .6 Hardening to more than 25% over specified hardness.

## PART 2 - PRODUCTS

### 2.1 SEALANTS

- .1 General:

- .1 Colours: Sealant colours shall match colours of adjacent materials, as selected and approved by the *Consultant*:
  - .1 Colours shall be selected from manufacture's full range of colours, generally to match adjacent finished colours
- .2 Comply with ASTM C920-11 and other requirements indicated for each liquid- applied chemically curing sealant, including those referencing ASTM C920-11 classifications for type, grade, class, and uses.
- .3 *Provide* joint sealants, primer(s) and backings that are compatible with one another and with joint substrates under conditions of service and application as demonstrated by joint sealant manufacturer based on proven test results and field experience.
- .4 For sealants to be applied to porous substrates: *Provide* products that have undergone testing according to ASTM D1248-12 and have not stained porous joint substrates indicated for *Work*.
- .5 Sealant supplied shall not exude any material(s) which travels into adjacent materials, or travels onto surfaces of adjacent materials; causing damage, or attracting soiling, which becomes apparent during the service life of the building.
- .2 Interior sealants shall have VOC limit of less than 250 g/L.
- .3 Sealant designations:
  - .1 Type 1 – Urethanes Two Part.
    - .1 Non-sag, multi-component, epoxidized polyurethane sealant to CAN/CGSB 19.24-M90, Type 2, Class B.
    - .2 Location: use at all locations except where noted otherwise.
    - .3 Acceptable *Product*: Dymeric, as manufactured by Tremco Ltd. or equivalent.
  - .2 Type 2 – Silicones One Part.
    - .1 One-part, acetoxysilicone sealant, mildew resistant, to CAN/CGSB 19.22- M89.
    - .2 Location: for washroom fixtures and vanity tops.
    - .3 Acceptable *Product*: Tremsil 200, as manufactured by Tremco Ltd. or equivalent.
  - .3 Type 3 – Acrylics One Part.
    - .1 Acrylic terpolymer sealant, solvent release, to CGSB 19-GP-5M-1984.
    - .2 Location: at interior joints between windows, door frames, and screen frames.
    - .3 Acceptable *Product*: Mono 555, as manufactured by Tremco Ltd. or equivalent.
  - .4 Type 4 – Acoustical Sealant.
    - .1 Siliconized acrylic latex sealant, to CGSB 19.21-M87.
    - .2 Location: at all perimeter joints and openings in gypsum board systems.
    - .3 Acceptable *Product*: Tremflex 834, as manufactured by Tremco Ltd. or equivalent.
  - .5 Type 5 – Urethanes Two Part.

- .1 Non-sag, multi-component, chemically cured, polyurethane sealant to CAN/CGSB 19.24-M90, Type 2, Class B.
- .2 Location: at control joints in masonry assemblies.
- .3 Acceptable *Product*: Dymeric511, as manufactured by Tremco Ltd. or equivalent.
- .6 Type 6 – Urethanes Two Part.
  - .1 Non-sag, multi-component, chemically cured, polyurethane sealant to CAN/CGSB 19.24.
  - .2 Location: at all locations calling for EPDM membrane.
  - .3 Acceptable *Product*: Lexcan pourable sealer or equivalent.
- .7 Type 7 – Urethanes One Part.
  - .1 Non-sag, single component, polyurethane sealant to CAN/CGSB 19.13-M87.
  - .2 Location: at metal flashing and trim.
  - .3 Acceptable *Product*: RC-1 Sealant as manufactured by Lexsuco or equivalent.
- .8 Type 8 – Polyurethane One Part
  - .1 Non-sag, single component, moisture curing, modified polyurethane sealant to CGSB 19.12, class MC-2-25-B-N.
  - .2 Location: as toe bead filling void beneath glazing strip in Window Wall in accordance with Section 08500 Aluminum Windows.
  - .3 Acceptable *Product*: DyMonic, as manufactured by Tremco Ltd. or equivalent.
- .9 Type 9 – Structural Silicone.
  - .1 Non-sag, single component, elastomeric, chemical curing, neutral core, medium modulus silicone sealant to CAN/CGSB 19.13-M87, MCG-2-25-A-L.
  - .2 Location: as structural silicone sealant in Window Wall in accordance with Section 08500 Aluminum Windows.
  - .3 Acceptable *Product*: Spectrum 2, as manufactured by Tremco Ltd. or equivalent.
- .10 Type 10 – Acrylics One Part.
  - .1 Single component, elastomeric, water based, acrylic firestop sealant to CAN/ULC-S115-11.
  - .2 Location: fire rated joints and penetrations in fire rated systems.
  - .3 Acceptable *Product*: TREMstop Acrylic, as manufactured by Tremco Ltd. or equivalent.
- .11 Interior sealant, mildew resistant one part silicone sealant in accordance with the following:
  - .1 Comply with:
    - .1 ASTM C920-11, Type S, Grade NT, Class 25
    - .2 CAN/CGSB 19.22-M89.
  - .2 Acceptable Products:

- .1 GE Silicones "Sanitary SCS1700 Sealant";
- .2 BASF Building Systems "OmniPlus";
- .3 Dow Corning "786";
- .4 Tremco, Inc. "Tremsil 200";
- .5 Or equivalent.

## 2.2 ACCESSORIES

- .1 General: *Provide* component joint sealant primers, backings and fillers that are compatible with joint substrates and other sealants or joint fillers specified and approved for applications indicated under joint sealant schedule.
- .2 Cylindrical sealant backings: *Provide* joint backings that meet ASTM C1330-02, Type O (open-cell polyurethane), or Type B (non-absorbent bi-cellular backing materials with surface skin), sized 25 percent or greater than joint opening with proper density to control sealant depth and profile. Follow joint sealant manufacturer's recommendations with backing selections for optimum joint sealant performance, in accordance with the following schedule:
  - .1 Use open cell foam with non-absorbing closed cell skin (Sof-Rod) for vertical joints; round shape for open joints and triangular shape for angular joints.
  - .2 Use closed cell foam for horizontal joints.
- .3 Bond-breaker tape: Polyethylene tape or other approved plastic tape as recommended by joint sealant manufacturer to prevent 3-sided joint adhesion to rigid, inflexible joint fillers or joint surfaces at back of joint where such adhesion would restrict proper sealant movement or result in sealant failure.
- .4 Masking Tape: Non-staining, non-absorbent and compatible with joint sealants and adjacent surfaces.
- .5 Sealant primers: Use primers only as recommended by sealant manufacturer where required to enhance adhesion of sealant to specific joint substrates indicated and as determined for use from pre-construction mock-up testing. Select primers in consultation with sealant manufacturer and manufacturer of substrate material which do not have a detrimental effect on sealant adhesion or in-service performance.
- .6 Cleaners for nonporous surfaces: *Provide* non-staining, chemical cleaners of type which are acceptable to manufacturer of sealant and sealant backing material, which are not harmful to substrates and adjacent nonporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in-service performance.
  - .1 *Provide* cleaner conditioner required for glass and glazed surfaces as recommended by sealant manufacturer.

## PART 3 - EXECUTION

### 3.1 MANUFACTURER'S RECOMMENDATIONS

- .1 Unless specified otherwise herein, comply with the recommendations and directions of the manufacturer whose materials are being used in the work of this Section.



### 3.2 PREPARATION

- .1 Prior to installation, clean substrates of substances that could impair the bond of joint sealants. Clean and prepare joint surfaces immediately before installing joint sealants. Protect adjacent work areas and finished surfaces from damage during joint sealant installation.
- .2 Clean porous joint surfaces by using heavy-duty brushing, light abrasive, mechanical abrading or combination of these methods to produce a clean, sound surface for optimum bond with joint sealants per manufacturer's recommendations. *Provide* a dry, dust-free and cleaned substrate for optimum results.
- .3 Non-porous surfaces should be cleaned using the two-cloth solvent wipe method as referenced in ASTM C1193-13 and outlined by joint sealant manufacturer's instruction. IPA (isopropyl alcohol) is not a degreasing solvent yet may be used in new construction for non-porous joint cleaning and preparation. Use xylene, toluene or MEK for degreasing solvent and general cleaning of non-porous surfaces.
- .4 Rusting or scaling surfaces must be prepared using abrasive cleaning methods as recommended by joint sealant manufacturer prior to joint sealant installation. Efflorescence, mould, mildew and algae must be removed and neutralized prior to joint sealant installation.
- .5 Coordinate cleaning, priming and installation to avoid contamination of wet, freshly coated or adjacent finished surfaces. Prepare finish-coated surfaces per joint sealant manufacturer's specific recommendations.
- .6 Test materials for indications of staining or poor adhesion before any sealing is commenced. Submit reports in writing to the *Consultant* of results.

### 3.3 MASKING

- .1 Where necessary to prevent contamination or marring surfaces of adjacent materials, mask areas adjacent to joints with masking tape prior to priming or sealing application. Remove tape immediately after joint has been completed and an initial set achieved.

### 3.4 INSTALLATION

- .1 Review the complete *Contract Documents* for extent of sealant work required.
- .2 Comply with joint sealant manufacturer's installation instructions for products, primers and applications indicated unless more stringent project-specific instructions or requirements apply.
- .3 Apply joint sealants for continuous waterproof sealant joint protection. Vertical joints should be lapped over horizontal joints as recommended by sealant manufacturer. Comply with installation recommendations in ASTM C1193-13 for use of joint sealants as applicable to each specific sealant installation.
- .4 Install sealant primers only when recommended by sealant manufacturer and demonstrated at pre-construction tests after joint surface preparation has been completed and when surfaces are verified as clean and dry. Allow any primer installation to completely dry or cure prior to installation of backing or joint sealants.
- .5 Install joint sealants in accordance with joint sealant manufacturer's instructions using proven techniques that comply with the following and in proper sequence with installation of primers and backings.

- .1 Using proper joint sealant dispensing equipment, place sealants by pushing sealant beads into opening to fully wet-out joint sealant substrates. Fill sealant joint opening to full and proper configuration.
- .2 Install, providing uniform cross-sectional shapes and depths in relation to joint width for optimum sealant movement capability per joint sealant manufacturer's instructions.
- .6 Joint sealant tooling is required for non-sag joint sealant installations. Immediately after placing fresh sealants and before skinning or curing begins, tool sealants using metal spatulas designed for this purpose in accordance with manufacturer's recommendations. *Provide* a smooth, uniform sealant finish, eliminating air pockets and ensuring good contact for optimum sealant adhesion within each side of the joint opening.
  - .1 *Provide* concave joint configuration as indicated per figure 5-A in ASTM C1193- 13 unless otherwise indicated. Dry tooling is required for joint sealants, and wet tooling agents are not allowed.
  - .2 Remove excess sealant from surfaces adjacent to joint openings using metal spatula, promptly cleaning any sealant residue from adjacent finished surfaces. Remove masking after joint sealant is installed.
- .7 Allow single-component sealants to fully cure before adhesion testing is performed as recommended by joint sealant manufacturer.
- .8 Match approved sealant mock-up for colour, finish and overall aesthetics. Remove, refinish or re-install work not in compliance with the *Contract Documents*.
- .9 When surfaces of adjacent materials are to be painted, perform sealant work before these surfaces are painted.
- .10 Check to make sure shop paint is compatible with primer and sealant. When incompatible, inform the *Consultant* and change primer and sealant to compatible type acceptable to the *Consultant*.
- .11 Check form release agent used on concrete for compatibility with primer and sealant. If they are incompatible inform the *Consultant* and change primer and sealant to compatible type, or clean concrete to sealant manufacturer's acceptance.
- .12 Install joint backing material, filler strips, gaskets, bond breakers and similar type material of comparable performance characteristics. Install bond breaker tape or packing over asphalt impregnated fibre board as recommended by sealant manufacturer.
- .13 Where joints are 12.7 mm (1/2") or deeper, insert backing material in continuous uniform compression with setback from finished face of adjoining materials equal to required depth of sealant (width/depth ratio) as specified herein.
- .14 On horizontal traffic surfaces, support joint filler against vertical movement which might result from traffic loads, including foot traffic.
- .15 Pack joints tightly with sealant backing set at depth specified for sealant. Fill other voids with filler.
- .16 Install bond breaker tape in bottom of joints in lieu of sealant backing where proper depth cannot be obtained when backing is installed.
- .17 Maintain correct sealant depth. Sealant depth shall be 1/2 the width of the joint, maximum depth shall be 12.7 mm (1/2"), minimum depth shall be 6 mm (1/4"). Comply with manufacturer's written recommendations.

- .18 Fillet bead sealant joints to be sized to *Provide* proper contact area with substrates, in accordance with manufacturer's written recommendations.
- .19 Apply sealants using pressure-operated guns fitted with suitable nozzles in accordance with manufacturer's directions. Apply sealants in such manner as to ensure good adhesion to sides of joints and to completely fill voids in joints.
- .20 Apply sealants so that surfaces of joints are smooth, full bead, free from ridges, wrinkles, sags, air pockets and embedded impurities. Tool sealant surfaces to produce a smooth surface.
- .21 Remove droppings and excess sealant as work progresses, before material achieves initial set. Do not use soap and water in tooling.
- .22 Install sealant materials and primers when surfaces are prepared, and ambient temperature and weather conditions are prevalent, consistent with manufacturer's recommendations. Primer is mandatory for gun applied sealants.
- .23 Install sealant with exterior face of sealant set back 10 mm (3/8") from face of adjacent materials at building movement joints, unless otherwise indicated.
- .24 Do not apply sealants to areas where installation of paints, coatings or flooring is in progress. Apply sealants after such work is complete and fully cured.

### **3.5 ADJUSTING AND CLEANING**

- .1 Clean off excess sealant or sealant residue adjacent to sealant joint installations as the work progresses by methods approved by joint sealant manufacturer. Do not damage adjacent surfaces with harmful removal techniques and protect finished surfaces beyond those that have been masked. Protect installed sealants during and after final curing from damage resulting during construction. Remove and replace damaged joint sealants.
- .2 Remove temporary coverings and masking protection from adjacent work areas upon completion. Remove construction debris from the *Site* on a planned and regular basis.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Administrative Requirements
- .5 1.5 Submittals
- .6 1.6 Quality Assurance
- .7 1.7 Delivery, Storage, and Handling
- .8 2.1 Performance/Design Requirements
- .9 2.2 Materials
- .10 2.3 Fabrication - General
- .11 2.4 Fabrication – Steel Doors and Panels
- .12 2.5 Fabrication – Steel Frames
- .13 2.6 Hardware Reinforcements and Preparations
- .14 2.7 Frame Anchorage
- .15 2.8 Sizes and Tolerances
- .16 2.9 Hardware Locations
- .17 3.1 Examination
- .18 3.2 Installation – Steel Doors and Frames
- .19 3.3 Installation - Finishing Hardware
- .20 3.4 Adjusting and Cleaning

### **1.3 SUMMARY**

- .1 Section includes:
- .2 Hollow metal doors and panels (steel doors).
- .3 Insulated metal doors (insulated steel doors).
- .4 Metal frames (steel frames, transom frames).
- .5 Thermally broken metal door frames (thermally broken steel frames).

### **1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination:
  - .1 Cooperate fully with finish hardware distributor's representative during preparation of shop drawings and execution of shop fabrication.

### **1.5 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.

- .2 Submit copy of NAAMM-HMMA 840-07 standard.
- .3 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section.
- .4 Shop drawings:
  - .1 Include details of each door and frame type, finish hardware types and locations, frame profiles, door and frame elevations, mitre details, fire protection rating, glazing preparation details and anchor details and locations.
  - .2 Include schedule identifying each unit, with door marks and numbers relating to numbering on the Drawings and in the door schedule.
  - .3 Electrified hardware requirements and preparations shall be clearly indicated on shop drawings.

## 1.6 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Manufacturers:
    - .1 *Provide* doors and frames manufactured by a firm specializing in the design and production of hollow metal steel doors and frames.
    - .2 Manufacturer shall be a member in good standing of the Canadian Steel Door Manufacturers Association (CSDMA).

## 1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Inspect materials thoroughly upon receipt and report immediately discrepancies, deficiencies and damages, in writing, to supplier.
- .2 Note damages incurred during shipment on carriers' bill of lading and report immediately, in writing, to supplier.
- .3 Store materials properly on planks, out of water and covered to protect from damage from adverse weather conditions. Remove wet packaging immediately.
- .4 Remove wrappings or coverings from doors upon receipt at the *Place of the Work*, and store in a vertical position, spaced with blocking to permit air circulation between them.

## PART 2- PRODUCTS

### 2.1 PERFORMANCE/DESIGN REQUIREMENTS

- .1 Exterior insulated metal doors shall be tested to meet an operable U-value of 0.400.

### 2.2 MATERIALS

- .1 Steel:
  - .1 Fabricated from tensioned levelled steel to ASTM A924/A924M-14, galvanized to ASTM A653/A653M-11, Commercial Steel CS, Type B.
  - .2 Steel shall be free of scale, pitting, coil breaks, surface blemishes, buckles, waves, and other defects.

- .3 Equivalent minimum base steel thicknesses for gauges shall be in accordance with Appendix 1 of CSDMA "Recommended *Specifications* for Commercial Steel Door and Frame Products".
- .4 Finish: Galvanneal coating designation ZF120 (A40).
- .2 Door core materials:
  - .1 Honeycomb: Structural small cell 25 mm (1") maximum kraft paper 'honeycomb'. Weight: 36.3 kg (80 lb) per ream (minimum). Density: 16.5 kg/m<sup>3</sup> (1.03 pcf) minimum, sanded to required thickness.
  - .2 Polystyrene: EPS polystyrene, Type 1, density: 16 to 32 kg/m<sup>3</sup> (1 to 2 pcf), thermal values: RSI 1.06 (R 6.0) minimum, conforming to ASTM C578-14a.
  - .3 Polyisocyanurate: Closed cell, faced board, thermal value: RSI 2.17 (R12.3) minimum, conforming to ASTM C1289-14a.
- .3 Adhesives:
  - .1 Heat resistant, single component, polyurethane reactive (water) hot melt, thermoset adhesive.
  - .2 Rigid insulation cores: Heat resistant, epoxy resin based, low viscosity, contact cement.
  - .3 Lock seam doors: fire resistant, resin reinforced polychloroprene, high viscosity sealant-adhesive.
- .4 Primer: rust inhibitive for touch-up.
- .5 Finishing hardware: in accordance with Section 08 71 00.
- .6 Miscellaneous:
  - .1 Door silencers: single stud rubber or neoprene type.
  - .2 Exterior top caps: Rigid polyvinylchloride extrusion.
  - .3 Frame thermal breaks: Rigid polyvinylchloride extrusion.

## 2.3 FABRICATION - GENERAL

- .1 Fabricate steel doors and frames as applicable, to the design and dimensions indicated. Take field measurements where coordination with adjoining work is necessary.
- .2 Fabricate steel doors and frames to be rigid, neat in appearance and free from defects, warp, wave or buckle with all corners square unless otherwise indicated.
- .3 Operating clearances:
  - .1 *Provide* clearance at floor with allowance made for indicated finish flooring materials.
  - .2 Clearances for Non-Fire-Rated Doors: Not more than 3 mm (1/8") at jambs and heads, except not more than 6 mm (1/4") between pairs of doors. Not more than 19 mm (3/4") at bottom.
- .4 Drill and tap or reinforce for mortised or surface mounted hardware in accordance with accepted hardware schedule, ANSI A115, NFPA 80, or manufacturers recommendations.
- .5 Countersink exposed fasteners unless otherwise shown. Use flat or oval head screws.

- .6 Reinforce components to resist stresses imposed by hardware in use.
- .7 Allow for anticipated expansion and contraction of frames and supports.
- .8 Fit elements at intersections and joints accurately together, in true planes, and plumb and level.
- .9 Weld continuously at joints exposed to view or at joints through which air or water could penetrate from the exterior of building to the interior.
- .10 Perform welding to CSA W59-15.
- .11 Mortise, reinforce, drill and tap to receive hardware and security devices using templates provided by respective *Supplier*.
- .12 Touch up finish damaged during fabrication.
- .13 Prepare doors or frames to receive seals where seals are indicated.

## **2.4 FABRICATION – STEEL DOORS AND PANELS**

- .1 Fabricate steel doors and panels to a thickness of 45 mm (1-3/4"), unless indicated otherwise.
- .2 Exterior and insulated doors and panels:
  - .1 Face sheets fabricated from 1.60 mm (0.063") 16 gauge steel.
  - .2 Insulation core:
    - .1 Polystyrene.
    - .2 Polyisocyanurate.
  - .3 Longitudinal edges mechanically interlocked.
    - .1 Adhesive assisted with edge seams visible.
- .3 Interior doors and panels:
  - .1 Face sheets fabricated from 1.087 mm (18 gauge) steel.
  - .2 Honeycomb core.
  - .3 Longitudinal edges mechanically interlocked.
    - .1 Adhesive assisted with edge seams visible.
- .4 Fabricate of composite metal face construction with each face formed from flush sheet steel without visible seams, free of scale, pitting, coil brakes, buckles and waves.
- .5 Formed edges shall be true and straight with minimum radius for the thickness of steel used.
- .6 Lock and hinge edges shall be bevelled 3 mm in 50 mm (1/8" in 2") unless hardware or door swing dictates otherwise.
- .7 Top and bottom of doors shall be provided with inverted, recessed, 1.60 mm (0.063") 16 gauge steel end channels, welded to each face sheet at 50 mm (2") on centre maximum.
- .8 Prior to shipment, mark each door with an identification number as shown on the approved submittal drawings.
- .9 Exterior doors shall be provided with factory installed flush PVC top caps.

- .10 Blank, reinforce, drill and tap doors for mortised, templated hardware. Locate hardware to manufacturer's standard unless indicated otherwise.
- .11 Holes 12.7 mm (1/2") and larger shall be factory prepared.
- .12 Fabricate closing stiles of paired doors as indicated or scheduled.

## 2.5 FABRICATION – STEEL FRAMES

- .1 General: Applicable to frames, transom panel frames, sidelights, and window assemblies.
- .2 Interior and non-thermally broken frames; welded:
  - .1 Fabricated from:
    - .1 1.60 mm (0.063") 16 gauge steel.
    - .2 1.98 mm (0.078") 14 gauge steel for frames noted as heavy duty.
  - .2 Supplied set-up and welded (SUW).
- .3 Factory assembled frame product shall be square, free of defects, warps or buckles.
- .4 Set-up and welded corner joints (SUW):
  - .1 Profile welded–punch mitred, continuously welded on inside of the profile faces, rabbets, returns and soffit intersections, with exposed faces filled and ground to a smooth, uniform seamless surface, as defined in the CSDMA - "Recommended *Specifications* for Commercial Steel Door and Frame Products".
- .5 Set-up and welded joints at mullions, sills and center rails:
  - .1 Coped accurately, butted and tightly fitted.
  - .2 At intersecting flush profile faces, securely weld, fill and grind to flush, smooth, uniform, seamless surface.
  - .3 At intersecting recessed profile faces, securely weld to concealed reinforcements, with exposed hairline face seams.
  - .4 At other intersecting profile elements make exposed face seams to hairline tolerance.
- .6 Where required due to *Site* access, when required for co-ordination or installation, or shipping limitations, frame product shall be fabricated in sections for splicing in the field.
  - .1 Field spliced jambs, heads and sills shall be provided with 1.60 mm (0.063") 16 gauge steel splice plates securely welded into one section, extending 100 mm (4") minimum each side of splice joint.
  - .2 Field splices at closed sections (mullions or center rails) shall be 1.60 mm (0.063") 16 gauge steel splice angles securely welded to the abutting member. Face of splice angle shall extend 100 mm (4") minimum into closed sections when assembled.
  - .3 Field splice joints shall be welded, filled and ground to present a smooth uniform surface by the installation company responsible for installation after assembly.
- .7 On factory assembled frame product, *Provide* 2 temporary steel shipping bars welded to the base of the jambs or mullions to maintain alignment during shipping and handling. Remove shipping bars prior to anchoring of frames to floor.



- .8 Each door opening shall be prepared for single stud door silencers. Silencers shall be shipped loose for installation by installer, after finish painting.
  - .1 Single interior doors: 3 at strike jamb.
  - .2 Pair of interior doors: 2 at header.
  - .3 Dutch doors: 4 at strike jamb.
  - .4 Weather-stripped doors: None required.
  - .5 Sound, light, or smoke sealed doors: None required.
  - .6 Transom panels: 2 at each jamb.
- .9 Prior to shipment, mark each frame with an identification number as shown on the approved submittal drawings.
- .10 *Provide* mullions and transom bars of closed construction type. For fixed condition, attach members to frame with butt-welded joints. For removable condition, attach members with removable mullion anchors.
- .11 Conceal fastenings unless otherwise indicated.
- .12 Fasten removable stops by counter-sunk Phillips head screws at approximately 225 mm (9") on centre symmetrically spaced on stop length.
- .13 Anchor frames to floor by 1.60 mm (0.063") 16 gauge thick angle clips, welded to frame and *Provide* with 2 holes for floor anchorage.
- .14 Grind welded corners to a flat plane, fill with metallic paste filler and sand to uniform smooth finish.
- .15 Protect strike and hinge reinforcements using guard boxes welded to frames at masonry construction.
- .16 Reinforce head of frames wider than 1220 mm (48").
- .17 Brace frame units to prevent distortion in shipment and protect finish.
- .18 Where removable mullions provided under this section are indicated, head or transom mullion shall be reinforced. *Provide* loose mounting bracket/shoe mechanical fasteners and installation instructions.

## 2.6 HARDWARE REINFORCEMENTS AND PREPARATIONS

- .1 Door and frame product shall be blanked, reinforced, drilled and tapped at the factory for fully templated mortise hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier.
- .2 Door and frame products shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
- .3 Where surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware are required frame product shall be reinforced only, with drilling and tapping done by field installation.
- .4 Templated holes 12.7 mm (1/2") diameter and larger shall be factory prepared, except mounting and through bolt holes, which shall be by installation on *Site*. Templated holes less than 12.7 mm

(1/2") diameter shall be factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.

- .5 Hinge reinforcements shall be 3.51 mm (0.138") 10 gauge steel minimum, high frequency type shall be provided.
- .6 Frames shall be prepared for 114 mm (4.5") standard weight hinges minimum unless otherwise indicated.
- .7 Doors and frames in excess of 2450 mm (96") rabbet height shall be prepared for 114 mm (4.5") heavy weight 4.6 mm (0.180") hinges minimum.
- .8 Lock, strike and flush bolt reinforcements shall be 1.60 mm (0.063") 16 gauge steel minimum, with extruded tapped holes that *Provide* equivalent number of threads as 2.74 mm (0.108") 12 gauge.
- .9 Reinforcements for surface mounted hardware, concealed closers and holders and flush bolts shall be 1.30 mm (0.051") 18 gauge steel minimum.
- .10 Reinforcements are not required for surface applied hardware supplied with thru-bolts and spacers or sex-bolts.
- .11 *Provide* hardware mortises on perimeter frame members to be grouted in masonry or concrete partitions with 0.84 mm (0.033") 22 gauge steel grout guards.
- .12 Electrified hardware:
  - .1 Where electrically or electronically operated hardware is specified on the schedules or details or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on the templates, shall be provided and inter-connected with CSA approved 12.7 mm (1/2") diameter conduit and connectors.
  - .2 Refer to electrical documents for general electrical rough-in details. At door locations indicated in electrical documents as requiring rough-in only of electrical (ie. where no electrically or electronically operated hardware is specified in the hardware schedule), *Provide* enclosures, boxes, and conduit to permit future installation of devices without removal of grout, demounting of frames, or installation of exposed conduits.
- .3 Frames:
  - .1 Frames with electrified devices shall include electrical connection boxes sized to accommodate devices specified in Section 08 71 00. At time of frame manufacture, electrical connection boxes shall be supplied by Divisions 26, 27 and 28 for installation into frame by work of this section.
  - .2 Frame electrical connection boxes shall be positioned flush to edge of frame face return. Clearance shall be maintained to allow wall material to be consistently applied for length of frame member. Frame connection boxes shall be welded in place and positioned to allow necessary clearance for electrical *Subcontractor* to install conduit and connection components, with conduit layout in a manner that takes conduit up to ceiling in an uninterrupted configuration and to accommodate wire installation.
- .4 Doors:
  - .1 Doors with electrified devices shall be manufactured to include wire raceway in door panel to accommodate electrified devices, such as electric hinge, power transfer units, electrified locks, electrified door closures and electrified exit devices. Construction of

raceways shall *Provide* a continuous conduit or channel between entry and exit points to accommodate wire installation after door manufacture.

- .2 Doors with electrified locks may require extended space to accommodate plug-type connection components or wire collection space. Coordinate with work of Section 08 71 00 and obtain hardware templates for electrified hardware clearly indicated on reviewed shop drawings and prior to door manufacture.

## 2.7 FRAME ANCHORAGE

- .1 Frame products shall be provided with anchorage appropriate to floor, wall and frame construction.
- .2 Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb.
- .3 Frame products installed in steel stud partitions shall be provided with 1.00 mm (0.039") 20 gauge steel snap-in or "Z" stud type anchors.
- .4 Jambs of frames in previously placed concrete, masonry or structural steel shall be punched and dimpled to accept machine bolt anchors, 6.4 mm (1/4") diameter, located not more than 150 mm (6") from the top and bottom of each jamb. Anchor preparations and guides shall also be located immediately above or below the intermediate hinge reinforcing and directly opposite on the strike jamb. Each preparation shall be provided with 1.60 mm (0.063") 16 gauge anchor bolt guides.
- .5 Anchor bolts and expansion shell anchors for the above preparations shall be provided by the installation company.
- .6 Where frame product is installed prior to construction of the adjacent wall, each jamb shall be provided with 1.60 mm (0.063") 16 gauge steel floor anchors. Each anchor shall be provided with 2 holes for mounting to the floor and shall be securely welded to the inside of the jamb profile.
- .7 On sidelights or windows exceeding 3 m (9'-10") in width, installed in stud partitions, channel extensions shall be provided from the top of the frame assembly to the underside of the structure above. Extensions shall be fabricated from 2.74 mm (0.108") 12 gauge steel formed channels, mounting angles and adjusting brackets, with mounting angles welded to the inside of frame head. Formed channels, adjusting brackets and fasteners shall be shipped loose. Channels shall be mechanically connected to mounting angles and adjusting brackets with supplied fasteners, on *Site*, by the *Subcontractor* responsible for installation.

## 2.8 SIZES AND TOLERANCES

- .1 Widths of door openings shall be measured from inside of frame jamb rabbet with a tolerance of  $\pm 1.6$  mm ( $\pm 0.063$ ").
- .2 Heights of door openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame with a tolerance of  $\pm 1.2$  mm ( $\pm 0.047$ ").
- .3 Unless finishing hardware dictates otherwise, doors shall be sized so as to fit the above openings and allow a 3 mm (1/8") clearance at jambs and head. A clearance of 19 mm (3/4") between the bottom of the door and the finished floor (exclusive of floor coverings) shall be provided. Tolerances on door sizes shall be  $\pm 1.2$  mm ( $\pm 0.047$ ").
- .4 Manufacturing tolerances on formed frame profiles shall be  $\pm 0.8$  mm ( $\pm 0.031$ ") for faces, door stop heights and jamb depths. Tolerances for throat openings and door rabbets shall be  $\pm 1.6$  mm ( $\pm 0.063$ ") and  $\pm 0.4$  mm ( $\pm 0.016$ ") respectively. Hardware cut-out dimensions shall be as per template dimensions,  $\pm 0.4$  mm ( $\pm 0.015$ ").

## 2.9 HARDWARE LOCATIONS

- .1 Hardware preparations in frame product shall be as noted below and locations on doors shall be adjusted for clearances specified in paragraph 2.8 of this section.
- .2 Top of upper hinge preparation for 114.3 mm (4.5") hinges shall be located 180 mm (7.5") down from head, transom mullion or panel as appropriate. The top of the bottom hinge preparation for 114.3 mm (4.5") hinges shall be located 310 mm (12.625") from finished floor as defined in paragraph 2.8 of this section. Intermediate hinge preparations shall be spaced equally between top and bottom cutouts.
- .3 Strike preparations for unit, integral, cylindrical and mortise locks and roller latches shall be centered 1033 mm (40-5/16") from finished floor. Strikes for deadlocks shall be centered at 1220 mm (48") from finished floor. Strikes for panic or fire exit hardware shall be located as per device manufacturer's templates.
- .4 Push and/or pulls on doors shall be centered 1070 mm (42") from finished floor.
- .5 Preparations not noted above shall be as per hardware manufacturer's templates.
- .6 Hardware preparation tolerances shall comply with the ANSI A115 standards.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 *Provide* necessary grounds, bracing and strapping for fitting and adequate for securing of the work.
- .2 Cooperate with work of other sections to ensure fastenings set by others are provided and located, their work is installed to their specifications and that those responsible for back priming are notified in sufficient time for them to schedule work.

### 3.2 INSTALLATION – STEEL DOORS AND FRAMES

- .1 Set frame product plumb, square, aligned, without twist at correct elevation in accordance with NAAMM-HMMA 840-07.
- .2 Frame product installation tolerances:
  - .1 Plumbness tolerance, measured through a line from the intersecting corner of vertical members and the head to the floor, shall be  $\pm 1.6$  mm ( $\pm 1/16$ ").
  - .2 Squareness tolerance, measured through a line 90 from one jamb at the upper corner of the product, to the opposite jamb, shall be  $\pm 1.6$  mm ( $\pm 1/16$ ").
  - .3 Alignment tolerance, measured on jambs, through a horizontal line parallel to the plane of the wall, shall be  $\pm 1.6$  mm ( $\pm 1/16$ ").
  - .4 Twist tolerance, measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall, shall be  $\pm 1.6$  mm ( $\pm 1/16$ ").
- .3 Brace frame product rigidly in position while building-in. Remove temporary steel shipping jamb spreaders. Install temporary wood spreaders at mid-point of frame rabbet height to maintain frame widths. Remove wood spreaders after product has been built-in.
- .4 *Provide* vertical support at center of head for openings exceeding 1250 mm (48") in width.
- .5 Secure anchorages and connections to adjacent construction.

- .6 Execute installation and assembly using skilled forces under supervision of a competent joinery foreperson.
- .7 Install doors in accordance with NAAMM-HMMA 840-07, maintaining clearances outlined in paragraph 2.8 of this section.
- .8 Install finishing hardware in accordance with ANSI A115.1G-1994, manufacturers' templates and instructions, and Section 08 71 00.
- .9 Adjust operable parts for correct clearances and function.
- .10 Steel surfaces shall be kept free of grout, tar or other bonding materials or sealers.
- .11 Remove grout or other bonding material from products immediately following installation.
- .12 *Provide* appropriate anchorage for floor and wall construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite the strike jamb. On each jamb, install 2 anchors for openings up to and including 1525 mm (60") high and install 1 anchor for each additional height of 760 mm (30") of height or fraction thereof, except as indicated below. Frames placed in previously placed concrete, masonry or structural steel shall be Provided with anchors located not more than 150 mm (6") from top and bottom of each jamb, and intermediate anchors at 660 mm (26") on centre maximum.
- .13 Secure frames set in previously constructed concrete or masonry openings by countersunk expansion bolts at same centres as for adjustable Tee wall anchors. Reinforce frame at fastening location to prevent indentation of frame by fastening device.
- .14 Fill and grind smooth "punch and dimpled" frame installations.
- .15 Prior to *Site* touch-up, exposed surfaces of galvanneal steel to be finished shall be cleaned to remove foreign matter. Refer to paint manufacturers recommendations for additional information and requirements of Section 09 91 00.
- .16 Touch-up exposed field welds shall be finished to present a smooth uniform surface and with a rust inhibitive primer.
- .17 Touch-up exposed surfaces that have been scratched or otherwise marred during shipment, installation, and handling shall be with a rust inhibitive primer.
- .18 Finish paint in accordance with Section 09 91 00.
- .19 Install door silencers.
- .20 Adequately fasten units and secure in place with concealed fixings wherever possible. Include grounds and furring where required.
- .21 Coordinate installation of doors and frames with installation of hardware specified in Section 08 71 00.
- .22 Make allowance for deflection to ensure structural loads are not transmitted to frames.
- .23 Adjust operable parts for correct clearances and function.

### 3.3 INSTALLATION - FINISHING HARDWARE

- .1 Install finishing hardware in accordance with Section 08 71 00.

### **3.4 ADJUSTING AND CLEANING**

- .1 Adjust doors to swing freely, smoothly and easily, to remain stationary at any point, to close evenly and tightly against stops without binding, and to latch positively when doors are closed with moderate force.
- .2 Adjust hardware so that latches and locks operate smoothly and without binding, and closers act positively with the least possible resistance in use. Lubricate hardware if required by *Supplier's* instructions.
- .3 Ensure that doors equipped with closers operate to close doors firmly against anticipated wind and building air pressure, and to enable doors to be readily opened as suitable for function, location and traffic.
- .4 Clean hardware after installation in accordance with *Supplier's* instructions.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Administrative Requirements
- .5 1.5 Submittals
- .6 1.6 Quality Assurance
- .7 1.7 Delivery, Storage, And Handling
- .8 1.8 Site Conditions
- .9 1.9 Warranty
- .10 2.1 Performance/Design Requirements
- .11 2.2 Products
- .12 2.3 Accessories
- .13 2.4 Fabrication - General
- .14 2.5 Fabrication - Doors
- .15 2.6 Factory Finish
- .16 3.1 Examination
- .17 3.2 Installation
- .18 3.3 Installation - Doors
- .19 3.4 Adjustment And Cleaning

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Solid core doors with wood veneer.

### **1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination:
  - .1 Cooperate fully with finish hardware distributor's representative during preparation of shop drawings and execution of shop fabrication.
- .2 Definitions:
  - .1 Exposed surfaces:
    - .1 Surfaces visible when doors are opened, backs of hinged doors and edges of hinged doors exposed when opened.
  - .2 Pre-machined:

- .1 Factory prepared cut-outs for hardware and glazing. Site trimming of work will not be permitted, except trimming of door height.
- .3 Forest Stewardship Council (FSC):
  - .1 FSC is an international not-for-profit membership based organization geared to find solutions to the problems created by bad forestry practices and to reward good forest management.
- .4 Certificates of Chain-of-Custody:
  - .1 Certificates signed by manufacturer's certifying that wood used to make products was obtained from forests certified by an
- .5 FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria."  
Certificates shall include evidence that Vendor or Supplier is certified for chain-of-custody by an FSC-accredited certification body.

## 1.5 SUBMITTALS

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 Product data sheets:
  - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
  - .1 Indicate door location using numbering system per door schedule, size, and hand of each door, elevation of each door type; undercuts, bevelling, construction type core and edge construction not covered in product data; and special blocking requirements.
  - .2 Indicate dimensions and locations of factory machining criteria for hardware, extent of hardware blocking.
  - .3 Indicate dimensions and locations of cut-outs including trim for openings.
  - .4 Indicate door face finish requirements including veneer matching.
  - .5 Indicate doors to be factory finished and finish requirements.
  - .6 Dimensions and locations of cutouts, mortises and holes for hardware.
  - .7 Fire ratings for fire doors.
  - .8 Jointing, fastening and related items.
  - .9 Electrified hardware requirements and preparations shall be clearly indicated on shop drawings.
- .4 Verification samples:
  - .1 Submit 3 sets of samples minimum 300 mm (12") x 300 mm (12") of veneers showing full range of grain variation, finish and patterns proposed for wood specified.
    - .1 Submit samples as many times as required until approved by *Consultant*. First submission to include one set of samples per *Consultant* request plus one set lighter in tone and one set darker in tone.



- .2 Submit cut-away sample of each type of door, to show stile and rail construction, core, cross banding, door face finish and edges.
- .3 Submit solid lumber frames for light openings, minimum 150 mm (6") long, for each material, type and finish required.

## **1.6 QUALITY ASSURANCE**

- .1 Qualification in accordance with Section 01 45 00.
  - .1 Manufacturer: Five (5) years prior to award of contract.
    - .1 Manufacturer shall be a member in good standing of the Architectural Woodwork Institute or the Architectural Woodwork Manufacturers Association of Canada or the Woodwork Institute.
- .2 Source Limitations, Doors:
  - .1 Obtain doors through one source from a single manufacturer.
- .3 Certificates:
  - .1 Product certificates signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements.
  - .2 Declaring doors meet WDMA and North American Architectural Woodwork Standards 4.0 (NAAWS).
- .4 Composite wood material, including plywood, particleboard, fibreboard and laminate adhesives to have no added urea-formaldehyde (NAUF).

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- .1 Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
- .2 Door numbers shall be marked with door numbers used on shop drawings in the top hinge cavity created by the machining for hinges.
- .3 Mark each door on top and bottom rail with opening number used on Shop Drawings.
- .4 Ensure complete protection of edges and finishes during shipment to the job site.
- .5 Store doors flat at the place of work in piles with bottom face on bottom of pile. Protect from moisture by placing water resistant material under skids supporting piles. Cover top of piles and provide air at sides of piles.
- .6 Deliver the wood doors only after the building is closed and dry and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period. Do not receive the doors in a damp area. Do not drag the doors on the ground, floor or across one another.

## **1.8 SITE CONDITIONS**

- .1 Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

## **1.9 WARRANTY**

- .1 Warrant work of this Section against defects and deficiencies for period of five (5) years.
  - .1 Commencing at the date of Substantial Performance. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of the Owner and at no additional cost.
  - .2 The warranty includes re-installation of hardware, re-hanging and fitting, and finishing.
  - .3 Defects shall include, but not be limited to, delaminating, telegraphing of core construction in face veneers exceeding 0.254 mm (0.01") in a 75 mm (3") span, and warp exceeding 3 mm (1/8") in a 1066 mm (42") x 2133 mm (84") section.

## **PART 2- PRODUCTS**

### **2.1 PERFORMANCE/DESIGN REQUIREMENTS**

- .1 Design, fabricate, and install work of this section in accordance with the Building Code and requirements of all other governing authorities.
- .2 Performance duty level: Door shall meet the requirements of ANSI/WDMA I.S. 1A for interior flush doors[, and ANSI/WDMA I.S. 6A for stile and rails doors, Heavy Duty performance level.
- .3 Quality of finish: Comply with the requirements for Premium Grade in accordance with the North American Architectural Woodwork Standards 4.0 (NAAWS).
- .4 Sound Transmission Class (STC): Doors indicated with an STC rating shall be in accordance with ASTM E90. Unless otherwise indicated, accessories required for acoustical rating compliance shall be Provided by door manufacturer; accessories to approval by the Consultant.
- .5 STC rating: Refer to Door Schedule.

### **2.2 PRODUCTS**

- .1 Solid particleboard core, veneer faced, wood door, painted finish to North American Architectural Woodwork Standards 4.0 (NAAWS), Section 9 and as follow:
  - .1 Type PC-5, particle board core.
- .2 Solid lumber core door with stiles and rails bonded to the core and abrasive planed flat prior to application of the faces, stain finish to North American Architectural Woodwork Standards 4.0 (NAAWS), Section 9 and as follow:
  - .1 Type SLC-5.
- .3 Hollow honeycomb core; veneer faced, construction to North American Architectural Woodwork Standards latest Editio4.0 (NAAWS), Section 9 as follow:
  - .1 Type IHC-7, honeycomb cell core.
- .4 Wood Veneer: To North American Architectural Woodwork Standards 4.0 (NAAWS), Grade B for painted finish, equal width, uniform, clean, without open defects, patches, plastic repair, minimum 1.5 mm (1/16") thick after sanding.
  - .1 Specie: Birch, unless otherwise indicated.
  - .2 Cut: Plain sliced, unless otherwise indicated.

- .3 Match between Veneer Leaves: Book match.
- .4 Assembly of Veneer Leaves on Door Faces: Balance match.
- .5 Doors in pair or sets: Pair match for doors hung in same opening or separated only by mullions.
- .6 Room Match: Match door faces within each separate room or area of building. Corridor door faces do not need to match where they are separated by 3 m or more.
- .5 Door Edge:
  - .1 Edge Type A: Minimum 11 mm (7/16") thick, closed grain, solid hardwood edge.
- .6 Hardware Blocking, Non-Rated Doors: 150 mm glued block or structural composite lumber in particleboard core doors as follows:
- .7 Adhesive: Waterproof type, suitable for specific end use.
  - .1 Any adhesives, sealants or paints used onsite must have low VOC content.

## 2.3 ACCESSORIES

- .1 Glass: Fire rated glass. Refer to Section 08 80 00.
- .2 Wood louvers: Solid hardwood, species to match face veneer, and referenced quality standard. Refer to Mechanical drawings.
- .3 Finishing hardware: In accordance with Section 08 71 01-Hardware Schedule.

## 2.4 FABRICATION - GENERAL

- .1 Pre-machine work in factory.
- .2 Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
  - .1 Clearances: Provide 3.2 mm (1/8") maximum at heads, jambs, and between pairs of doors. Provide 3.2 mm (1/8") maximum from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, 6.4 mm (1/4") maximum from bottom of door to top of threshold unless otherwise indicated. Reseal top and bottom edges of wood doors if they are cut to fit, in accordance with door manufacturer's instructions and warranty requirements.
- .3 Bevel non-fire-rated doors 3-1/2 degrees (1/8" in 2") at lock and hinge edges.
- .4 Factory machine doors for finish hardware that is not surface applied. Do not machine for surface hardware. Locate hardware to comply with Door and Hardware Institute (DHI) Recommended Locations for Architectural Hardware for Flush Wood Doors (latest edition). Comply with final reviewed hardware schedules, door and frame shop drawings and hardware templates.
  - .1 Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- .5 Electrified hardware:
  - .1 Where electrically or electronically operated hardware is specified on the schedules or details or the final approved schedule and templates provided by the hardware supplier, doors with

electrified devices shall be manufactured to include wire raceway in door panel to accommodate electrified devices, such as electric hinge, power transfer units, electrified locks, electrified door closures and electrified exit devices. Construction of raceways shall provide a continuous conduit or channel between entry and exit points to accommodate wire.

- .2 Electrified hardware will be terminated with ElectroLynx or similar system approved by the Consultant, quick connect Molex connectors provided by Section 08 71 00 Finishing Hardware.

## **2.5 FABRICATION - DOORS**

- .1 Paint Grade Doors, Solid Core: Particleboard core, 5 ply construction in conformity with ANSI A208.1, full length stiles and rails bonded to core. North American Architectural Woodwork Standards 4.0 (NAAWS) Type A edge, and as indicated
- .2 Wood Veneer Door, Stained Finish, Solid structural composite lumber core, Type SCLC-5, structural composite lumber core, construction in conformity with North American Architectural Woodwork Standards 4.0 (NAAWS) Section 9.
- .3 Wood Veneer Doors, Stained Finish, Hollow Honeycomb Core; Type IHC-7, honeycomb cell core, construction to North American Architectural Woodwork Standards 4.0 (NAAWS) Section 9.
- .4 Completely seal wood edges and edges of cuts-outs in shop for doors schedule to receive paint finish. Apply sealer in accordance with the manufacturer's printed instructions.
- .5 Bevel edges of single acting doors 3 mm on lock side and 1.6 mm on hinge side.
- .6 Undercut doors for carpet in the plant.

## **2.6 FACTORY FINISH**

- .1 Natural wood faced wood doors: Factory finish in accordance North American Architectural Woodwork Standards 4.0 (NAAWS), system 11 - Polyurethane Catalyzed Factory finish work scheduled to match approved control sample. Apply finish in accordance with manufacturer's approved methods using approved equipment to cut outs, and exposed surfaces. Unfinished work will be listed as deficiencies.
- .2 Seal and finish exposed and semi-exposed surfaces, opaque catalysed lacquer colour and sheen as selected by the Consultant.
- .3 Clean surfaces free of dust before applying successive coat. Carefully sand with even strokes to provide perfect, scratch free surface.

## **PART 3 – EXECUTION**

### **3.1 EXAMINATION**

- .1 Provide necessary grounds, bracing and strapping for fitting and adequate for securing of the work.
- .2 Cooperate with work of other sections to ensure fastenings set by others are provided and located, their work is installed to their specifications and that those responsible for back priming are notified in sufficient time for them to schedule work.

### 3.2 INSTALLATION

- .1 Install work of this Section plumb, square, true, rigid and secure. Conceal fastenings in the finished work unless otherwise indicated on final reviewed shop drawings and in accordance with manufacturer's printed instructions.
- .2 Execute installation and assembly at the Place of the Work using skilled forces under supervision of a competent joinery foreperson.
- .3 Install work plumb, level and straight, and fasten it securely to backing to support itself and anticipated superimposed loads.
- .4 Build into construction as indicated, or specified in other sections of this specification, or both.
- .5 Adequately fasten units and secure them in place with concealed fixings wherever possible. Include grounds and furring where required.
- .6 Provide even margins between doors and jambs and doors and finished floor as follows:
  - .1 Hinge side: 3 mm.
  - .2 Latchside and head: 3 mm.
  - .3 Finished floor for non-rated assemblies: 12 mm.
  - .4 Finished floor for rated assemblies: 6 mm.
- .7 Allowable tolerances on deformation: Conforming with North American Architectural Woodwork Standards 4.0 (NAAWS).
- .8 Coordinate installation of wood doors in metal frames with Section 08 11 13.

### 3.3 INSTALLATION - DOORS

- .1 Install wood doors after finishing of walls.
- .2 Align and fit doors in frames with uniform clearances as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
  - .1 Clearances: Provide 3.2 mm (1/8") maximum at heads, jambs, and between pairs of doors. Provide 3.2 mm (1/8") maximum from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, 6.4 mm (1/4") maximum from bottom of door to top of threshold unless otherwise indicated. Reseal top and bottom edges of wood doors if they are cut to fit, in accordance with door manufacturer's instructions and warranty requirements.
- .3 Seal top and bottom edges of wood doors are re-sealed if they are cut to fit, in accordance with door manufacturer's warranty requirements.
- .4 Pilot drill screw and bolt holes.

### 3.4 ADJUSTMENT AND CLEANING

- .1 Adjust doors to swing freely, smoothly and easily, to remain stationary at any point, to close evenly and tightly against stops without binding, and to latch positively when doors are closed with moderate force.

- .2 Adjust hardware so that latches and locks operate smoothly and without binding, and closers act positively with the least possible resistance in use. Lubricate hardware if required by Supplier's instructions.
- .3 Ensure that doors equipped with closers operate to close doors firmly against anticipated wind and building air pressure, and to enable doors to be readily opened as suitable for function, location and traffic.
- .4 Clean hardware after installation in accordance with Supplier's instructions.
- .5 Sand and clean woodwork to leave free from finish defects in any exposed part.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

1. Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Closeout Submittals
- .6 1.6 Quality Assurance
- .7 1.7 Delivery, Storage, And Handling
- .8 1.8 Field Conditions
- .9 1.9 Warranty
- .10 2.1 Manufacturer
- .11 2.2 Performance/Design Requirements
- .12 2.3 Materials
- .13 2.4 Entrance Framing
- .14 2.5 Aluminum Entrance Doors - Exterior
- .15 2.6 Aluminum Window Wall
- .16 2.7 Interior Architectural Wall Systems
- .17 2.8 Finishes
- .18 2.9 Fabrication
- .19 3.1 Installation
- .20 3.2 Window Wall System Installation:
- .21 3.3 Installation Interior Architectural Wall Systems
- .22 3.4 Air Vapour Barrier Closures
- .23 3.5 Glazing
- .24 3.6 Sealants
- .25 3.7 Hardware
- .26 3.8 Field Quality Control
- .27 3.9 Adjusting And Cleaning

### **1.3 SUMMARY**

1. Section includes:
  - .1 Aluminum entrances.
  - .2 Aluminum Window Wall.
  - .3 Interior architectural wall systems.

## 1.4 SUBMITTALS

1. Submit required submittals in accordance with Section 01 33 00.
2. *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section.
3. Shop drawings:
  - .1 Further to requirements of Section 01 33 00, indicate system dimensions, framed opening requirements and tolerances, adjacent construction, anticipated deflection under load, affected related work, weep drainage network, expansion and contraction joint location and details, field welding, coordination with hardware and electrical requirements.
  - .2 Identify and describe material types being supplied, wall thicknesses of extrusions, and shapes including connections and grades, dimensions and tolerances (minimum and maximum), attachments, reinforcing, anchorage and locations of fastenings, and provisions for thermal and structural movement between components of this section and adjacent materials.
  - .3 Include description of materials, metal finishing specifications, and other pertinent information.
  - .4 Design loads, typical reactions and support movement allowances, both vertical and horizontal, shall be placed on the shop drawings.
  - .5 Shop drawings shall clearly indicate the specification of materials and, where applicable, indicate installation methods and coordination with other sections.
  - .6 Submit framing member structural and physical characteristics, calculations, dimensional limitations, special installation requirements.
4. Samples:
  - .1 Submit samples of frame, sill and mullion sections, sill flashing and accessories, fasteners for connection of frame to opening, glazing tape, glass retainers, glazing gaskets, screening and frame, spandrel panels and each finish material and any other material, as requested.
  - .2 Samples of colour and finish prepared as specified on respective metal components for both extrusion and sheet.
  - .3 Identify samples as to treatment, thickness, alloy, framing composition, colour, manufacture, performance standard and portion of the work to which they apply.
  - .4 Fabrication shall not proceed without written acceptance of samples from the *Consultant*.
5. Test reports:
  - .1 Submit valid laboratory test reports, prepared by an independent laboratory, verifying that proposed system has been tested by an independent laboratory and achieved performance values that meet the specified performance criteria.

## 1.5 CLOSEOUT SUBMITTALS

1. Operation and maintenance data:



- .1 Submit manufacturer's operation and maintenance instructions for incorporation into the operation and maintenance manuals in accordance with Section 01 77 00.

## 1.6 QUALITY ASSURANCE

### 1. Qualifications:

#### .1 Installers / applicators / erectors:

- .1 Execute work of this section only by company who has adequate plant, equipment, and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past 5 years.
- .2 *Provide* at least one trade specialist who shall be thoroughly trained and experienced in skills required, be completely familiar with referenced standards and requirements of this work, and personally direct installation performed under this section.
  - .1 Foreperson experience: Minimum 10 years' experience as glazing mechanic.
  - .2 Typical glazing mechanic experience: Minimum 3 years' experience as glazers.
- .3 Welding: Perform welding of structural components only by fabricators certified by Canadian Welding Bureau to CSA Welding qualification codes; CSA W47.1-09(2014) for welding of steel, and CSA W47.2-12 for welding of aluminum.

## 1.7 DELIVERY, STORAGE, AND HANDLING

1. Store parts in a dry place and permit natural ventilation over their finished surfaces.
2. Store materials in locations protected from damage of other trades.
3. Under conditions of high humidity or cold temperatures, supply heating or forced air ventilation to prevent accumulation of surface moisture.
4. Mark components to show location on building and on the Drawings.
5. Protect finishes with strippable coating that will not mar, nor deface finish on removal, or a similar method designed to afford an equivalent amount of protection. Leave protected coating intact until damage risk is past or immediately prior to final cleaning.
6. Stacking should be done to prevent bending pressure or abrasion of finished surfaces.
7. Brace and protect frame units to prevent distortion and damage in shipment and handling.
8. *Provide* methods for lifting or hoisting units into place without causing damage.

## 1.8 FIELD CONDITIONS

1. Comply with requirements of *Product* manufacturers.

## 1.9 WARRANTY

1. This section shall assume responsibility for warranties of glass and glazing included in the work of this section, in accordance with Section 08 80 00.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURER

1. *Work* of this section shall be provided by the following:
  - .1 Kawneer Company Ltd.
  - .2 Or equivalent (substitutions in accordance with Section 01 25 00).

## 2.2 PERFORMANCE/DESIGN REQUIREMENTS

1. Air Leakage; except entrance doors: Air leakage through the work shall not exceed 0.3 L/s/m<sup>2</sup> (0.06 cfm/ft<sup>2</sup>) of glazing area when tested in accordance with ASTM E283- 04(2012) at test pressure of 300 Pa (6.24 psf).
2. Water Penetration (other than entrance doors): No water penetration shall occur when the work is tested in accordance with ASTM E331-00(2009), amended to prohibit water from passing through interior glazing seals or frame joints, at a test pressure of 300 Pa (6.24 psf).
3. Fabricate mullions to ensure under specified loads a maximum deflection of 1/175 of mullion span or 19 mm (3/4"), whichever is less.
4. Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with code.
5. Design and size components to withstand seismic loads and sway displacement as calculated in accordance with code.
6. *Provide* system to accommodate, without damage to components or deterioration of seals:
  - .1 Movement within system,
  - .2 Movement between system and perimeter framing components,
  - .3 Dynamic loading and release of loads,
  - .4 Deflection of structural support framing,
7. Maintain continuous air barrier throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound, in accordance with the *Contract Documents*.
8. Position thermal insulation to exterior of air barrier, in accordance with the *Contract Documents*.
9. Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.
10. *Provide* anchors sufficiently rigid to resist wind and snow loads caused by aluminum shades and brackets, without damage to wall system.

## 2.3 MATERIALS

1. Aluminum extrusions: Aluminum Association alloy AA6063-T5 or T6 temper for framing.
2. Sheet aluminum: aluminum sheet, 0.92 mm (0.04") minimum thickness.
  - .1 Aluminum alloy:
    - .1 AA3003-H14 Painting Quality.
    - .2 AA5005H14 Anodizing Quality.

3. Concealed sheet metal air barriers: 1 mm (0.04") (22 gauge) Z275 galvanized steel sheet.
4. Fasteners: aluminum or Type 304 stainless steel, finished to match adjacent material.
5. Isolation coating: alkali resistant bituminous paint or epoxy solution.
6. Glazing gaskets: fully resilient, shim type butyl glazing tape or EPDM glazing gasket.
7. Glass and other glazing materials: Refer to Section 08 80 00.
8. Silicone Sealant: One component, chemical curing; capable of water immersion without loss of properties: cured Shore A Durometer hardness of 15 to 25 to ASTM D2240- 05 (2010), colour as selected by the *Consultant*, where exposed, to ASTM C920-11.
9. Sheet metal work air barrier sealant: One component elastomeric chemical curing, to ASTM C920-11.
10. Air barrier membrane:
  - .1 Self-Adhesive membrane: Composite preformed modified membrane system consisting of SBS modified asphalt for low temperature flexibility and polyethylene scrim reinforcing.  
Acceptable Products:
    - .1 Bakor 'Blueskin SA' Self-Adhesive Grade Air Barrier Membrane.
    - .2 Soprema 'Soprseal Stick 1100'.
    - .3 W.R. Meadows 'Air Shield'.
    - .4 .4 Or equivalent.
  - .2 Primer: as recommended by manufacturer.
  - .3 Membrane Properties:
    - .1 Thickness: 1.0 mm (40 mils).
    - .2 Application temperature: minimum +5°C.
    - .3 Service temperature: -40°C to +70°C.
    - .4 Elongation: 200% minimum in accordance with ASTM D412-06a (2013)- modified.
    - .5 Low temperature flexibility: to -30°C to CGSB 37-GP-56M-1985.
    - .6 Air leakage: 0.005 L/m2.s under a pressure differential of 75 Pa (0.01 PSI) in accordance with ASTM E283-04(2012).

## 2.4 ENTRANCE FRAMING

1. Exterior aluminum framing: 50.8 mm x 152.4 mm (2" x 6") frames and 152.4 mm x 152.4 mm (6" x 6") jambs, thermally broken extruded aluminum assembly with flush sight lines.
  - .1 Acceptable *Product*: Kawneer Tri Fab 601UT or equivalent.
2. All section shall be designed for shear block joinery.

## 2.5 ALUMINUM ENTRANCE DOORS - EXTERIOR

1. Entrance glazing system shall be designed according to Section 08 41 00 requirements and the following:

- .1 Doors:
  - .1 Acceptable *Product*: Kawneer 360 Insulclad Thermal Entrance or equivalent.
- .2 Fasteners connecting and fixing the frame members shall be concealed.
- .3 Reinforce mechanically-joined corners of doors by welding, spigotting, welding and spigotting or by one piece cast aluminum angle to produce sturdy door unit.
- .4 Door stiles shall be weathered with metal backed polypropylene pile weather- stripping.  
*Provide* weather-stripping sweeps at door bottoms.
- .5 Door hardware: Norton 1605 closer, 1 MS lock and 2 thumb latches (locations ass scheduled or indicated), exterior threshold 115 mm (4.5"), 1 pair butt hinges, weather stripping and Classic Hardware CO-9 with stainless steel US32 polished finish, flash cap across the top of door.
  - .1 Barrier free door operators: in accordance with Section 08 71 13.
- .6 Weathering on offset pivot or butt hung doors (single or pairs) shall be Kawneer SEALAIR elastomeric weathering of tubular shape, with a semi-rigid polymeric backing, or equivalent.
- .7 Door bottom rail weathering (where required) shall be an extruded elastomeric blade sweep strip applied with concealed fasteners.
- .8 Glass: Refer to Section 08 80 00.

## 2.6 ALUMINUM WINDOW WALL

- 1. Glass Design:
  - .1 Glass shall be designed according to CAN/CGSB 12.20-M89 and Section 08 80 00.
  - .2 Glass subjected to guard loads shall be designed with an alternative resistance path in the event of failure of one lite or ply of glass.
  - .3 Insulating glass units in accordance with Section 08 80 00.
- 2. Window wall shall be designed according to Section 08 41 00 requirements and the following:
  - .1 Acceptable Products:
    - .1 Kawneer Metroview® FG 601T PG Window Wall
      - .1 Pre-glazed system
      - .2 Sightline: 2-1/4" (57.2 mm)
      - .3 System depth: 6" (152.4 mm)
      - .4 1" (25.4 mm) infill, wet glazed or 1-3/16" (30.1 mm) infill, tape glazed
      - .5 4-side captured format
  - .2 Thermally broken sections.
  - .3 Mechanically fasten horizontal and vertical edges of infill materials and glass units with mechanically fastened continuous pressure plates complete with caps.
  - .4 Glazing cavity shall be compartmentalized at every floor level and every 6000 mm horizontally to prevent the movement of air in accordance with standard rain screen design.

- .5 Fasteners: Aluminum, nonmagnetic stainless steel or other materials must be non-corrosive and compatible with aluminum members, trim hardware, anchors, and other components.
- .6 Anchors, Clips, and Accessories:
  - .1 Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating.
  - .2 Anchors, clips, and accessories shall provide sufficient strength to withstand the design pressure indicated.
- .7 Reinforcing Members:
  - .1 Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating.
  - .2 Reinforcing members must provide sufficient strength to withstand the design pressure indicated.
- .8 Sealant:
  - .1 For sealants required within fabricated window wall system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
- .9 Thermal Barrier:
  - .1 Kawneer IsoLock® Thermal Break with a 3/8" (9.5 mm) separation consisting of a two-part chemically curing, high-density polyurethane, which is mechanically and adhesively joined to aluminum window wall sections.
  - .2 Thermal break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.
- .10 Tolerances:
  - .1 References to tolerances for wall thickness and other cross-sectional dimensions of glazed window wall members are nominal and in compliance with AA Aluminum Standards and Data.

## 2.7 INTERIOR ARCHITECTURAL WALL SYSTEMS

- 1. Basis of Design:
  - .1 Elite Solutions - Wide Batten by PC 350
- 2. Extruded aluminum interior wall system complete with components and accessories.
  - .1 Materials - Aluminum:
    - .1 ASTM B221M (ASTM B221), Alloy and temper 6063-T5 or as recommended by aluminum frame manufacturer for strength, corrosion resistance, and application of required finish.
    - .2 Sheet and Plate: ASTM B209M (ASTM B209).

- .1 Thickness: not less than 3.2 mm (0.125 inch) on exposed surfaces, and 4.75 mm (0.187 inch) on internal webs.
  - .3 Steel Members: Hot dip galvanize all steel items to comply with the following:
    - .1 STM A653/A65M for sheet steel,
    - .2 ASTM A153/A 153M for steel and iron hardware,
    - .3 ASTM A123/A 123M or CAN/CSA-G164 for other steel products.
- 3. Aluminum door and sidelite frames - Door and Glazing Frames: Manufacturer's standard glazing frame system with the following characteristics:
  - .1 Frame System: Provide frames with the following characteristics:
    - .1 45 mm (1-3/4") face profile.
    - .2 Trims (Batten Covers): 32 mm (1-1/4") extruded aluminum, unless otherwise indicated, with removable snap-in casing trims and without exposed fasteners.
    - .3 1.8 mm (0.070") rabbet wall thickness.
    - .4 Glazing System: Retained mechanically with gaskets on four sides.
    - .5 Fabrication Method: Field-fabricated stick system.
- 4. Swing door systems: Provide aluminum framed swing door frame with stationary sidelight system to fit wall thickness.
  - .1 Doors: Aluminum Stile x 45 mm (1-3/4") thick x heights as indicated on Shop Drawings, with extruded aluminum tubular rail and stile members.
  - .2 Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
  - .3 Framing Members for sidelites, and transom frames: Manufacturer's standard extruded aluminum frames as specified in this Section, reinforced for hinges and strikes as required to support imposed operational loads.
  - .4 Hardware: Manufacturers standard and recommended hardware as required for door system applications.
    - .1 Hinges: Manufacturer's standard 5 knuckle, ball bearing, full mortise
    - .2 stainless steel hinges.
    - .3 Door pulls, colour to match frame finish
    - .4 Roller Latch: 404H•by Gallery Specialty Hardware Ltd.
    - .5 Adams Rite MS-1850S-310-6280 lock.
    - .6 Automatic Door Bottom: Manufacturer's standard sponge neoprene gasket material held in place by aluminum housing that automatically activates when plunger depresses against door stop or jamb. Door bottom must be designed to seal out draft, sound and light. Mount on bottom rail of doors. CT-54 by KN Crowder.
- 5. In-line sliding door systems: Aluminum 45 mm (1-3/4") thick x heights as indicated on Shop Drawings, with extruded aluminum tubular rail and stile members.

- .1 Sliding Configuration: In-line, concealed track system.
  - .1 Framing Members for sidelites, and transom frames: Manufacturer's standard extruded aluminum frames as specified in this Section, reinforced for hinges and strikes as required to support imposed operational loads.
  - .2 Hardware: Manufacturers standard and recommended hardware as required for door system applications.
    - .1 Door pulls, colour to match frame finish
    - .2 Adams Rite MS-1850S-310-6280 lock.
    - .3 Sliding Door Hardware Track: Rated for maximum door weight of 120 kg (265 lb), with soft closing mechanism. SRT Wheelsby PC350
- 6. Wood Doors: 50 mm (2") stile x 45 mm (1-3/4") thick x heights as indicated on the drawings.
- 7. Glass and Glazing:
  - .2 Single glazing, 10mm (3/8") tempered,
    - .1 Coordinate glass requirements with Section 08 80 00.
    - .2 3mm max space, with clear silicone joints.
- 8. Finish
  - .3 Anodized Finish: Clear Anodic Coating: Anodized to AAMA 611, AA-M10C21A41 / AA-M45C22A41 Class I, 0.018 mm (.7 mils minimum).

## 2.8 FINISHES

- 1. Exposed aluminum surfaces; anodized to AAMA 611-98:
  - .1 Clear anodized to AA Designation AA-M12C22A41 at exterior, AA-M12C22A31 at interior.

## 2.9 FABRICATION

- 1. Sills: extruded aluminum, finished to match window frames, 15 mm (5/8") minimum projection beyond wall surface. *Provide* preformed end caps wherever sill terminates. Butt joint sill and *Provide* preformed splice connector and sealant to prevent water penetration. Locate splice connectors (joint covers) at center line of mullions when required. Trim and detail corners neatly.
- 2. Make allowances for deflection of structure. Ensure that structural loads are not transmitted to aluminum work.
- 3. *Provide* structural steel reinforcement for strength, stiffness and connections.
- 4. Fit intersecting members to flush hairline weathertight joints and mechanically fasten together, except where indicated otherwise.
- 5. Conceal fastenings from view. Exposed fastenings where indicated.
- 6. Form cut-outs, recesses, mortising or milling for finishing hardware to templates supplied. Reinforce with aluminum or galvanized steel plates.
- 7. Field apply isolation coating to aluminum in contact with dissimilar metals and/or cementitious materials.

8. Fabricated assemblies shall make required clearances other assemblies and for deflection of structure.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

1. Install work of this section plumb, square, level, free from warp, twist and superimposed loads.
2. Secure work in required position. Do not restrict thermal movement.
3. Install hardware in accordance with templates.
4. Adjust operable parts for correct function.
5. Isolate from cementitious materials.

### **3.2 WINDOW WALL SYSTEM INSTALLATION:**

1. Install window wall systems plumb, level, and true to line, without warp or rack of frames, within manufacturer's prescribed tolerances, and complying with installation instructions.
2. Provide support and anchor in place.
3. Dissimilar Materials:
  - .1 Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points.
4. Glazing:
  - .1 Glass shall be inside-glazed.
  - .2 Glass shall be held in place with extruded aluminum glass stops.
5. Water Drainage
  - .1 Each light of glass shall be internally drained using water deflectors and sealant to divert water to the sill horizontal weep locations.
  - .2 Weep holes shall be located in the sill to divert water to the exterior of the building.
6. Related Products Installation:
  - .3 Sealants (Perimeter):
    - .1 Refer to Joint Treatment (Sealants) Section.
7. Glass:
  - .4 Refer to Glass and Glazing Section.
  - .5 Reference: ANSI Z97.1, CPSC 16 CFR 1201, and GANA Glazing Manual.

### **3.3 INSTALLATION INTERIOR ARCHITECTURAL WALL SYSTEMS**

1. Provide manufacturer's information and templates required for installation of work of this section, and assist or supervise, or both, the setting of anchorage devices, and construction of other work incorporated with products specified in this section in order that they function as intended.



2. Install work in accordance with manufacturer's instructions and recommendations, true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation. Adjust components to allow for irregularities in adjacent construction and relate accurately to finished ceiling and floor coverings.
3. Install frames plumb and square, securely anchored to substrates with fasteners recommended by frame manufacturer.
4. Use concealed installation clips to assure that splices and connections are tightly butted and properly aligned.
5. Secure clips to main structural components and not to snap-in or trim members.
6. Do not use screws or other fasteners that will be exposed to view when installation is complete.
7. Fit joints and junction between components tightly and in true planes, conceal joints where possible.
8. Once door is hung check and re-adjust, as required, all aspects including, but not limited to; operating hardware installed under this section.

### **3.4 AIR VAPOUR BARRIER CLOSURES**

1. It is the responsibility of this section to give complete cooperation in providing and maintaining the continuity of air/vapour seal to adjacent materials to which the windows and frames abut. Fit flexible seals, tapes, sealants and gaskets at locations required to achieve air/vapour/water resistant and weathertight junctions. Ensure continuity of seal at end joints between lengths of material by overlapping and cementing. Caulk junctions of system components to themselves and other work with sealant to maintain effective vapour, air and water barrier and fix in place with an aluminum flat to the air/vapour seal line at the adjacent material and to the glazing rebate.
2. Where deflection of structure will cause dynamic joint movement between aluminum work and dissimilar materials, install flexible seals of sufficient width to allow formation of bellows to take up any torsional and shear stresses.

### **3.5 GLAZING**

1. Glaze aluminum framed windows and doors at exterior using insulating glazing units in accordance with Section 08 80 00.
2. Glaze interior windows and doors in accordance using glass types given in the glazing schedule and in accordance with section 08 80 00.

### **3.6 SEALANTS**

1. Seal between frame members, sills and adjacent construction as a part of the work of this section and in accordance with Section 07 92 00.

### **3.7 HARDWARE**

1. Install in accordance with manufacturer's installation instructions.
2. Accurately locate and adjust hardware to meet manufacturer's instructions. Use special tools and jigs as recommended.
  1. Set, fit and adjust hardware according to manufacturer's directions, at heights as confirmed by the *Consultant*. Hardware shall operate freely. Protect installed hardware from damage and paint spotting.

2. At operable windows, provide hook bolt locking mechanisms (2 per window) and crank mechanism complete with T-Crank window handle (as manufactured by CR Laurence) H38xx (last two digits dependant on colour selection). Handle must not project beyond interior face of window framing so that window shades can be adjusted without interference of handle. Finish of locking and crank mechanisms shall match finish of framing.
3. Powered hardware:
  - .1 Power wiring will be supplied and installed by electrical work installer including conduit, boxes and other electrical appurtenances, including connections and terminations. Be responsible for ensuring that all wiring work is done in accordance with the Suppliers wiring diagrams and directions.
  - .2 Arrange for testing and commissioning of system by the distributor of the system. Submit a copy of reports to the *Consultant*.

### **3.8 FIELD QUALITY CONTROL**

1. Professional engineer responsible for the preparation of engineered submittals shall undertake periodic field review.
2. Field reviews shall be at intervals as necessary and appropriate to be familiar with the progress and quality of such work and to determine if the work is proceeding in general conformity with the Contract Documents, including reviewed shop drawings and design calculations.
3. Field inspection and testing.

### **3.9 ADJUSTING AND CLEANING**

1. Cleaning on completion of installation:
  - .1 Remove deposits which affect appearance or operation of units.
  - .2 Remove protective materials.
  - .3 Clean interior and exterior surfaces by washing with clear water; or with water, and soap or detergent; followed by a clear water rinse.
  - .4 Clean and restore stained metal surfaces in accordance with manufacturer's recommendations. Replace if cleaning is impossible.
  - .5 Final cleaning is specified in Section 01 77 00.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Administrative Requirements
- .5 1.5 Submittals
- .6 1.6 Closeout Submittals
- .7 1.7 Quality Assurance
- .8 1.8 Delivery, Storage, and Handling
- .9 2.1 Performance/Design Requirements
- .10 2.2 Automatic Door Operators - General
- .11 2.3 Automatic Door Operators - Door Frame/Wall Mounted
- .12 2.4 Finishes
- .13 2.5 Fabrication
- .14 3.1 Examination
- .15 3.2 Preparation
- .16 3.3 Installation
- .17 3.4 Adjusting and Cleaning

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Automatic door operators.

### **1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination:
  - .1 Check dimensions at the *Place of the Work* before fabrication commences, and report to the *Consultant* in writing all discrepancies.
  - .2 Where dimensions are not available before fabrication commences, the dimension required shall be agreed upon between the various sections concerned.
- .2 Templates:
  - .1 Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing automatic door operators to comply with indicated requirements.
- .3 Electrical System Roughing-in:
  - .1 Coordinate layout and installation of automatic door operators with connections to, power supplies and electrical door latching hardware.

.4 System Integration:

- .1 Integrate automatic door operators with other systems as required for a complete working installation.

## 1.5 SUBMITTALS

- .1 Submit required submittals in accordance with Section 01 33 00.

.2 *Product* data sheets:

- .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section.

.3 Shop drawings:

- .1 Shop drawings to be prepared specifically for this *Contract* and to indicate location of components, anchorage details, adjacent construction interface, and dimensions as well as all necessary wiring and electrical requirements.

.4 Samples:

- .1 Submit samples of each finish material proposed for use in the *Work*.

.5 Certificates:

- .1 Submit certificate of conformance to specified standards following procedures for submittal of *Product* data.

.6 Templates:

- .1 Submit templates during construction for use by installers and fabricators as required for proper location and installation of hardware.

## 1.6 CLOSEOUT SUBMITTALS

.1 Operation and maintenance data:

- .1 Demonstrate, and *Provide* instruction in, the proper operation and maintenance of the Products Provided as part of the work of this section to the *Owner* in accordance with Section 01 77 00.
- .2 Submit operation data and maintenance data for cleaning and maintenance of hardware for incorporation into the operation and maintenance manual specified in Section 01 77 00.

## 1.7 QUALITY ASSURANCE

.1 Qualifications:

.1 Installers / applicators / erectors:

- .1 Execute the work of this section only by a certified *Subcontractor* who has adequate plant, equipment, and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past 5 years, and with 10 years' satisfactory experience.
- .2 Installer shall be approved in writing by the manufacturer of the operators for installation of their *Product*.

- .2 Barrier free door operators shall be certified by the manufacturer to performance design criteria in accordance with CAN/CSA C22.2 No. 247-92(R2014), and ANSI/BHMA A156.19-2013.

## **1.8 DELIVERY, STORAGE, AND HANDLING**

- .1 Store finishing hardware in locked, clean dry area.
- .2 Package each item of hardware, including fastenings, separately or in like groups of hardware, and label each package as to item definition and location.
- .3 Submit hardware with an easily removable covering to protect against scratches, abrasions, coating with dissimilar finish materials on adjacent surfaces, and tarnishing.

## **1.9 WARRANTY**

- .1 Automatic door operators shall be free of defects in material and workmanship for a period of one (1) year from the date of Substantial Performance.
- .2 During the warranty period the Owner shall engage a factory-trained technician to perform service and affect repairs. A safety inspection shall be performed after each adjustment or repair and a completed inspection form shall be submitted to the Owner.
- .3 During the warranty period all warranty work, including but not limited to emergency service, shall be performed during normal working hours.

## **PART 2 - PRODUCTS**

### **2.1 PERFORMANCE/DESIGN REQUIREMENTS**

- .1 Use ULC or ULI listed and labelled hardware in fire separations and exit doors.
- .2 Be responsible for, and abide by, all requirements and regulations of the Ontario Building Code. Conduct tests and inspections required and pay all charges incidental thereto.

### **2.2 AUTOMATIC DOOR OPERATORS - GENERAL**

- .1 Operation:
  - .1 Activation type:
    - .1 Push-plate.
  - .2 Door to safely stop and reverse if an object is encountered in the opening or closing cycle.
  - .3 Manual opening force: 62 N.
  - .4 Closing force: 26.6 N.
  - .5 Factory-set door hold open voltage.
  - .6 Fail safe: In the event of power failure, door shall operate manually, without damage to operator components.
- .2 Activators; wall-mounted:
  - .1 Push-plate:
    - .1 Formed stainless steel plate, satin finish, approximately 127 mm (5") square, with depressed wheelchair logo marking, 2 required per opening.
  - .2 Electrical supply: 120 Volt.

## 2.3 AUTOMATIC DOOR OPERATORS - DOOR FRAME/WALL MOUNTED

- .1 Provide low *energy* operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for compliance with UL 325. Coordinate operator mechanisms with door operation, hinges, and activation devices.
  - .1 Fire-Rated Doors:
    - .1 Provide door operators for fire-rated door assemblies that comply with NFPA 80 for fire-rated door components and are listed and labeled by a qualified testing agency.
  - .2 Standard:
    - .1 Certified ANSI/BHMA A156.19.
  - .3 Configuration:
    - .1 Surface mounted or in-ground as required. Door operators to control single swinging and pair of swinging doors.
  - .4 Operation:
    - .1 Power opening and spring closing operation capable of meeting ANSI A117.1 accessibility guideline. Provide time delay for door to remain open before initiating closing cycle as required by ANSI/BHMA A156.19.
  - .5 Features:
    - .1 Opening speed.
    - .2 Back-check.
    - .3 Hold-open, from 5 seconds to 30 seconds.
    - .4 Closing speed.
    - .5 Opening force.
    - .6 Acceleration during opening and recycling, for soft start.
  - .6 Controller:
    - .1 Completely electromechanical capable of the following functions:
      - .1 Obstruction detection.
      - .2 Initialization and power on.
      - .3 Door motion learn cycle.
      - .4 Manual mode, without spring closer.
      - .5 Power open/power close logic.
    - .2 Control box and motor/gear box to be contained in aluminum housing finished to match aluminum entrances, precision-machined gears and bearing seats and all- weather lubricant, mounted on vibration isolators.
      - .1 Design for surface-mounted application on surface of door frame/wall, maximum 3 mm (1/8") above top of door.

- .2 Design for interior application.
- .3 Gears: manufactured by operator manufacturer specifically for operators being provided.
- .4 Motor: DC permanent magnet motor with shielded ball bearings. Stop motor when door stops or is fully open and when breakaway is operated.
- .5 Door operating arm: forged steel, attached at natural pivot point of door. Do not use side block in top of door. Exposed arms to be factory polished and finished to match operator enclosure.
- .6 Control circuits for actuators and safeties: low-voltage, NEC Class II.
- .7 Service conditions: satisfactory operation between -34°C and 71°C.
- .7 Provide outputs and relays on board the operator to allow for coordination of exit device latch retraction, electric strikes, magnetic locks, card readers, safety and motion sensors and specified auxiliary contacts.
- .8 Brackets and Reinforcements:
  - .1 Manufacturer's standard, fabricated from aluminum with nonferrous shims for aligning system components.
- .9 Wireless Interface:
  - .1 Operator units shall have a wireless interface via a mobile device for ease of installation and setup. Anti-ligature, digitally controlled and intelligent complete swing door system. Includes built-in anti-finger trap door leaves mounted into a tight sealed frame. Complete with an overhead concealed swing door operator and ball-raced heavy duty bottom pivot.
- .10 Acceptable Products:
  - .1 Assa Abloy SW200 I (Integra) by Assa Abloy.

## **2.4 FINISHES**

- .1 Finish components to match aluminum framed glazing systems in conjunction with which they are to be provided, in accordance with Section 08 41 00.

## **2.5 FABRICATION**

- .1 Fit intersecting members to flush hairline weathertight joints and mechanically fasten together, except where indicated otherwise.
- .2 Conceal fastenings from view, except where indicated otherwise.
- .3 Form cut-outs, recesses, mortising or milling for finishing hardware to templates supplied. Reinforce with aluminum or galvanized steel plates.
- .4 Field apply isolation coating to aluminum in contact with dissimilar metals or cementitious materials.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- .1 Verify that door openings are properly installed and ready to receive the work of this section.
- .2 Verify that electrical service is available, properly located, and of proper type.

### **3.2 PREPARATION**

- .1 Before furnishing any hardware, carefully check the *Contract Documents*, verify door swings, door and frame materials and operating conditions, and assure that hardware will fit work to be attached.
- .2 Check shop drawings and frame and door lists affecting hardware type and installation, and verify to correctness thereof, or advise of required revisions. Check that doors, frames and panels requiring additional support are reinforced.
- .3 Point out special requirements to installer. Make final adjustment of hardware, in particular closer arms, valves and locksets, to work properly.

### **3.3 INSTALLATION**

- .1 Install in accordance with manufacturer's instructions and in accordance with CAN/CSA C22.2 No. 247-92(R2014).
- .2 *Provide* operator system complete in all its parts and connected to electrical service provided as part of the work of Divisions 26, 27 and 28. Secure all wiring such that it is concealed from view.

### **3.4 ADJUSTING AND CLEANING**

- .1 Verify that installed hardware and operators function properly and instruct installers accordingly of requirements and procedures for adjustments for operation without binding or scraping, and without excessive noise.
- .2 Clean hardware after installation in accordance with *Supplier's* instructions.

**END OF SECTION**



## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 References
- .5 1.5 Submittals
- .6 1.6 Closeout Submittals
- .7 1.7 Quality Assurance
- .8 1.8 Delivery, Storage, and Handling
- .9 1.9 Field Conditions
- .10 1.10 Extended Warranty
- .11 2.1 Performance/Design Requirements
- .12 2.2 Glass Materials
- .13 2.3 Fire Protection Rated Glass
- .14 2.4 Glazing Materials (non-fire rated)
- .15 2.5 Glazing Accessories (fire rated)
- .16 2.6 Fabrication
- .17 3.1 Examination
- .18 3.2 Preparation
- .19 3.3 Glazing - General
- .20 3.4 Tape Glazing
- .21 3.5 Gasket Glazing (Dry)
- .22 3.6 Sealant Glazing (Wet)
- .23 3.7 Installation – Mirrors
- .24 3.8 Field Quality Control
- .25 3.9 Protection
- .26 3.10 Finishing

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Glass and glazing.

### **1.4 REFERENCES**

- .1 Definitions:
  - .1 Deterioration of coated glass: Defects developing from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for

- maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking and other indications of deterioration in metallic coating.
- .2 Deterioration of insulating glass: Failure of the hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture or film on interior surfaces of glass.
  - .3 Deterioration of laminated glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delaminating material obstructing vision through glass and blemishes exceeding those allowed by referenced laminated glass standards.
  - .4 Interspace or airspace: The space between lites of any insulating glass unit that contains dehydrated air or a specified gas.
  - .5 Manufacturer: A firm that produces primary glass or fabricated glass products as defined in referenced glazing publications.

## 1.5 SUBMITTALS

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section.
- .3 Shop drawings:
  - .1 Show details of each type of glazing system in conjunction with the framing system indicating type of glass, sizes, shapes, glazing material and quantity. Show details indicating glazing material, glazing thickness, bite on the glass and glass edge clearance.
  - .2 For glass scheduled or indicated as engineered and glass to serve as guards in accordance with the Ontario Building Code, shop drawings to be engineered shop drawings.
  - .3 Indicate analysis of glass including maximum deflection and allowable stresses (from imposed dead/live loads and thermal loads.
- .4 Samples:
  - .1 Submit 305 mm (12") square samples of each type of glass indicated except for clear monolithic glass products, and 305 mm (12") long samples of each color required, except black, for each type of sealant or gasket exposed to view.
    - .1 Submit 3 control samples for each glass type showing maximum range of visible difference between units for the project.
- .5 Test and evaluation reports:
  - .1 Obtain compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealant as well as other glazing materials including insulating units.
- .6 Manufacturer reports:

- .1 Submit glass fabricator's product information and structural calculations indicating compliance with glazing standards established by the Glass Association of North America (GANA). Submittal to include thermal stress and structural load analysis of the proposed glass types, configuration and sizes.
- .7 Submit sample glazing warranty.
- .8 Submit letter from IGMAC or IGMA/IGCC, or a test report prepared by independent testing company confirming insulating glass units of the types required have been successfully tested in accordance with CAN/CGSB 12.8-97 or ASTM E2190-10 and will withstand design loads specified in the *Contract Documents*.

## **1.6 CLOSEOUT SUBMITTALS**

- .1 Submit closeout submittals in accordance with Section 01 77 00.
- .2 Operation and maintenance data:
  - .1 Submit maintenance and cleaning instructions for glass and glazing for incorporation into the operating and maintenance manuals.

## **1.7 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Manufacturers: Fabrication processes, including low emissivity and reflective coatings, insulating, laminated, silk-screening and tempering shall be manufactured by a single manufacturer with a minimum of ten (10) years of fabrication experience and meet ANSI / ASQC 9002 1994.
  - .2 Installers / applicators / erectors: *Provide* the work of this section executed by specialist *Subcontractor* who shall be thoroughly trained and experienced in skills required, be completely familiar with referenced standards and requirements of the work of this section, and personally direct installation performed under this section.
    - .1 Foreperson experience: a minimum of 10 years' experience as glazing mechanic.
    - .2 Typical glazing mechanic experience: a minimum of 3 years' experience as glazers.
    - .3 Mirror installations: Installation only by applicator trained and approved by adhesive manufacturer for application of its products.
  - .3 Licensed professionals: Retain a Professional Engineer to design the work of this section; to prepare, seal and sign shop drawings; and to perform field review. Shop drawings shall show both design and installation requirements.
- .2 Mock-ups:
  - .1 *Provide* mock-up of mirror installation, including minimum of 4 full size mirrors.
  - .2 Locate mirror mock-up where approved by the *Consultant*.

## **1.8 DELIVERY, STORAGE, AND HANDLING**

- .1 Protect glass from edge damage, dust, and contaminants during handling and storage. For insulating units exposed to substantial altitude changes, comply with insulating glass manufacturers written recommendations for venting and sealing to avoid hermetic seal ruptures.

- .2 Storage and protection: Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun or other causes.

## 1.9 FIELD CONDITIONS

- .1 Ambient Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by the glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation or other causes.
- .2 Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 4.4°C.

## 1.10 EXTENDED WARRANTY

- .1 The glazing systems shall perform properly to the extent that the design and the *Contract Documents* permit such performance for the duration of the warranty period.
- .2 Special product warranty for insulating glass unit products:
  - .1 *Provide* a written warranty from date of manufacture for sealed insulating glass units. Warranty shall cover the following:
    - .1 Deterioration due to normal conditions of use and not to handling, installing, protecting and maintaining practices contrary to the glass manufacturer's published instructions.
    - .2 Replacement of sealed insulating glass units.
    - .3 No dollar limit.
    - .4 Non-prorated.
    - .5 10-year warranty duration.
- .3 Special product warranty for mirror glass products:
  - .1 *Provide* a written warranty from date of manufacture for mirror silvering. Warranty shall cover the following:
    - .1 Deterioration due to normal conditions of use and not to handling, installing, protecting and maintaining practices contrary to the glass manufacturer's published instructions.
    - .2 Replacement of mirror glass units.
    - .3 10 year warranty duration.

## PART 2 – PRODUCTS

### 2.1 REGULATORY REQUIREMENTS

- .1 Safety Glazing Standard: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with building code, ANSI Z97.1, and requirements of CPSC 16 CFR Part 1201 for category II materials.
- .2 Barrier-Free Strips: Comply with the Ontario Building Code Requirements for a barrier-free path of travel and Facility Accessibility Design Standards.
  - .1 Where a vision panel is provided in a door in a barrier-free path of travel, such panel shall be at least 75 mm in width and be located so that:

- .2 The bottom of the panel is not more than 900 mm above the finished floor,
- .3 The edge of the panel closest to the latch is not more than 250 mm from the latch side of the door.
- .3 Fully-glazed interior doors, screens and sidelights shall be marked with continuous opaque strip that is colour and brightness contrasted to background of door:
  - .1 Shall be at least 50 mm wide.
  - .2 Located across width of door at height of 1350 mm to 1500 mm above finished floor.
  - .3 May incorporate a logo or symbol provided such logo or symbol does not diminish opacity of strip, width of the strip, colour and brightness contrast of strip to background of door, and continuity of strip across width of the door.

## 2.2 PERFORMANCE/DESIGN REQUIREMENTS

- .1 General:
  - .1 Publications: Comply with recommendations in the publications below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this section.
    - .1 GANA Glazing Manual.
    - .2 GANA Engineering Standards Manual.
    - .3 GANA Laminated Glazing Reference Manual.
    - .4 GANA Sealant Manual.
- .2 Regulatory requirements:
  - .1 Fire rated glass:
    - .1 Each lite shall bear permanent, non-removable label of UL certifying it for use in tested and rated fire protective assemblies.
- .3 Glass strength:
  - .1 *Provide* glass products in the thickness and strengths required to meet or exceed the following criteria based on project loads and in-service conditions.
    - .1 Analysis shall comply with CAN/CGSB 12.20-M89.
    - .2 Minimum thickness of annealed or heat-treated glass products to be selected so the worst case probability of failure does not exceed the following:
      - .1 8 breaks per 1000 for glass installed vertically less than 15 degrees from the vertical plane and under wind action.
      - .2 5 breaks per 1000 for heat soaked tempered glass as a result of verifiable NiS inclusion.
      - .3 1 break per 1000 for glass installed 15 degrees or more from the vertical plane and under action of wind and/or snow.
  - .3 Maximum lateral deflection; insulating glass units:

- .1 For insulating glass units supported on four edges, limit centre-of-glass deflection at design wind pressure to not more than 1/175 times the long- side length or 19 mm (3/4") maximum.
- .4 Glass at guards, balustrades, and where glass is likely to be subjected to human impact shall comply with safety glass requirements of CAN/CGSB 12.20-M89 and CAN/CGSB 12.1-M90, where applicable, and the Ontario Building Code.
- .5 *Provide* annealed, heat strengthened, and tempered lights where required by the Ontario Building Code, and where required for the various solar exposures on the building.
- .6 Glass thicknesses and glass types specified, indicated, or scheduled in the *Contract Documents* are minimums required. Glass designer/engineer to modify as required to satisfy design and Ontario Building Code requirements, and requirements of authorities having jurisdiction, and any such modifications shall be clearly indicated on shop drawings.
- .4 Thermal and optical performance: *Provide* glass products with performance properties specified or published by glass manufacturer where not specified. Performance properties to be manufacturer's published data as determined according to the following procedures:
  - .1 Centre of glass U-Value: National Fenestration Rating Council (NFRC) 100 methodology using LBNL WINDOW 5.2 computer program.
  - .2 Centre of glass solar heat gain coefficient: NFRC 200 methodology using LBNL- 35298 WINDOW 5.2 computer program.
  - .3 Visible light transmittance: NFRC 200 methodology.
  - .4 Solar optical properties: NFRC 300 or LBNL Optics.
- .5 Glazing systems shall be capable of withstanding normal thermal movements, without failure, including loss due to defective manufacture, fabrication and installation; deterioration of glazing materials; and other defects in construction.
- .6 Protect laminated glass interlayer from damage or discolouration resulting from contact with deleterious and incompatible sealants, substances, and materials. Comply with manufacturer's recommended installation instructions.

## 2.3 GLASS MATERIALS

- .1 General:
  - .1 Single source responsibility: *Provide* materials from a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source and manufacturing plant for each type and class required.
- .2 Insulating glass units:
  - .1 Hermetically sealed, CAN/CGSB 12.8-97, minimum 12 mm (1/2") air space, air filled, double sealed edges (primary to be polyisobutylene, secondary to be polysulphide/polyurethane, desiccant filled aluminum spacer bar.
    - .1 The minimum thickness of the secondary seal shall be 1.59 mm (1/16").
    - .2 The target width of the primary seal shall be 3.97 mm (5/32").
    - .3 There shall be no voids or skips in the primary seal.

- .4 Gaps or skips between primary and secondary sealant are permitted to a maximum width of 1.59 mm (1/16") by maximum length of 50 mm (2") with gaps separated by at least 450 mm (18"). Continuous contact between the primary seal and the secondary seal is desired.
- .5 Both primary and secondary sealant adhesion shall exhibit continuous, tenacious adhesion to both glass and spacer contact areas.
- .2 Warm edge, hermetically sealed, CAN/CGSB 12.8-97, minimum 12 mm (1/2") air space, air filled, double sealed edges (primary to be polyisobutylene, secondary to be polysulphide, desiccant filled warm edge spacer (splice connectors at corner of each glass unit).
  - .1 The minimum thickness of the secondary seal shall be 1.59 mm (1/16").
  - .2 The target width of the primary seal shall be 3.97 mm (5/32").
  - .3 There shall be no voids or skips in the primary seal.
  - .4 Gaps or skips between primary and secondary sealant are permitted to a maximum width of 1.59 mm (1/16") by maximum length of 50 mm (2") with gaps separated by at least 450 mm (18"). Continuous contact between the primary seal and the secondary seal is desired.
  - .5 Both primary and secondary sealant adhesion shall exhibit continuous, tenacious adhesion to both glass and spacer contact areas.
  - .6 Warm edge spacer:
    - .1 Vinyl faced, electrolytic tinplated steel: Fenzi 'Warmedge' or equivalent.
    - .2 Spacer bar colour:
      - .3 Black.
- .3 IGMAC or IGMA/IGCC certified.
- .4 Low 'E' coating (double silver):
  - .1 Acceptable Products:
    - .1 Vitro Architectural Glass 'Solarban 90'.
    - .2 Or equivalent.
- .5 Glass thickness: 6 mm (1/4") minimum, and as required to suit design requirements.
- .6 Glass colour: clear, unless otherwise indicated in the *Contract Documents*.
- .7 Performance Requirements:
  - .8 Visible Light Transmittance: 41 percent minimum
  - .9 Winter Nighttime U-Factor: 0.47 (Btu/hr\*ft<sup>2</sup>\*°F) maximum
  - .10 Summer daytime U-Factor: 0.45 (Btu/hr\*ft<sup>2</sup>\*°F) maximum
  - .11 Shading Coefficient: 0.26 maximum
  - .12 Solar Heat Gain Coefficient: 0.23 maximum
  - .13 Outdoor Visible Light Reflectance: 16 percent maximum

- .3 Annealed (float) glass:
  - .1 Clear, annealed glass, 6 mm (1/4") thick minimum, CAN/CGSB 12.3-M91, Glazing Quality.
- .4 Heat treated (tempered or heat strengthened) float glass:
  - .1 CAN/CGSB 12.1-M90.
  - .2 *Provide* thickness as indicated or greater thickness as needed to comply with requirements. Minimum thickness: 6 mm (1/4").
  - .3 Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
  - .4 For uncoated glass, comply with requirements for Condition A in accordance with ASTM C1048-12e1.
  - .5 For coated vision glass, comply with requirements for Condition C (other coated glass) in accordance with ASTM C1048-12e1.
  - .6 Heat strengthened glass shall have surface compression of 24-52 MPa (3,500- 7,500 psi).
- .5 Mirrors:
  - .1 Annealed glass, to ASTM C1503-08(2013) as follows:
  - .2 Grade: Mirror Cut Size.
  - .3 Quality: Mirror Select Quality, except allowable distortion shall be  $\geq 80^\circ$  vision interference angle to ASTM C1036-11e1 Table 5.
  - .4 Colour: Clear.
  - .5 Thickness: 6 mm (1/4")
  - .6 Exposed edges shall be chamfered, ground, and polished.
- .6 Ceramic-coated spandrel glass:
  - .1 Glass treatment:
    - .1 Tempered float glass.
  - .2 Thickness: 6 mm (1/4") minimum thickness.
  - .3 Coating Location: Second surface.
  - .4 Fallout Resistance: Passes fallout-resistance test in ASTM C1048-12e1 for an assembly of glass and adhered reinforcing material.
  - .5 Ceramic enamel coating, baked on.
    - .1 Colour: Custom colour to later selection by the *Consultant*
  - .6 Acceptable ceramic coating manufacturers:
    - .1 Viracon Inc.
    - .2 Prelco Inc.
    - .3 Or equivalent.



.7 Frosted glass:

- .1 Glass type: Tempered or type as required to suit design requirements.
- .2 Surface treatment: Etching.
- .3 Level of opacity: As selected by Consultants

**2.4 FIRE PROTECTION RATED GLASS**

.1 Fire rated, impact safety resistant glass, non-wired:

- .1 Film-faced ceramic glazing:
  - .1 Fire-rated and impact safety-rated, clear ceramic glazing material with surface applied impact safety film, and listed for use in doors, sidelites, transoms, and borrowed lites in both interior and exterior applications, not functioning as a barrier to heat.
  - .2 Fire-ratings: as indicated or scheduled, from 20 minutes to 90 minutes, 3 hours in doors where applicable, with hose stream test.
  - .3 Impact Safety Resistance: ANSI Z97.1-2010 and CPSC 16 CFR 1201 (Cat. I and II).
  - .4 Surface finish:
    - .1 Premium Grade: clear glass, polished for superior optical clarity.
  - .5 Acceptable *Product*:
    - .1 Schott Gemtron (Canada) Corporation 'Pyran Platinum F'.
    - .2 Technical Glass Products Ltd. 'FireLite NT'.
    - .3 Or equivalent.

**2.5 GLAZING MATERIALS (NON-FIRE RATED)**

- .1 Glazing materials; general: Select glazing sealants, tapes, gaskets and additional glazing materials of proven compatibility with other materials they will contact, including glass products, seals of insulating glass units and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.
- .2 Glazing gaskets: Moulded or extruded gaskets of profile and hardness required to maintain watertight seal, made from the following:
  - .1 Preformed, EPDM to ASTM C864-05(2011).
- .3 Setting blocks: Moulded or extruded material with Shore, Type A Durometer hardness of 85, plus or minus 5, made from the following:
  - .1 Preformed, EPDM to ASTM C864-05(2011).
- .4 Spacers: Moulded or extruded blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated made from the following:
  - .1 Preformed, EPDM to ASTM C864-05(2011).
- .5 Edge blocks: Moulded or extruded material of hardness needed to limit glass lateral movement (side walking) made from the following:
  - .1 Preformed, EPDM to ASTM C864-05(2011).

- .6 Cleaners, primers and sealers: Type recommended by sealant or gasket manufacturer.
- .7 Polyurethane foam glazing tape:
  - .1 High density, closed-cell, flexible, non-extruding tape, adhesive backed one side only; recommended by manufacturer for exterior applications with nominal pressure in glazing channel.
  - .2 Acceptable manufacturer: Norton Company or equivalent.
  - .3 Acceptable products: As recommended by manufacturer suitable for conditions of application and use.
- .8 Silicone glazing (Weatherseal) sealant:
  - .1 Medium-modulus, neutral-curing silicone sealant; complying with ASTM C920- 11, Type M or S, Grade NS, Class 25.
  - .2 Acceptable products:
    - .1 Dow Corning '790' or '795'.
    - .2 Pecora Corporation '864' or '890'.
    - .3 Sika Canada Inc. 'Sikasil WS-290' or 'WS-295'.
    - .4 Tremco Inc. 'Spectrum 2'.
    - .5 Momentive Performance Materials Inc. 'SilGlaze II'.
    - .6 Or equivalent.
- .9 Mirror clips:
  - .1 Nickel plated, CR Laurence 'Vancouver' clips or equivalent.
- .10 Mirror adhesive: Palmer Mirro-Mastic, complete with sealer as required.

## **2.6 GLAZING ACCESSORIES (FIRE RATED)**

- .1 Glazing tape; fire-rated glass (non-wired):
  - .1 Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air and vapour seal.
- .2 Silicone sealant: One-part neutral curing silicone, medium modulus sealant, to ASTM C920-11, Type S; Grade NS; Class 25 with additional movement capability of 50 percent in both extension and compression (total 100 percent); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable.
  - .1 Acceptable Products:
    - .1 Dow Corning '795'.
    - .2 Momentive Performance Materials Inc. 'Silglaze-II 2800'.
    - .3 Tremco Inc. 'Spectrem 2'.
    - .4 Or equivalent.

- .3 Setting blocks: Neoprene or other resilient blocks of 40 to 50 Shore A durometer hardness, adhesive-backed on one face only, tested for compatibility with specified glazing compound.
- .4 Cleaners, primers, and sealers: Type recommended by manufacturer of glass and gaskets.

## **2.7 GLAZING FILMS**

- .1 Glazing Film: Refer to Architectural Drawings.
  - .1 Meets ASTM E84, Class A.
  - .2 Pressure-sensitive adhesive application
- .2 Provide barrier-free strips to comply with the Ontario Building Code Requirements for a barrier-free path of travel.
  - .1 Provide samples to the Consultant for approval.
  - .2 Basis of Design: Refer to Architectural Drawings

## **2.8 FABRICATION**

- .1 Factory sealed insulating glass units:
  - .1 Fabricate units to requirements of CAN/CGSB 12.8-97.
  - .2 Spacer core shall be straight and evenly set into glass units.
  - .3 Insulating glass units shall be manufactured to conform to IGMAC recommendations (Insulated Glass Manufacturers Association of Canada) and the manufacturer shall be a member of IGMAC. Sealed units shall bear IGMAC certification markings.
- .2 Grind, chamfer, and polish exposed glass edges, unless otherwise indicated in the *Contract Documents*.

# **PART 3 - EXECUTION**

## **3.1 EXAMINATION**

- .1 Examine framing, glazing channels, and stops, with glazing installer present, for compliance with the following:
  - .1 Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - .2 Inspect butt and mitre joints in framing. Seal joints found to be open with a compatible sealant prior to glazing.
  - .3 Glazing pockets and surfaces are free of dust, construction debris, and contaminants.
  - .4 Presence and functioning of weep systems.
  - .5 Minimum required face and edge clearances as per IGMA and GANA standards.
  - .6 Effective sealing between joints of glass-framing members.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- .1 Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- .2 Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.
- .3 Clean contact surfaces with solvent and apply primers to surfaces to receive tapes and sealants in accordance with the manufacturer's instructions. Ensure surfaces are free of moisture and frost.

### **3.3 GLAZING - GENERAL**

- .1 Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- .2 Adjust glazing channel dimensions as required by conditions during installation to *Provide* necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- .3 Protect glass edges from damage during handling and installation. Remove damaged glass from the *Site* and legally dispose of off *Site*. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- .4 Clean glazing rebate surfaces of traces of dirt, dust, or other contaminants.
- .5 Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- .6 Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- .7 Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- .8 *Provide* spacers for glass lites where length plus width is greater than 1270 mm (50").
  - .1 Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  - .2 *Provide* 3.2 mm (1/8") minimum bite of spacers on glass and use thickness equal to sealant width.
- .9 *Provide* edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel.
- .10 Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- .11 Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- .12 Glaze hollow metal doors and frames specified under work of Section 08 11 13 using tape glazing installation.

- .13 Install fire rated glazing in accordance with fire rated glazing material manufacturer's specifications. Field cutting or tampering is not permissible.

### **3.4 TAPE GLAZING**

- .1 Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- .2 Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- .3 Cover vertical framing joints by applying tapes to heads and sills first and then to jambs.
- .4 Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- .5 Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- .6 Do not remove release paper from tape until right before each glazing unit is installed.
- .7 Centre 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 toward centres of openings.

### **3.5 GASKET GLAZING (DRY)**

- .1 Allow gaskets to relax and cut compression gaskets to lengths recommended by gasket manufacturer to fit openings to suit frame dimensions.
- .2 Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- .3 Installation with drive-in wedge gaskets: Centre 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 toward centres of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- .4 Installation with Pressure-Glazing Stops: Centre glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- .5 Install gaskets so they protrude past face of glazing stops.

### **3.6 SEALANT GLAZING (WET)**

- .1 Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- .2 Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

- .3 Tool exposed surfaces of sealants to *Provide* a substantial wash away from glass.

### **3.7 INSTALLATION – MIRRORS**

- .1 *Provide* frameless mirrors only. Grind and polish exposed mirror edges.
- .2 Mount mirrors in true planes, free of distortions. Surfaces of butted mirrors shall be flush to  $\leq 1$  mm (0.04"). Mirror installation shall be flat to within 1.5 mm in 1220 mm (1/16" in 4 ft).
- .3 Locate joints in mirrors at maximum available mirror sizes to the *Consultant's* direction, unless otherwise indicated. *Provide* butt joints with flat ground and polished edges to *Provide* inconspicuous joint complete with black tape behind joint to hide wall substrate.
- .4 Mastic adhesive and top and bottom support clip installation:
  - .1 Secure mirrors in place over mastic adhesive with metal clips. Locate clips at not more than 914 mm (36") on centre on top and bottom edges of mirrors.
  - .2 Make sure mirror and substrate are free of dust, clean, and dry. On nonporous substrates, such as glass, tile, or metal, sealing is not necessary. On porous substrates, such as drywall or wood, use Mirro-Mastic Bond (or a primer or sealer, not paint) on the substrates and allow it to dry. Painted surfaces should be sanded through to the original surface and the substrate cleaned and sealed where the mastic is to be applied.
  - .3 Support mirror at the bottom using concealed bottom angles.
  - .4 Apply mirror adhesive to the mirror or substrate in a minimum of 1 ping-pong ball size mound for every 0.0929 m<sup>2</sup> (1 ft<sup>2</sup>) of mirror. Do not apply mastic too close to the edge to prevent "squeeze out". Place the mounds so space will be left between them when the mirror is installed. Mastic adhesive shall be at room temperature (22°C).
  - .5 Press mirror firmly in place making good contact between the mirror, mastic, and substrate. Mastic should spread to a pat approximately 114 mm (4-1/2") in diameter. The mastic needs air circulation to cure properly. Curing time will depend on temperature, humidity, type of substrate, and amount of air that can reach the mastic.

### **3.8 INSTALLATION – GLASS FILM**

- .1 Install film with adhesive, applied in accordance with film manufacturer's written instructions.
- .2 Comply with requirements of the Building Code regarding the installation of film at vision panel in doors and in doors in a barrier free-path of travel.
- .3 Place without air bubbles, creases or visible distortion.
- .4 Fit tight to glass perimeter with razor cut edge.

### **3.9 FIELD QUALITY CONTROL**

- .1 Conduct quality control in accordance with Section 01 45 00.

### **3.10 PROTECTION**

- .1 *Provide* safety markings to installed glass by attaching streamers or tape to face of sash. Do not apply tape directly to the glass. Do not mark the glass with paint or any other substance that is hard to remove or could leave permanent stains.
- .2 Take all precautions necessary to protect stored glass and installed glass from lime mortar, water run-off from concrete or copper, weld spatter, acids, roofing tar, solvents, abrasive cleaners,

careless handling of construction machinery and equipment, and any other activities that could permanently damage the glass.

- .3 Install protective cover to glass where there is a high risk of damage. Use plywood, heavy kraft paper, or non-staining transparent plastic sheet. Do not let protective materials contact surface of glass.
- .4 Do not rely on use of adhesive plastic films to protect installed glass. When plastic sheeting is used, it must be transparent, suspended away from the surface of the glass, and be provided with adequate ventilation holes to prevent heat build-up.

### **3.11 FINISHING**

- .1 Immediately remove sealant and compound droppings from finished surfaces. Remove labels after work is completed.
- .2 Final cleaning of glass in accordance with Section 01 77 00.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Quality Assurance
- .6 2.1 Materials - General
- .7 2.2 Partition Support Materials
- .8 2.3 Ceiling Support Materials And Systems
- .9 2.4 OSB Sheathing
- .10 3.1 Installation General
- .11 3.2 Metal Stud Partition & Ceiling Framing
- .12 3.3 Control Joints
- .13 3.4 Field Quality Control

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Metal support systems for interior partitions, interior ceilings and interior assemblies as indicated.

### **1.4 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section, including additional data as may be required to demonstrate compliance with the *Contract Documents*.
- .3 Test and evaluation reports:
  - .1 Submit certified test results for each required fire resistance rated assembly for work of this section.

### **1.5 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Installers / applicators / erectors:
    - .1 *Provide* work of this section, executed by a *Subcontractor* with a minimum 5 years' experience in application of Products, systems and assemblies specified and with approval and training of *Product* manufacturers.



## **PART 2 - PRODUCTS**

### **2.1 MATERIALS - GENERAL**

- .1 For sheet metal Products: Sheet metal thickness indicated herein pertains to the "minimum base steel thickness exclusive of coating".

### **2.2 PARTITION SUPPORT MATERIALS**

- .1 Interior non-loadbearing channel stud framing: to ASTM C645-14; roll formed from 0.455 mm (0.0179") minimum thickness unless otherwise indicated, electro-galvanized steel sheet. *Provide* service holes starting at 450 mm (18") from bottom, then 914 mm (36") on centre to top of studs.
  - .1 Steel studs; at backer plate locations: 0.836 mm (0.0329") minimum thickness.
  - .2 Steel studs at cement board locations: 0.836 mm (0.0329") minimum thickness.
  - .3 Steel studs at tile backer board locations: 0.836 mm (0.0329") minimum locations.
- .2 Interior floor and ceiling tracks (runners): to ASTM C645-14; in widths to suit stud sizes.
  - .1 Metal thickness: to match studs.
  - .2 For openings wider than 914 mm (36"), *Provide* 0.836 mm (0.0329") minimum thickness for header.
- .3 Bracing channels: Minimum 19 mm x 10 mm x 1.087 mm (3/4" x 3/8" x 0.0428") cold rolled galvanized steel.

### **2.3 CEILING SUPPORT MATERIALS AND SYSTEMS**

- .1 General: Size ceiling support components to comply with ASTM C754-15 unless otherwise indicated in the *Contract Documents*.
- .2 Main runners: Steel channels, hot or cold rolled; Z180 (G60) galvanized where used in shower rooms, other wet areas, and outdoors.

### **2.4 OSB SHEATHING**

- .1 OSB Sheathing: 13mm OSB; fastened to studs for attachment of FRP panel.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION GENERAL**

- .1 Comply with ASTM C754-15 and manufacturer's instructions, except as modified herein. Do not bridge building expansion joints with support system. Frame both sides of joints with furring and other supports as indicated.
- .2 *Provide* and install studs, framing, shimming, and furring to *Provide* proper support for gypsum board to achieve the following installation tolerances:
  - .1 Do not exceed 3 mm (1/8") in 3 m (10') variation from plumb, level, and plane.
  - .2 Do not exceed 10 mm (3/8") from the Drawing locations.
  - .3 Do not exceed 1.5 mm (1/16") variation between planes of abutting edges or ends.
  - .4 Install each framing member so fastening surfaces vary not more than 3.2 mm (1/8") from the plane formed by faces of adjacent framing.

- .3 Give complete cooperation and direction to trades erecting framing and furring over which this work is applied. Coordinate finished joint location with framing.
- .4 Coordinate installation and cooperate with mechanical and electrical work to accommodate mechanical electrical items and any other work required to be incorporated into or coordinated with the partitions, ceiling, and soffit systems.
  - .1 Where the presence of suspended ductwork or other mechanical or electrical services or devices above ceiling framing conflicts with ceiling framing suspension points from structure above, provide bridging framing below conflicting work as required to support ceiling framing on specified intervals.
  - .2 Do not suspend ceiling framing from mechanical or electrical suspension systems unless agreement is obtained in writing from Professional Engineer for *Subcontractor* installing such framing that additional imposed loads are acceptable; obtain the *Consultant's* acceptance before proceeding.
- .5 *Provide* clearances between work of this section and structural elements to prevent transference of structural loads.
- .6 Do not bridge building expansion joints with steel framing or furring members. Independently frame both sides of joints with framing or furring members or as indicated.
- .7 Size framing systems according to manufacturer's engineered load tables, to meet allowable deflection without permanent deformation.
  - .1 Maximum allowable deflection: L/240.
  - .2 Maximum allowable deflection for tiled partitions: L/360.

### 3.2 METAL STUD PARTITION & CEILING FRAMING

- .1 *Provide* partition tracks (runners) at floor and underside of structural assembly and as follows:
  - .1 Align accurately and lay out according to partition layout.
  - .2 Secure runners to concrete access flooring and to concrete slabs, as applicable, with screwed or shot fasteners located 50 mm (2") from each end and spaced at maximum 610 mm (24") on centre.
  - .3 At partition corners, extend one runner to end of corner and butt other runner to it, allowing necessary clearance for gypsum board thickness. Runners should not be mitred.
- .2 Unless otherwise indicated, place interior studs vertically at centres as follows:
  - .1 *Provide* studs at 400 mm (16") on centre, and as specially spaced in accordance with details indicated.
  - .2 *Provide* studs not more than 50 mm (2") from abutting walls, openings, and each side of corners.
  - .3 *Provide* freedom for 19 mm (3/4") deflection under beams, structural slabs and the like to avoid transmission of structural loads to studs or install 50 mm (2") leg ceiling tracks.
- .3 Install studs in tracks at floor and ceiling.
- .4 Where horizontal runs of service lines are scheduled to be installed, arrange with applicable trades and install studs simultaneously with services.

- .5 At openings in stud walls, erect track at head and sills to accommodate intermediate studs. At each end of track, cut out flanges, turn up web, and fasten to studs. Install intermediate studs above and below openings in same manner and spacing as wall studs. Install double studs at each jamb, and double tracks at head of door openings.
- .6 At partitions requiring fire rating, erect in accordance with requirements of listing.
- .7 Size studs, connections, and runners to carry loads according to stud manufacturer's load tables, at 24 kg/m<sup>2</sup> (5 lb/ft<sup>2</sup>) live load to meet maximum allowable deflection limits. Where depth of stud is indicated, size metal thickness to meet allowable deflection limits.
- .8 *Provide* three studs at corner and intermediate intersections of partitions.
- .9 Coordinate work with others installing horizontal runs of service lines so that work is done simultaneously. Where standard holes are too small for installed services, notch studs, and splice notched flanges with splice pieces 305 mm (12") longer than notches, each fastened with 2 screws.
- .10 *Provide* metal studding to maximum tolerance of 3 mm in 3 m (1/8" in 10 ft).
- .11 Coordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .12 Coordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other sections.
- .13 Unless otherwise indicated, partitions, together with gypsum board facings, shall extend above ceilings to underside of structure above.
- .14 Maintain clearance to avoid transference of structural loads to studs.
- .15 Chase walls:
  - .1 *Provide* chase walls where indicated, consisting of two parallel steel stud partitions.
  - .2 *Provide* cross bracing consisting of metal furring, located at quarter points on each pair of studs. Attach cross bracing to studs with metal screws. Coordinate construction of partitions to suit installation of services.
- .16 Lateral support bracing channels:
  - .1 Stiffen partitions over 3 m (10') in vertical span, at mid-height to maximum vertical spacing of 2440 mm (8') on centre, with at least one 19 mm (3/4") horizontal bracing channel, extending full length of partition, overlapping at least two stud spaces at ends of bracing channels.
  - .2 Stiffen partitions at not more than 150 mm (6") from the top and bottom of openings and across two full stud spaces at each side of openings with horizontal bracing channel.

### 3.3 CONTROL JOINTS

- .1 Control joints: in accordance with Section 09 29 00.

### 3.4 FIELD QUALITY CONTROL

- .1 Conduct quality control in accordance with Section 01 45 00.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Quality Assurance
- .6 1.6 Delivery, Storage, and Handling
- .7 1.7 Field Conditions
- .8 2.1 Performance/Design Requirements
- .9 2.2 General
- .10 2.3 Gypsum Board Panels
- .11 2.4 Cement Board Panels
- .12 2.5 Attachment Materials
- .13 2.6 Accessories
- .14 2.7 Related Support Assemblies and Backer Plates
- .15 2.8 Joint Treatment Materials
- .16 2.9 Acoustic Wall Assembly Materials
- .17 2.10 Access Doors
- .18 3.1 Installation
- .19 3.2 Accessories
- .20 3.3 Board Application - General
- .21 3.4 Water Resistant Gypsum Board Application
- .22 3.5 Exterior Sheathing Board Application – Gypsum Sheathing Board
- .23 3.6 Interior Tile Backer Board Application
- .24 3.7 Interior Cement Board
- .25 3.8 Acoustic Wall Assemblies
- .26 3.9 Finishing
- .27 3.10 Fire Separations
- .28 3.11 Access Doors
- .29 3.12 Adjusting and Cleaning

### **1.3 SUMMARY**

- .1 Section Includes
  - .1 Gypsum board; plain.
  - .2 Gypsum board; fire-rated.

- .3 Water resistant backing board; paper faced gypsum.
- .4 Tile backer board; cement board.
- .5 Exterior sheathing board; glass scrim gypsum sheathing board.
- .6 Gypsum board accessories and miscellaneous related materials.

#### **1.4 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section.
- .3 Fire-rated assembly listings:
  - .1 Submit fire-rated assembly listings for each required fire resistance rated assembly for work of this section.

#### **1.5 QUALITY ASSURANCE**

- .1 *Subcontractor* executing the work of this section shall have a minimum of 10 years' continuous experience in successful installation of work of type and quality indicated and specified.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 Store materials in protected dry areas. Store gypsum board flat in piles with edges protected.
- .2 Ensure that finish metal members are not bent, dented, or otherwise deformed.
- .3 Deliver Products supplied under the work of this section only to those who are responsible for installation, to the place they direct, and to meet installation schedules.
- .4 Package fire rated materials with labels attached.

#### **1.7 FIELD CONDITIONS**

- .1 Comply with requirements of referenced gypsum board application standards and recommendations of gypsum board manufacturer, for environmental conditions before, during and after application of gypsum boards.
- .2 When ambient outdoor temperatures are below 12°C maintain continuous, uniform comfortable building working temperatures of not less than 12°C for a minimum period of 48 hours before, during and following application of gypsum board and joint treatment materials or bonding of adhesives.
- .3 Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent too rapid drying.
- .4 Protection:
  - .1 *Provide* adequate protection of materials and work of this section from damage by weather and other causes. Protect work of other trades from damage resulting from work of this section. Make good such damage at no additional cost to the *Owner*.

- .2 Exterior sheathing board's exposure to weather: Comply with manufacturer's printed instructions. *Provide* protection prior to exposure for periods greater than manufacturer's recommendations and warranty.

## **PART 2 – PRODUCTS**

### **2.1 PERFORMANCE/DESIGN REQUIREMENTS**

- .1 Fire resistance rating:
  - .1 Where gypsum board systems with fire resistance ratings are indicated or required, *Provide* materials and installations that are identical with those of applicable assemblies tested by fire testing laboratories acceptable to *Authorities Having Jurisdiction*.

### **2.2 GENERAL**

- .1 Single source responsibility: Obtain gypsum board products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.

### **2.3 GYPSUM BOARD PANELS**

- .1 Plain gypsum board:
  - .1 Paper faced gypsum core panel solid set core enclosed in paper, 12.7 mm (1/2") or 16 mm (5/8") thick unless otherwise indicated, 1220 mm (48") wide x maximum practical length, ends square cut, tapered edges, to ASTM C1396/C1396M-11.
  - .2 Acceptable Products:
    - .1 CertainTeed 'Regular Gypsum Board'.
    - .2 CGC Inc. 'SHEETROCK Gypsum Panel, Regular'.
    - .3 Georgia-Pacific 'ToughRock Gypsum Board'.
    - .4 Lafarge 'Gypboard'.
    - .5 National Gypsum 'Gold Bond Gypsum Board'.
    - .6 Or equivalent.
- .2 Fire-rated gypsum board:
  - .1 Paper faced gypsum core panel with a specially formulated core for use in fire- resistive Type X or Type C designs, to ASTM C1396/C1396M-11.
  - .2 Acceptable Products:
    - .1 CertainTeed 'Type X and Type C'.
    - .2 CGC Inc. 'SHEETROCK Firecode and Firecode C'.
    - .3 Georgia-Pacific 'ToughRock Fireguard and Fireguard Gypsum Board'.
    - .4 Lafarge 'Firecheck C and X'.
    - .5 National Gypsum 'Gold Bond Fire-Shield and Fire Shield C Gypsum Board'.
    - .6 Or equivalent.
- .3 Water resistant gypsum backing board (greenboard), wall applications:

- .1 Paper faced gypsum core panel with enhanced water and water resistant paper facers to ASTM C1396/C1396M-11, fire rated where indicated.
- .2 Acceptable Products:
  - .1 CertainTeed 'ProRoc Moisture Resistant'.
  - .2 CGC Inc. 'SHEETROCK Mold Tough Panel'.
  - .3 Georgia-Pacific 'ToughRock Moisture-Guard'.
  - .4 Lafarge 'Mold Defense'.
  - .5 Or equivalent.
- .4 Exterior sheathing board:
  - .1 Service grade: Exterior grade.
  - .2 Fibreglass mat faced on front and back sides and long edges, silicone-treated water-resistant core, to ASTM C1177/C1177M-08, fire rated where indicated.
    - .1 Acceptable Products:
      - .1 CertainTeed 'GlasRoc Sheathing'.
      - .2 CGC Inc. 'Securock Glass-Mat Sheathing'.
      - .3 Georgia-Pacific 'Dens-Glass Gold'.
      - .4 Lafarge; Weather Defense Platinum Sheathing'.
      - .5 Or equivalent.

## **2.4 CEMENT BOARD PANELS**

- .1 Cement board; interior and exterior grade, tile backer board and sheathing applications:
  - .1 Composition:
    - .1 Portland cement, sand, and expanded polystyrene beads, with a fully embedded alkali resistant glass fibre mesh facing.
    - .2 Free of asbestos, gypsum, organic fibres or cellulose.
  - .2 Thickness: 12.7 mm (1/2") minimum.
  - .3 Acceptable Products:
    - .1 CGC 'Durock'.
    - .2 National Gypsum 'PermaBase Plus Cement Board'.
    - .3 Or equivalent.

## **2.5 ATTACHMENT MATERIALS**

- .4 Screws; for gypsum board: bugle head, fine thread, self-tapping, Type W or S or S-12 point to suit framing type and metal gauge, with corrosion resistant finish to ASTM C1002-07/ASTM C954-11. Screw sizing:
  - .1 #6 x 25 mm (1") for single thickness board fastening.

- .2 #6 x 32 mm (1-1/4") for single thickness 15.9 mm (5/8") board fastening.
- .3 #7 x 41 mm (1 5/8") for double thickness board fastening.
- .5 Screws; for cement board: Wafer head, Type S-12 point or 'Hi-Lo', self-tapping, with corrosion resistant polymer finish.
- .6 Tie wire: 1.6 mm (0.063") diameter galvanized soft annealed steel wire.

## 2.6 ACCESSORIES

- .1 Accessories: to ASTM C1047-14a unless otherwise indicated, maximum length pieces per location. Flanges shall be free from dirt, grease, or other material that adversely affects the bond of joint treatment or decoration.
- .2 Trim reveal:
  - .1 Standard metal trim reveal for suspended gypsum board walls or ceilings abutting concrete block walls, suitable for paint finish in all locations except where indicated otherwise in the *Contract Documents*.
- .3 Control joints: No. 093 Zinc Control Joint by CGC Inc. or equivalent, certified by manufacturer for use at fire resistance rated assemblies.
- .4 Casing beads, corner beads: 0.5 mm (0.02") base thickness commercial grade sheet steel with Z275 zinc finish to ASTM A525, perforated flanges, one piece length per location.

## 2.7 RELATED SUPPORT ASSEMBLIES AND BACKER PLATES

- .1 Dimensional wood blocking at interior assemblies: in accordance with Section 06 10 53.
- .2 Metal support systems and backer plates at interior assemblies: in accordance with Section 09 22 00.

## 2.8 JOINT TREATMENT MATERIALS

- .1 General: Comply with ASTM C475/C475M-12e1.
- .2 Joint tape:
  - .1 Interior gypsum board: Paper.
  - .2 Glass-mat gypsum sheathing board: 10-by-10 glass mesh.
  - .3 Tile backing panels: As recommended by panel manufacturer.
- .3 Joint compound for interior gypsum board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
  - .1 Prefilling: Use setting-type compound as recommended by panel manufacturer.
  - .2 Embedding and first coat: Use setting-type or taping compound as recommended by panel and trim manufacturers.
  - .3 Fill and finish coats: Use sanding type setting-type or taping compound as recommended by panel manufacturer.
- .4 Joint compound for exterior applications:
  - .1 Glass-mat gypsum sheathing board: As recommended by sheathing board manufacturer.



- .5 Joint compound for tile backing panels:
  - .1 Cementitious backer units: As recommended by backer unit manufacturer.
  - .2 Water-resistant gypsum backing board: Use setting-type taping compound and setting-type, sandable topping compound.

## **2.9 ACOUSTIC WALL ASSEMBLY MATERIALS**

- .1 Acoustic sealant; concealed locations: non-skinning butyl sealant, non-hardening, remains soft and tacky, to CGSB 19.21-M87:
  - .1 Sealant shall not deteriorate (stain or bleed into) painted surfaces.
  - .2 Acceptable Products:
    - .1 DAP 'Mono Acoustic Sealant'.
    - .2 Pecora 'BA98'.
    - .3 Quiet Solution 'QuietSeal'.
    - .4 Tremco 'Acoustical Sealant'.
    - .5 Or equivalent (substitutions in accordance with Section 01 25 00).
- .2 Acoustic sealant; exposed locations: Interior paintable sealant in accordance with Section 07 92 00.
- .3 Acoustic compound: premixed perlite plaster.
- .4 Acoustic (sound attenuation) insulation:
  - .1 Mineral-fibre sound attenuation batts: to CAN/ULC S702-09, Type 1, fire resistant and non-combustible to CAN/ULC-S114-05, high density for sag-free, tight fitting installation.
    - .1 Density: minimum 40 kg/m<sup>3</sup> (2.5 lbs/ft<sup>3</sup>).
    - .2 Acceptable Products:
      - .1 Roxul 'AFB'.
      - .2 Or equivalent.
  - .2 Fasteners: use mechanical fasteners where required to secure insulation into position in accordance with insulation manufacturer.

## **2.10 ACCESS DOORS**

- .1 Access doors: in accordance with Divisions 21, 22, and 23 and Divisions 26, 27, and 28.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- .2 General: Comply with ASTM C840-11, GA-216, GA-600, and manufacturer's instructions, except as otherwise indicated. Do not bridge building expansion joints with support system. Frame both sides of joints with furring and other supports as indicated.

- .3 Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1.6 mm (1/16") open space between boards. Do not force into place.
- .4 Cover both faces of stud partition framing with gypsum board in concealed spaces (above ceiling, and the like) unless otherwise indicated, except in chase walls which are properly braced internally.
- .5 Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cut-outs.
- .6 Securely attach trim, casings, framing, and accessories.
- .7 Apply components of fire-rated assemblies in conformance with indicated designs.
- .8 Erect materials to dimensions indicated, plumb, level, straight, and square to adjoining elements.
- .9 Do not apply gypsum board in close proximity to hot pipes or heating ducts.
- .10 Install materials with the minimum number of joints. Tightly butt joints, without force, and neatly align them.
- .11 Frame openings on every side. *Provide* clearances with services.
- .12 *Work* shall include bulkheads over doors, frames, screens, and changes in ceiling levels, pipe space and as indicated.
- .13 *Provide* clearances between work of this section and structural elements to prevent transference of structural loads in accordance with Section 09 22 00.
- .14 Tolerances:
  - .1 Do not exceed 3 mm (1/8") in 3 m (10') variation from plumb, level, and plane in exposed surfaces, except at end joint between gypsum board panels.
  - .2 Do not exceed 10 mm (3/8") from indicated location.
  - .3 Do not exceed 1.5 mm (1/16") variation between planes of abutting edges or ends.
  - .4 Surface flatness shall not exceed 1.5 mm (1/16") within 305 mm (12") straight edge. For non-tapered-edge end joints between boards, measure flatness tolerance with end of straight end at centreline of joint.

### 3.2 ACCESSORIES

- .1 At external corners install corner trim secured to framing at 230 mm (9-1/16") on centre on both flanges with screw fasteners or clinch tool.
- .2 Secure casing trim at board edges where exposed to view, where board butts against other materials with no trim to conceal junction, at perimeter of ceiling surfaces at tops of partitions where they stop against continuous ceiling surfaces, and where indicated.
- .3 Erect accessories straight, plumb or level, rigid and at proper plane.
- .4 Use full length pieces.
- .5 Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners, free from rough edges. Secure in accordance with manufacturer's specifications unless otherwise required.
- .6 Installation tolerances:

- .1 Alignment with board panels shall not exceed tolerances specified above.
- .2 End joints shall be flush aligned to maximum offset of 0.5 mm (0.020").

### 3.3 BOARD APPLICATION - GENERAL

- .1 Before application of gypsum board commences, ensure that internal services have been installed, tested, and approved; that conduits, pipes, cables, and outlets are plugged, capped, or covered; and that fastenings and supports installed by others are in place.
- .2 Extend board into door, window, and other openings, reveals, behind fitments, and other applied items and on metal stud partitions to structure above unless indicated otherwise in the *Contract Documents*.
- .3 Apply board with long dimension perpendicular to supports, unless otherwise indicated in the *Contract Documents*.
- .4 Locate joints on opposite sides of partitions on different studs, and at least 305 mm (12") from opening jambs.
- .5 Install board to minimize joints, and align end joints to be the least objectionable (where they are unavoidable), according to the indicated lighting design. Locate joints in ceilings where least prominently discerned, and never line them up with opening edges.
- .6 Form smooth joints at ends and at field cut edges of board panels.
- .7 Fasten board to metal support members by metal gypsum board screws, 9.5 mm (0.374") minimum to, and 12.7 mm (1/2") maximum from, center of joints. Space screws:
  - .1 At fire rated board as per fire-rated assembly.
  - .2 At typical board walls at 400 mm (16") on centre at edges and field unless otherwise required.
  - .3 At typical board ceilings at 305 mm (12") on centre at edges and field unless otherwise required.
- .8 At laminated plain gypsum board locations: Apply adhesive with notched spreader to leave ribbons 10 mm x 13 mm (3/8" x 1/2") at 38 mm (1-1/2") apart over entire back side of face layer. Erect board immediately after spreading adhesive. Temporarily secure face boards with screws or bracing to ensure adequate bond until adhesive sets. Temporary face screws may also be used. Substrate shall be fully cured and sufficiently dry to allow adhesive to fully cure and not re-emulsify.
- .9 Offset gypsum board joints 150 mm (6") minimum from corners of openings.
- .10 Gypsum panel product joints shall be located so that no joint will align with the edge of an opening unless control joints are to be installed at these locations.

### 3.4 WATER RESISTANT GYPSUM BOARD APPLICATION

- .1 Apply water resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.

### 3.5 EXTERIOR SHEATHING BOARD APPLICATION – GYPSUM SHEATHING BOARD

- .2 Install sheathing in accordance with manufacturer's instructions and applicable instructions in GA-253, ASTM C1280-13, and ASTM C1397-13. Do not bridge building expansion joints with support system. Frame both sides of joints with furring and other supports as indicated in the *Contract Documents*.

- .3 Use maximum board lengths to minimize number of joints. Sheathing joints shall be staggered, offset by at least one framing member. Offset gypsum board joints 150 mm (6") minimum from corners of openings.
- .4 Install sheathing with exterior board side facing exterior. Butt boards together for a light contact at edges and ends with not more than 1.6 mm (1/16") open space between boards. Do not force into place.
- .5 Drive fasteners to bear tight against and flush with surface of sheathing. Do not countersink.
- .6 Locate fasteners minimum 10 mm (3/8") from edges and ends of sheathing boards.
- .7 *Provide* clearances between work of this section and structural elements to prevent transference of structural loads, and in no case less than 16 mm (5/8").
- .8 Tolerances:
  - .1 Sheathing where acting as substrate for direct applied or insulated finishing system shall be flat to within 6 mm in 3050 mm (1/4" in 10'), in accordance with ASTM C1397-13.
  - .2 Maximum gap between board joints: 1.6 mm (1/16").

### 3.6 INTERIOR TILE BACKER BOARD APPLICATION

- .1 Install in accordance with manufacturer's specifications.
- .2 Section 09 31 00 to install tile setting material over tape installed by this section. Install mesh tape centred over tile backer board joints.
- .3 Apply tile backer board full height unless otherwise indicated, and in accordance with manufacturer's installation instructions. Install water barrier sheeting over gypsum board substrates, where applicable.
- .4 Fastener spacing:
  - .1 Walls: fasten at 150 mm (6") on centre at vertical butt joints and 210 mm (8") on centre in field.
  - .2 Ceilings: fasten at 150 mm (6") on centre.
- .5 Maintain 6 mm (1/4") gap between board and tub or shower base as applicable.

### 3.7 INTERIOR CEMENT BOARD

- .1 Apply cement board with rough side towards interior, as and with ends applicable, and edges over supports. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses.
- .2 Fasten cement board to framing with specified fasteners. Drive fasteners in field of cement board first, working toward ends and edges. Hold cement board in firm contact with framing while driving fasteners. Space fasteners along framing with perimeter fasteners at least 9.5 mm (0.374") and less than 15.9 mm (5/8") from ends and edges. Drive fasteners so bottom of heads are flush with surface of cement board to *Provide* firm board contact with framing. Do not drive fastener heads below panel surface.
  - .1 Maximum fastener spacing as follows:
    - .1 Walls: 200 mm (8").

- .2 Ceiling: 150 mm (6").
- .3 Perimeters: minimum 9.5 mm (3/8") and maximum 15.9 mm (5/8") from ends and edges.

### **3.8 ACOUSTIC WALL ASSEMBLIES**

- .1 Sound attenuation insulation:
  - .1 Install sound attenuation insulation to fill cavity unless otherwise indicated in the *Contract Documents*.
  - .2 Trim insulation to *Provide* close-fit contact to framing assemblies and fill the partition cavity or acoustic insulation assemblies to thicknesses specified or indicated.
  - .3 Maintain air space between backs of sound attenuation insulation and back of opposite partition face layer, as applicable.
  - .4 Cut insulation to *Provide* close-fit contact around electrical boxes, pipes, and other obstructions and penetrations through and within acoustic assemblies.
  - .5 Extend acoustic partition assemblies to underside of structure. Incorporate approved provision to prevent transmittance of structural deflection to partition assembly.
  - .6 Staple sound attenuation insulation where required by manufacturer's installation instructions.
  - .7 Where studs are not faced with gypsum board on both sides, mechanically fasten wire mesh to non-faced side of stud to retain insulation.
  - .8 Mechanically attach sound attenuation insulation in wall assemblies where cavity of wall assembly is greater than 150 mm (6").
  - .9 Secure insulation in such a manner that it will not sag or settle away from required locations.

### **3.9 FINISHING**

- .1 *Provide* levels of gypsum board finish for locations as follows, in accordance with GA- 214.
  - .1 Level 1: Ceiling plenum areas and concealed areas, except *Provide* higher level of finish as required to comply with fire resistance ratings and acoustical ratings.
  - .2 Level 2: Gypsum board substrate at applied hard surfaces, except remove tool marks and ridges.
  - .3 Level 4: Exposed gypsum board surfaces, except where another finish level is indicated the in the *Contract Documents*.
  - .4 Level 5: Exposed gypsum board surfaces where indicated in the *Contract Documents*.
- .2 Interior gypsum board:
  - .1 Prefill:
    - .1 Use setting-type joint compound. Mix joint compound according to manufacturer's directions.
    - .2 Fill joints between boards flush to top of eased or beveled edge.
    - .3 Fill joints of gypsum board above suspended ceilings in fire rated partitions.
    - .4 Wipe off excess compound and allow compound to harden.

- .5 Joint gaps not greater than 3.2 mm (1/8") shall be prefilled with either ready- mix or setting type joint compound; joint gaps greater than 3.2 mm (1/8") shall be prefilled with setting-type joint compound.
- .2 Taping (Level 1):
  - .1 Butter taping compound into inside corners and joints.
  - .2 Center tape over joints and press down into fresh compound.
  - .3 Remove excess compound.
  - .4 Tape joints of gypsum board above suspended ceilings.
- .3 First coat (Level 2):
  - .1 Use taping or all-purpose drying-type compound.
  - .2 Immediately after bedding tape, apply skim coat of compound and allow to dry completely in accordance with manufacturer's instructions.
  - .3 Apply first coat of compound over flanges of trim and accessories, and over exposed fastener heads and finish level with board surface.
  - .4 Fastener heads and accessories shall be covered with 1 coat of joint compound.
- .4 Second coat (Level 3): After first coat treatment is dried, apply second coat of compound over tape and trim, feathering compound 50 mm (2") beyond edge of first coat.
  - .1 Fastener heads and accessories shall be covered with total of 2 separate coats of joint compound.
- .5 Third coat (Level 4):
  - .1 After second coat has dried, sand surface lightly and apply thin finish coat to joints, fasteners and trim, feathering compound 50 mm (2") beyond edge of second coat.
  - .2 Allow third coat to dry. Apply additional compound, and touch-up and sand, to *Provide* surface free of visual defects, tool marks, and ridges, and ready for application of finish.
  - .3 Finished joints will be accepted with a camber not greater than 1 mm (1/32") and shall be seamless, plumb, true and flush and with square, neat corners.
  - .4 Fastener heads and accessories shall be covered with total of 3 separate coats of joint compound.
- .6 Skim coat (Level 5):
  - .1 After the fourth coat has dried, apply skim coat of topping or all-purpose drying-type compound over exposed surfaces of gypsum board.
  - .2 After skim coat has dried, touch-up and sand to *Provide* surface free of visual defects, tool marks, and ridges, and ready for application of finish.
- .3 Water-resistant gypsum board: Treat fastener heads and joints with setting-type joint compound.
  - .1 For joints to be covered with tile, apply tape and joint compound bedding coat and skim coat only; do not apply finish coats.
  - .2 Do not crown joints or leave excess compound on panels.

- .3 Remove tool marks and ridges.
- .4 For fastener heads to be covered with tile, apply one coat of joint compound.
- .4 Interior tile backer board: Prepare and finish joints in accordance with manufacturer's instructions.
- .5 Cement board: Prepare, tape, and finish joints in accordance with manufacturer's instructions.
- .6 Joint compound:
  - .1 Apply finish coat of compound feathering 75 to 100 mm (3" to 4") beyond tape edges.
  - .2 Feather coats onto adjoining surfaces so that camber is maximum 0.79 mm (1/32").
- .7 Trim:
  - .1 Use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports, unless otherwise recommended by trim manufacturer.
  - .2 Install metal corner beads at external corners.
  - .3 Install metal casing bead trim whenever edge of gypsum base would otherwise be exposed or semi exposed, and where gypsum base terminates against dissimilar material.
  - .4 Erect beads plumb or level, with minimum joints.
- .8 Control joints:
  - .1 *Provide* control joints set in board facing. Support control joints with studs or furring channels on both sides of joint.
  - .2 *Provide* control joints in required locations.
    - .1 Review control joint locations with the *Consultant* prior to installation.
  - .3 Install control joints where a partition, wall, or ceiling traverses a construction joint (expansion, seismic or building control element) in the building structure.
  - .4 Install control joints where a wall or partition runs in an uninterrupted straight plane exceeding 9100 mm (30 linear feet).
  - .5 Install control joints in interior ceilings:
    - .1 With perimeter relief:
      - .1 Linear dimensions between control joints shall not exceed 15000 mm (50 ft) and total area between control joints shall not exceed 230 m<sup>2</sup> (2500 ft<sup>2</sup>).
    - .2 Without perimeter relief:
      - .1 Linear dimensions between control joints shall not exceed 9100 mm (30 ft) and total area between control joints shall not exceed 84 m<sup>2</sup> (900 ft<sup>2</sup>).
  - .6 Install control joints where ceiling framing members change direction.
  - .7 Where a control joint occurs in an acoustical or fire-rated system, blocking shall be provided behind the control joint by using a backing material such as 16 mm (5/8") type X gypsum panel products, mineral fibre, or other tested equivalent. Construct through-wall control joints at fire-rated assemblies in accordance with assembly listing requirements.

- .8 Line up control joints with joints in other construction or with centre lines of mullions, columns, piers, or similar building elements, where accepted by the *Consultant*.
- .9 Install control joints straight and true.
- .10 Ceiling height door frames may be used as control joints. Less than ceiling height frames shall have control joints extending to the ceiling from both corners. If control joints are not used, additional reinforcement is required at corners to distribute concentrated stresses.
- .11 Board joints shall be located so that no joint will align with the edge of an opening unless control joints are to be installed at these locations.

### **3.10 FIRE SEPARATIONS**

- .1 Install fire-rated assemblies in accordance with assembly listing requirements in order to obtain fire ratings indicated and as required by the *Authorities Having Jurisdiction*.
- .2 Vertical bulkheads in ceiling spaces over fire rated partitions, doors and the like shall have same fire rating as the partition over which they occur. Such bulkheads shall be of gypsum board construction unless otherwise indicated in the *Contract Documents*.
- .3 Use fire rated gypsum wallboard as specified in the *Contract Documents*.
- .4 Where lighting fixtures, diffusers, and the like are recessed into fire rated ceilings or bulkheads, *Provide* enclosure to maintain required fire rating. Form removable panel to give access to fixture outlet box.
- .5 Where fire hose cabinets or other fixtures or equipment are recessed in fire rated walls or partitions, *Provide* gypsum board enclosure or backing to maintain required fire rating, unless otherwise detailed in the *Contract Documents*.

### **3.11 ACCESS DOORS**

- .1 Install access doors to mechanical and electrical fixtures specified in respective sections of Divisions 21, 22, and 23 and Divisions 26, 27, and 28.
- .2 Access doors shall be as supplied by Divisions 21, 22, and 23 and Divisions 26, 27, and 28. Locations to be reviewed and confirmed by the *Consultant*.
- .3 Install access panels in locations to be determined by coordination with trades installing mechanical, electrical and other building services and consultation with the *Consultant*.
- .4 Rigidly secure frames to furring or framing systems.

### **3.12 ADJUSTING AND CLEANING**

- .1 Remove debris and rubbish from wall and ceiling cavities before enclosing with board.
- .2 Clean up and remove surplus materials and rubbish resulting from the work of this section upon completion.
- .3 Clean off beads, casings, joint compound droppings and the like, leave the work of this section ready for painting trades.

**END OF SECTION**



## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Administrative Requirements
- .5 1.5 Submittals
- .6 1.6 Closeout Submittals
- .7 1.7 Quality Assurance
- .8 1.8 Field Conditions
- .9 1.9 Extended Warranty
- .10 2.1 Performance/Design Requirements
- .11 2.2 Tile Materials
- .12 2.3 Grout and Adhesives
- .13 2.4 Accessories
- .14 3.1 Examination
- .15 3.2 Preparation
- .16 3.3 Mixing
- .17 3.4 Installation - General
- .18 3.5 Setting
- .19 3.6 Waterproofing Membrane Installation
- .20 3.7 Crack Suppression Membrane (Crack Isolation Membrane) Installation
- .21 3.8 Mortar-Bed Tiling
- .22 3.9 Thin-Set Method
- .23 3.10 Control Joints
- .24 3.11 Grouting or Pointing
- .25 3.12 Installation Tolerances
- .26 3.13 Adjusting and Cleaning

### **1.3 SUMMARY**

- .1 Section Includes
  - .1 Hard surface tiling.

### **1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Sequencing and Scheduling
  - .1 Coordinate installation of tile work with related work.

- .2 Proceed with tile work only after curbs, vents, drains, piping, and other projections through substrate have been installed and when substrate construction and framing of openings have been completed.

## 1.5 SUBMITTALS

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section.
  - .2 Submit manufacturer's installation instructions for Products proposed for use in the work of this section.
- .3 Samples:
  - .1 Submit full size samples of each type of tile specified.

## 1.6 CLOSEOUT SUBMITTALS

- .1 Submit closeout submittals in accordance with Section 01 77 00.
- .2 Operation and maintenance data:
  - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.
- .3 Maintenance materials:
  - .1 *Provide* minimum 2% of each type and colour of tile required for the *Work* for maintenance use.
  - .2 Maintenance material to be of same production run as installed material.

## 1.7 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Installers / applicators / erectors:
    - .1 Execute work of this section only by a *Subcontractor* who has adequate plant, equipment, and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past 5 years.
    - .2 *Subcontractor* shall be a member company in good standing of the Terrazzo, Tile and Marble Association of Canada and have been a member for at least the past 5 years.

## 1.8 FIELD CONDITIONS

- .1 Execute work of this section while temperature is maintained within safe working temperatures in accordance with manufacturer's installation instructions for a period of 72 hours before, during and following installation. Avoid concentrated or irregular heating during curing period.
- .2 Protect work of this section against damage by work of other sections for a minimum of 72 hours after application of grouting by prohibiting passage of traffic over tile. Do not immerse in water and protect tilework from freezing for at least 28 Days after installation.

- .3 For concrete floor substrates subject to moisture sensitive materials, conduct the following tests in accordance with the following:
  - .1 Test for moisture vapour transmission in accordance with ASTM F710-11 and ASTM F1869-11 or ASTM F2170-11 in accordance with manufacturer's written installation instructions. Results must not exceed the written recommendations of the product manufacturer.
  - .2 Test for surface pH. Levels of pH shall not exceed the written recommendations of the product manufacturer. Test in accordance with ASTM F710-11.
  - .3 For each test type: Conduct 3 tests for flooring applications up to 93 m2 (1000 square feet) in area, and 1 additional test for each additional 93 m2 (1000 square feet) of flooring area.

## **1.9 EXTENDED WARRANTY**

- .1 Warrant work of this section for a period of 2 years in accordance with Article A-15 of the Agreement Between *Owner* and *Contractor*.

## **PART 2 – PRODUCTS**

### **2.1 PERFORMANCE/DESIGN REQUIREMENTS**

- .1 Terrazzo, Tile and Marble Association of Canada ("TTMAC") Specification Guide 09 30 00 Tile Installation Manual 2012-2014.

### **2.2 TILE MATERIALS**

- .1 Tile company, size and color as noted on the Drawings.

### **2.3 GROUT AND ADHESIVES**

- .1 Acceptable manufacturers:
  - .1 Ardex Canada.
  - .2 Flextile Ltd.
  - .3 LATICRETE International, Inc.
  - .4 MAPEI Corp.
  - .5 TEC Specialty Products, Inc.
  - .6 Or equivalent.
- .2 Setting adhesives; interior applications:
  - .1 Portland cement/sand/latex mixture, to ANSI A108/A118/A136.1-2013 and with minimum Shear Bond (Porcelain Tile, immersion and dry 28 *Day* cure tests) of 2.3 MPa (340 psi) when tested to ANSI A108/A118/A136.1-2013.
    - .1 Acceptable products:
      - .1 Ardex 'X 77 Microtec Fibre Reinforced'.
      - .2 Flextile '51' mixed with Flextile '44'.
      - .3 Laticrete 'Laticrete 4237 Latex Thin Set Liquid' with 'Portland 211 Crete Filler Powder'.
      - .4 Mapei 'KERALASTIC' mixed with 'KERABOND'.

- .5 TEC Specialty Products, Inc. 'Super Flex Latex-Modified Thin Set Mortar'.
  - .6 Or equivalent.
- .2 Metal substrate conditions: Epoxy mortar setting mix to ANSI A108/A118/A136.1- 2013.
  - .1 Ardex Canada 'S 16 Rapid Setting Thin Set'.
  - .2 Flextile Ltd. '100 Flex-Epoxy'.
  - .3 Laticrete International Inc. 'Latapoxy 210 Modified Epoxy Adhesive'.
  - .4 Mapei Corp. 'Kerapoxy 9931'.
  - .5 Or equivalent.
- .3 Grout:
  - .1 TEC Specialty Products, Inc. '100% Solids Epoxy Mortar and Grout 470'.
    - .1 Sanded, polymer-modified, latex-modified, non-shrink, ANSI A108/A118/A136.1- 2013 and ANSI A108/A118/A136.1-2013.
    - .2 Ardex Canada 'FL Rapid Set, Flexible Sanded'.
    - .3 Flextile Ltd. '600'.
    - .4 Laticrete International Inc. '1500 Series' mixed with '1776 Grout Admix'.
    - .5 Mapei Corp. 'Keracolour S'.
    - .6 TEC Specialty Products, Inc. 'AccuColour Premium Sanded'.
    - .7 Or equivalent.
  - .2 Unsanded, polymer-modified, latex-modified, non-shrink, ANSI A108/A118/A136.1-2013 and ANSI A108/A118/A136.1-2013.
    - .1 Ardex Canada 'FG-C Microtec (unsanded)'.
    - .2 Flextile Ltd. '500'.
    - .3 Laticrete International Inc. '1600 Series' mixed with '1776 Grout Admix'.
    - .4 Mapei Corp. 'Keracolour U'.
    - .5 TEC Specialty Products, Inc. 'AccuColour Premium Unsanded'.
    - .6 Or equivalent.
  - .3 Epoxy, to ANSI A108/A118/A136.1-2013.
    - .1 Ardex Canada 'WA Epoxy Grout and Adhesive'.
    - .2 Flextile Ltd. '100 Flex-Epoxy 100% Solids Epoxy Grout'.
    - .3 Laticrete International Inc. 'SpectraLOCK™ PRO Grout'.
    - .4 Mapei Corp. 'Kerapoxy' and Kerapoxy CQ'.
    - .5 TEC Specialty Products, Inc. '100% Solids Epoxy Mortar and Grout'.

- .6 Or equivalent.
- .4 Scratch coat (by volume): 1 part Portland cement, 4 parts sand, and latex additive where required by TTMAC Detail. Premixed mortar may be used in accordance with manufacturer's instructions. Adjust water volume depending on moisture content of sand to obtain consistency and workability.
- .5 Slurry bond coat: mix Portland cement and water to a creamy paste consistency. Include latex additive where required by TTMAC Detail.
- .6 Mortar bed for walls (by volume): 1 part Portland cement, 4 parts sand, and latex additive where required by TTMAC Detail. Premixed mortar may be used in accordance with manufacturer's instructions. Adjust water volume depending on moisture content of sand to obtain consistency and workability.
- .7 Leveling coat (by volume): 1 part Portland cement, 4 parts sand, and latex additive where required by TTMAC Detail. Premixed mortar may be used in accordance with manufacturer's instructions.
- .8 Mortar bed for floors; where applicable: 1 part cement, 4 parts sand, 1 part water. Water volume may be adjusted depending on water content of sand.

## 2.4 ACCESSORIES

- .1 Waterproofing membrane: in accordance with Section 07 13 26.
- .2 Cleavage membrane: 0.11 mm (0.004") thick polyethylene film, to CAN/CGSB 51.34 - M86 (amended 1988).
- .3 Reinforcing wire fabric: galvanized welded wire fabric, 50 mm (2") x 50 mm (2"), WO.3 x WO.3 (16 ASW gauge or 1.6 mm (0.0625") diameter, to ASTM A1064/A1064M-15 and ASTM A1064/A1064M-15, except for minimum wire size.
- .4 Sealant: to CAN/CGSB 25.20-95 and tile and grout manufacturers' recommendations, colour selected by the *Consultant*.
- .5 Shower Thresholds: white carrera, 19 mm (3/4") thick, beveled edges two sides, honed finish on exposed surfaces, size to suit opening and frame width.
- .6 Transition strips: purpose made metal extrusion, anodized aluminum.
- .7 Reducer strips: purpose made extrusions, anodized aluminum, maximum slope of 1:2.
- .8 Prefabricated movement joints: purpose made, having a Shore A Hardness of not less than 60 and elasticity of  $\pm 40\%$  when used in accordance with TTMAC Detail 301EJ- 2002.
- .9 Floor sealer and protective coating: to tile and grout manufacturers' recommendations.
- .10 Water vapour reduction system:
  - .1 100% solids epoxy one coat system, 0 VOC, suitable for application to 100% RH floors per ASTM F2170-11, designed to protect moisture sensitive adhered flooring systems from elevated moisture and alkalinity levels, warranted by manufacturer to cover subsequent flooring materials and labour, compatible with finish flooring products.
  - .2 ASTM E96/E96M-10 water vapour transmission (wet methods) performance shall be documented by independent testing laboratory at a minimum 97% for water vapour transmission reduction compared to untreated concrete.
  - .3 ASTM E96/E96M-10 perm rating shall not exceed a 0.10 Perm rating.

- .4 ASTM D1308-02(2013) insensitivity to alkaline environment up to, and including, pH 14 in a 14 Day bath test.
- .5 Manufacturer certifies acceptance and exposure to continuous topical water exposure after final cure.
- .6 Water vapour reduction system shall be a single coat, stand alone system with no requirements for additional components such as sand broadcast for adhesion of flooring systems.
- .7 System shall reduce Calcium Chloride readings of up to 25lbs/1000 ft<sup>2</sup>/24 hrs by 97% in one coat. System must be able to perform as required with RH Probe readings of 100%.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- .1 Ensure compatibility of Products supplied under this section, and which bear contact with substrate.
- .2 Before work of this section commences, examine the areas to be covered and report any flaw or adverse conditions in writing to the *Contractor* and the *Consultant*. Do not proceed with the tilework until surfaces and conditions comply with the requirements indicated in the manufacturer's instructions and in ANSI A108/A118/A136.1-2013) specification.
- .3 Miscalibrated tiles, tiles with chipped corners, tiles with holes, will not be accepted for installation.
- .4 Carefully inspect the tiles for colour variation. Tiles presenting noticeable variations shall be carefully selected, set aside and used in areas where they fit in the pattern homogeneously. *Provide* for appropriate lighting equipment in addition to existing lighting in the immediate area where the installation is being performed so that any shade differences which are normally very slight can be identified easily.

### **3.2 PREPARATION**

- .1 Water vapour reduction system:
  - .1 Where concrete substrate exhibits higher than permitted moisture and alkalinity levels, *Provide* water vapour reduction system to protect moisture sensitive flooring system from elevated moisture and alkalinity levels.
  - .1 Shot blast floors to an International Concrete Repair Institute (ICRI) Concrete Surface Profile (CSP) #3 or #4 and clean surfaces with an industrial vacuum cleaner and remove residues from the substrate. Grinding is allowed only in areas not accessible by shot blasting. Remove defective materials, and foreign matter such as dust, adhesives, levelling compounds, paint, dirt, floor hardeners, bond breakers, oil, grease, curing agents, form release agents, efflorescence, laitance, and other deleterious substances. Repair cracks, expansion joints, control joints, and open surface honeycombs and fill in accordance with water vapour reduction system manufacturer's recommendations.
  - .2 Reinforcing fibres, if applicable, that are visible after shot blasting shall be removed and vacuumed leaving no fibres left on the concrete surfaces.
  - .3 Repair concrete prior to moisture vapour reduction system installation by using water vapour reduction system manufacturer's recommended bonding emulsion with approved concrete repair materials. Comply with requirements as listed in water vapour reduction

system manufacturer's technical data information. Consult with vapour reduction manufacturer.

- .4 Shot blast a small test area and review surface profile with the finished flooring applicator. As the water vapour reduction system is not a levelling material, *Provide* feather finish or levelling material to "flatten" or level the water vapour reduction system treated concrete prior to the flooring installation.
  - .5 Apply moisture vapour reduction system monolithically to manufacturer's recommended spreading rate in number of coats to achieve manufacturer's recommended thickness.
  - .6 Consult with vapour reduction manufacturer and comply with requirements as listed in water vapour reduction system manufacturer's technical data information.
  - .7 Review surface profile with the finished flooring applicator. As the water vapour reduction system is not a levelling material, *Provide* feather finish or levelling material to "flatten" or level the water vapour reduction system treated concrete prior to the flooring installation. Flooring installation shall not show telegraphing of substrate. Flooring installation shall be homogenous free of substrate lines, pockets, bumps and unevenness.
  - .8 Verify proper adhesion of flooring adhesives, coatings, and levelling compounds to the final vapour reduction coating system for acceptability.
  - .9 Do not proceed with finished flooring installation if moisture vapour transmission exceeds maximum permitted rates.
- .2 Wall surfaces:
- .1 Roughen surfaces with previously painted glossy finishes by sandpaper or other abrasive medium, and completely remove finishes which are not compatible with products specified under this section.
  - .2 Completely remove contaminants and deleterious substances and debris which may prevent, reduce, and affect adhesion or performance or may act as bond breaker.
  - .3 Prime gypsum, wood or porous concrete with primer, brush or roller applied at full strength in accordance with adhesive manufacturer's recommendations.
- .3 Floor surfaces:
- .1 Completely remove contaminants and deleterious substances and debris which may prevent, reduce, and affect adhesion or performance or may act as bond breaker.
  - .2 Concrete shall be minimum of 120 Days old.
- .4 Wire brush steel substrates to remove deleterious substances and rust, to promote full adhesion to steel.

### 3.3 MIXING

- .1 Mix mortars, additives and grouts in accordance with manufacturer's requirements.
- .2 Rotating blade mechanical mixer: Pour latex additive, start mixer and add sand first, followed by Portland cement. Mix no mortar in same mixer as a dissimilar type of mortar unless the mixer is first thoroughly washed clean.
- .3 Pail batch mixing with low revolution drill mixers as follows:
  - .1 Premix separately prior to adding to the latex additive.

- .2 Pour latex additive into clean mixing vessel and add dry materials slowly while mixing into a homogeneous and smooth consistency.

### 3.4 INSTALLATION - GENERAL

- .1 Install products in accordance with manufacturer's specifications and as indicated herein.
- .2 Install in accordance with TTMAC Specification Guide 09 30 00 Tile Installation Manual 2012-2014, except where specified otherwise.
- .3 Install in accordance with ANSI A108/A118/A136.1-2013 and ANSI A108/A118/A136.1- 2013.
- .4 Lay out tile work as indicated on the Drawings, and where lay-out not indicated, lay-out tiles so tiles less than 1/2 the least dimension do not occur and with minimum amount of cutting.
- .5 Make joints even, straight, plumb and of uniform width.
- .6 *Provide* uniform positive slope to floor drains, to minimum allowable slope of 20 mm/m (1/4 inch/ft).
- .7 *Provide* edge protection at tile edges and corners, unless otherwise indicated, using maximum length pieces.
- .8 *Provide* edge protection and transition strips at tile transitions, unless otherwise indicated, using maximum length pieces.
- .9 Lap tile at inside corners and seal around doors. Apply sealant in accordance with Section 07 92 00 and manufacturer's instructions. Sealant colour to later selection by the *Consultant*.
- .10 Install flooring to entire area indicated or scheduled, including coverplates occurring within finished floor areas. Maintain overall continuity of colour and pattern with pieces of flooring installed on cover plates. Tightly butt edges to perimeter of floor around cover plates and to cover plates. Do not install flooring to floor drains occurring within finished floor areas.
- .11 Review locations of tile accessories with the *Consultant* prior to setting tile and comply with directions of the *Consultant*.

### 3.5 SETTING

- .1 Using a damp towel, wipe off the back side of floor tile to remove any dust or other residue that may be left over from the manufacturing process.
- .2 Place as much tile as possible in one operation before setting bed reaches initial set. Clean back and remove bed when it has set before tile is laid.
- .3 Prime materials and by methods specified by manufacturer of bond coat.
- .4 Line up joints between tile installed on stairs from tread to tread.
- .5 Except where tiles have setting tabs, and except for expansion, control and isolation joints, maintain joint widths as selected by the *Consultant*.
- .6 Back up tile coves, curbs and other shaped pieces solid with mortar. Rigidly set, reinforce or otherwise make firm and secure such pieces.
- .7 Beat tiles in thoroughly and sufficiently to cause mortar ribs or notches to come together into a continuous void free bed and allow the mortar to flow up partially into the joint space to maximum of 1/3 the thickness of the tile. Sound floor tiles by tapping and reset all tiles with voids in setting bed.



- .8 Tile shall contact setting materials for minimum of 95% coverage.
- .9 Obtain 100% mortar coverage with applicable requirements for back buttering of tile in referenced TTMAC and ANSI A108/A118/A136.1-2013 series of tile installation standards for the following:
  - .1 Tile in wet areas:
  - .2 Tile installed with chemical resistant mortars and grouts.
  - .3 Tile having tiles 300 mm (12") or larger in any direction.
  - .4 Tile having tiles with raised or textured backs.
  - .5 Tile having tile installation rated for Heavy or Extra Heavy Duty.
  - .6 Porcelain tiles with more than 20% of the tile backs covered with firing release dust back buttered so that 100% of the back is covered with adhesive mortar rated for C627, Extra Heavy Duty rating.
- .10 Remove any excess setting material from the joint area so that 2/3 of the depth of the tile is available for grouting.
- .11 Remove smudges or smears of setting material from the tile surface with a damp sponge or cloth immediately after final adjustment and beat-in while the mortar is fresh.
- .12 Do necessary cutting and drilling of fixtures, fittings, and built-in or penetrating units without marring the tile. Replace all cracked or damaged tile.
- .13 Form external angles with round edge tile extending over edge of square edge adjacent tile. Internal angles shall be formed square, carrying 1 flat tile past edge of other.
- .14 Extend tile into recesses at windows, doors, or other openings.
- .15 Extend tiles 100 mm (4") behind mirrors, and fully behind cabinets, cupboards and other fixed objects at walls.
- .16 Cut tiles to conform to irregularities in wall lines and vertical planes along outer edges. Smooth cut edges with carborundum block or by other means to *Provide* clean straight edge.
- .17 At floor drains in mortar bed: *Provide* minimum setting bed of 10 mm (3/8"), sloped to drain at 6 mm (1/4") in 305 mm (12").

### **3.6 WATERPROOFING MEMBRANE INSTALLATION**

- .1 Install waterproofing membrane in shower areas in accordance with manufacturer's instructions and Section 07 13 26.

### **3.7 CRACK SUPPRESSION MEMBRANE (CRACK ISOLATION MEMBRANE) INSTALLATION**

- .1 Install membrane in accordance with manufacturer's instructions.
- .2 Prepare substrate in accordance with manufacturer's instructions.
- .3 Install crack suppression membrane to substrates for tile flooring installations located on suspended structural floor assemblies. Treat substrate with full coverage of crack isolation membrane and reinforcement in accordance with crack isolation membrane manufacturer's installation instructions.

### 3.8 MORTAR-BED TILING

- .1 Verify 25 mm (1") nominal bed thickness has been allowed. Apply latex-Portland cement thin bed mortar with flat trowel as a slurry bond coat approximately 1.5 mm (1/16") thick over clean concrete slab in compliance with current revision of ANSI A108/A118/A136.1-2013 (A-1 through A-3; A-4.1a.5.2).
- .2 Place latex-Portland cement thick bed mortar over slurry bond coat while bond coat is wet and tacky. Omit reinforcing wire fabric and fully compact bed by tamping.
- .3 Spread latex-Portland cement thin bed mortar with flat trowel over surface of "green"/fresh mortar bed as a slurry bond coat approximately 1.5 mm (1/16") thick.
- .4 Apply latex-Portland cement thin bed mortar slurry bond coat to back of tile or threshold and place each piece/sheet while slurry bond coats are wet and tacky. Beat with a hardwood block or rubber mallet to level/imbed pieces before mortar bed takes initial set.
- .5 Clean excess mortar/adhesive from finished surfaces.
- .6 For installation of tile over cured (pre-floated) latex-Portland cement thick bed mortar, follow Thin Bed Method.

### 3.9 THIN-SET METHOD

- .1 Install thin-set mortar in compliance with current revisions of ANSI A108/A118/A136.1- 2013) (A-1 through A-3) and ANSI A108/A118/A136.1-2013) (A-4.3).
- .2 Use the appropriate trowel notch size to ensure full bedding of the tile.
- .3 *Work* thin-set mortar into good contact with the substrate and comb with notched side of trowel.
- .4 Beat each piece/sheet into the thin-set mortar with a beating block or rubber mallet to insure full bedding and flatness.
- .5 Allow installation to set until firm.
- .6 Clean excess thin-set mortar from tile face and joints between pieces.
- .7 Do not cover, bridge or fill tile joints located over expansion joints with adhesive.

### 3.10 CONTROL JOINTS

- .1 Carry substrate control and movements joints through to tile work.
- .2 Install control joints around the perimeter of tiled areas, around columns and where tile abuts other hard materials, also incorporate control joints over all building expansion joints.
- .3 Cut tiles or stones on both sides along the edges of control or expansion joints.
- .4 *Provide* control joints equal to width of interior tile joints in floors and walls at perimeters of floor and within 4800 mm to 6100 mm (16 ft to 20 ft) centre to centre by raking out joints to full depth of tile and cleaning joints for application of sealant in accordance with Section 07 92 00. In areas subject to sunlight or exposed to exterior *Provide* control joints within 2400 mm to 3500 mm (8 ft to 12 ft) centre to centre.
  - .1 Review locations with the *Consultant* prior to setting tile and comply with instruction given by the *Consultant*.

### 3.11 GROUTING OR POINTING

- .1 Install grout to comply with ANSI A108/A118/A136.1-2013 and ANSI A108/A118/A136.1- 2013) unless otherwise specified and in accordance with manufacturer's printed instructions.
- .2 Allow tile installation to cure a minimum of 24 hours at ambient temperature of 21°C prior to grouting.
- .3 Verify grout joints are free of dirt, debris, water or tile spacers and face of tiles are clean
- .4 Apply grout release to face of absorptive, abrasive, non-slip or rough textured tile units that are not hot paraffin coated to facilitate cleaning.
- .5 Spread using a sharp edged, hard rubber float and work grout into joints using 45° diagonal strokes.
- .6 Pack joints full and free of voids/pits. Stroke diagonally to remove excess grout and to avoid pulling grout out of filled joints.
- .7 Once excess grout is removed, begin cleaning grout haze before grout is fully cured. Using a circular motion, lightly scrub grouted surfaces with the damp sponge to dissolve grout film/haze. Drag sponge diagonally over scrubbed surfaces to remove froth. Rinse sponge frequently and change rinse water at least every 2 m<sup>2</sup> (200 ft<sup>2</sup>). Repeat cleaning sequence again if grout haze is still present.
- .8 Allow grout joints to become firm. Buff surface of grout with clean coarse cloth. Inspect joint for pinholes/voids and repair them with freshly mixed grout. Within 24 hours, check for remaining haze and remove it with warm soapy water and a nylon scrubbing pad, using a circular motion, to lightly scrub surfaces and dissolve haze/film.
- .9 Chemical resistant, water cleanable tile-grouting epoxy (ANSI A108/A118/A136.1-2013):
  - .1 Install chemical epoxy resistant grout in compliance with current revisions of ANSI A108/A118/A136.1-2013 and ANSI A108/A118/A136.1-2013.
  - .2 Once excess grout is removed, begin cleaning grout haze approximately 20-30 minutes after grouting depending on temperature. Using a circular motion, lightly scrub grouted surfaces with the damp sponge to dissolve grout film/haze. Drag sponge diagonally over scrubbed surfaces to remove froth. Rinse sponge frequently and change cleaning solution at least every 4.7 m<sup>2</sup> (50 ft<sup>2</sup>).
  - .3 Within 1 hour of finishing first cleaning, clean the same area again following the same procedure but utilizing a clean white scrub pad and fresh cleaning solution. Rinse scrub pad frequently. Drag a clean sponge diagonally over scrubbed surfaces to remove froth. Use each side of sponge only once before rinsing and change cleaning solution at least every 4.7 m<sup>2</sup> (50 ft<sup>2</sup>). Allow cleaned areas to dry and inspect tile surface. Rinse with clean water and allow surface to dry. Inspect grout joint for pinholes/voids and repair them with freshly mixed grout.
- .10 Grout joint width to be 1.5 mm (1/16") unless otherwise indicated in the *Contract Documents*.
- .11 Grout joint width to be 3.2 mm (1/8") unless otherwise indicated in the *Contract Documents*.
- .12 Use caution when using sanded grouts to prevent scratching of tile or other material surfaces.
- .13 Do not cover bridge or fill any expansion joints in tile with grout.
- .14 Do not cover bridge or fill any expansion joints in tile with grout.

### **3.12 INSTALLATION TOLERANCES**

- .1 Maximum allowable lippage:
  - .1 Tile up to 152 mm x 152 mm (6" x 6") in size: 0.79 mm (1/32").
  - .2 Tile greater than 152 mm x 152 mm (6" x 6") in size: 1.5 mm (1/16").
- .2 Finish planes shall be straight and plumb to within 6 mm in 3 m (1/4" in 10 feet).

### **3.13 ADJUSTING AND CLEANING**

- .3 Clean installed tile surfaces after grouting has cured.
- .4 Re-point joints after cleaning to eliminate imperfections. Avoid scratching tile surfaces.
- .5 Prohibit traffic during installation and for minimum 48 hours after installation.
- .6 Protect floors from impact and vibration for a minimum of 48 hours after installation.
- .7 Install floor protection in areas where other work, repairs and installation of equipment, and foot traffic will occur.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Closeout Submittals
- .6 1.6 Quality Assurance
- .7 1.7 Field Conditions
- .8 1.8 Extended Warranty
- .9 2.1 Manufacturers
- .10 2.2 Materials
- .11 3.1 Examination
- .12 3.2 Preparation
- .13 3.3 Installation of Resilient Base
- .14 3.4 Installation Tolerances
- .15 3.5 Adjusting and Cleaning

### **1.3 SUMMARY**

- .1 Section Includes
  - .1 Resilient base.

### **1.4 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section.
- .3 Samples:
  - .1 Submit 3 - 305 mm (12") long samples of each colour and type of base material. Include outside corner of base.

### **1.5 CLOSEOUT SUBMITTALS**

- .1 Submit closeout submittals in accordance with Section 01 77 00.
- .2 Operation and maintenance data:
  - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.

.3 Maintenance materials:

- .1 Deliver 2% of each colour, pattern and type of resilient accessory required for this project.
- .2 Suitably package for protection and storage, each identified with name of manufacturer and with its type, colour. Note date.
- .3 Tag and store where directed by *Owner*.
- .4 Maintenance materials to be same production run as installed materials.

## 1.6 QUALITY ASSURANCE

.1 Qualifications:

.1 Installers / applicators / erectors:

- .1 *Provide* work of this section, executed by competent installers with minimum 5 years experience in application of Products, systems and assemblies specified and with approval and training of *Product* manufacturers.
- .2 Products installed as part of the work of this section shall be from same production run.

## 1.7 FIELD CONDITIONS

- .1 Temperature of room and materials shall be at least 18°C and 21°C for 48 hours before, during and 7 days after the installation of resilient accessories.
- .2 Applications exposed to intense or direct sunlight, protect Products during the conditioning, installation, and adhesive curing periods, by covering the light source.
- .3 Allow coiled wall base to lay flat for at least 24 hours at 18°C prior to installation, and maintain this temperature during installation.

## 1.8 EXTENDED WARRANTY

- .1 Warrant work of this section in accordance with Section 01 78 36 for a period of 2 years.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURERS

- .1 Johnsonite.
- .2 Substitutions: in accordance with Section 01 25 00.

### 2.2 MATERIALS

.3 Resilient base types:

- .1 Rubber base (for carpet): Traditional Carpet Wall Base with toe, as manufactured by Johnsonite, 63.5 mm (2-1/2") high with a 63.5 mm (2-1/2") face surface, in a 3.17mm (1/8") tapered wedge thickness, complete with preformed corners.
  - .1 Colour: refer to finish schedule in *Contract Documents*.
- .4 Resilient leveller strip and level strip extension system: LS Series, as manufactured by Johnsonite, sized to suit condition.

- .5 Block wall filler: Latex filler, "Planicrete AC" by Mapei Canada Ltd., "43 Thin-Set Mortar Additive and 53 Floor Mix" by Flextile Ltd. or waterproof filler recommended by flooring manufacturer.
- .6 Adhesive: Types as recommended by manufacturer to suit substrate types and compatible with materials.
  - .1 Porous wall surfaces: Johnsonite #960 Wall Base adhesive
  - .2 Non-porous wall surfaces (i.e.: metal, epoxy paint, ceramics): Johnsonite #945 Contact Bond adhesive.
- .7 Sealant: clear silicone, as manufactured by Tremco, Momentive, or Dow Corning.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- .1 Substrate shall be solid, dry, clean, smooth, free of deleterious materials and free of voids, gaps, cracks, ridges, or other defects which will preclude adequate adhesion, or will ghost or telegraph through finished base installation.
- .2 Examine walls to ensure that surfaces are protected against entry of water and moisture.

#### **3.2 PREPARATION**

- .1 Clean and remove deleterious materials which will preclude adequate adhesion.
- .2 Fill gaps, voids, and cracks, and remove ridges, or other defects which will ghost or telegraph through finished base installation.
- .3 Perform compatibility test with primer/adhesive and substrate.

#### **3.3 INSTALLATION OF RESILIENT BASE**

- .1 Spread adhesive to ribbed surface (back) of wall base with a 3 mm (1/8") square- notched trowel; allow slight set-up, then bring base into contact with substrate. Ensure full adhesion of base to substrate. Adhesive should cover 80% of back surface. Leave a 6 mm (1/4") uncovered space at the top of the wall base to prevent the adhesive from oozing onto the wall above the base when installed.
- .2 Position wall base on wall surface and roll with hand roller. Always roll back to starting point to prevent stretching the wall base.
- .3 Set base to ensure installation over finished flooring material is free of gaps.
- .4 Install base in longest lengths possible, minimum 2440 mm (8'). Adhere toe of base to substrate, and ensure edge of toe is straight.
- .5 Scribe and fit to door frames and other obstructions.
- .6 Joints shall be tightly fitted, straight and vertical, and not less than 610 mm (24") from corners.
- .7 *Provide* joints in base over substrate control joints.
- .8 Install factory preformed inside corners.
- .9 Install factory preformed outside corners.

### **3.4 INSTALLATION TOLERANCES**

- .1 Install straight and level to variation of 3 mm (1/8") over 3 m (10'-0").

### **3.5 ADJUSTING AND CLEANING**

- .1 Remove adhesive from surfaces as work progresses in manner described by manufacturer. Remove wet adhesive with a water dampened cloth. If adhesive has dried, use a cloth dampened with mineral spirits.
- .2 Wash surfaces using non-phosphate detergent to remove silicone, wax, dirt and dust using rotary scrubbing machines fitted with nylon brushes. Wash with neutral mild detergent and water, thoroughly buff dry with smooth wool pad. Do not apply any other compounds.

**END OF SECTION**



## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Closeout Submittals
- .6 1.6 Quality Assurance
- .7 1.7 Delivery, Storage, and Handling
- .8 1.8 Field Conditions
- .9 1.9 Warranty
- .10 2.1 Carpet Tile
- .11 2.2 Adhesives
- .12 2.3 Miscellaneous Materials
- .13 3.1 Examination
- .14 3.2 Preparation
- .15 3.3 Installation
- .16 3.4 Installation - Transition Trim
- .17 3.5 Service Marking
- .18 3.6 Field Quality Control
- .19 3.7 Adjusting and Cleaning

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Carpet tile.

### **1.4 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section.
- .3 Shop drawings:
  - .1 Submit layout drawings of tile pattern including recognition of possible wear locations, ease of replacement and the location and type of accessories and other information and details pertaining to the installation of carpet tile.

.4 Samples:

- .1 Submit 3 full size samples of each type and colour of carpet and 150 mm (6") length of transition trim for acceptance of colour and construction by *Consultant*. Obtain acceptance from *Consultant* prior to ordering material.

.5 Test and evaluation reports:

- .1 Submit moisture, alkalinity, and adhesive bond test results.

.6 Manufacturers' instructions:

- .1 Submit carpet and adhesive manufacturer's written installation recommendations for each type of substrate required.
- .2 Identify trowel notch size and shape and required adhesive coverage rates for each specified carpet material for installation of specified materials.

### 1.5 CLOSEOUT SUBMITTALS

- .1 Submit closeout submittals in accordance with Section 01 77 00.

.2 Operation and maintenance data:

- .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.

.3 Maintenance materials:

- .1 Deliver 2% of each carpet colour and type specified.
- .2 Suitably package for protection and storage, each identified with name of manufacturer and with its type, colour, dye lot and yardage. Note date.
- .3 Tag and store where directed by *Owner*.
- .4 Maintenance materials to be same production run as installed materials.

### 1.6 QUALITY ASSURANCE

.1 Qualifications:

.1 Installers / applicators / erectors:

- .1 *Provide* work of this section, executed by competent installers with minimum 5 years experience in application of Products, systems and assemblies specified and with approval and training of *Product* manufacturers.

.2 Mock-up:

- .1 Prior to commencing flooring installation for this section, prepare full room mock- up (room size at least 10 m2 (100 ft2) in area) for acceptance by the *Consultant*.
- .2 Mock-up shall include each type of carpet tile application, edge treatment and relationships to adjoining surfaces.
- .3 Location of installation shall be determined by *Consultant*.

### 1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Comply with CRI Carpet Installation Standard – 2011.

## 1.8 FIELD CONDITIONS

- .1 Do not begin carpet tile installation until painting and finishing work are complete and ceilings and overhead work have been tested, approved, and completed.
- .2 Ensure that adequate ventilation is provided during installation and curing of materials of this section.
- .3 Ambient temperature and humidity: Comply with CRI Carpet Installation Standard – 2011.
- .4 Concrete floors are to be dry, and exhibit negative alkalinity, carbonization, or dusting, and be free of curing/sealing compounds, residue from paint and adhesives.
- .5 Conduct the tests in accordance with ASTM F710-11 and the following:
  - .1 Test for moisture vapour transmission in accordance with ASTM F710-11 and ASTM F1869-11 or ASTM F2170-11 in accordance with manufacturer's written flooring installation instructions. Results shall not exceed 170 µg/m<sup>2</sup> (3 pounds per 1,000 square feet) in 24 hours when tested to ASTM F1869-11 or exceed 75% when tested to ASTM F2170-11.
  - .2 Test for surface pH. Levels of pH shall not exceed the written recommendations of the flooring manufacturer and adhesive manufacturer. Test in accordance with ASTM F710-11.
  - .3 For each test type: Conduct 3 tests for flooring applications up to 93 m<sup>2</sup> (1000 square feet) in area, and 1 additional test for each additional 93 m<sup>2</sup> (1000 square feet) of flooring area.
    - .1 Testing shall be completed prior to application of water vapour reduction system, if applicable, and after application of water vapour reduction system in accordance with floor finish specifications.
- .6 In areas that are exposed to intense or direct sunlight, Products shall be protected during the conditioning, installation, and adhesive curing periods, by covering the light source.

## 1.9 WARRANTY

- .1 General: Warrant work of this section in accordance with Section 01 78 36.
- .2 Manufacturer's warranty: Manufacturer's standard materials-only warranty in which manufacturer agrees to furnish replacement materials for defects attributable to materials within specified warranty period
  - .1 Warranty period: 10 years.
- .3 Installer's warranty: Installer agrees to *Provide* materials and labour warranty in which installer agrees to repair or replace carpet areas that fail within the specified warranty period. Failures shall include delaminating of flooring from substrates.
  - .1 Warranty period: 2 years.

## PART 2 - PRODUCTS

### 2.1 CARPET TILE

- .1 Products installed as part of the work of this section shall be from same production run.
- .2 Carpet for each carpet type to be from single manufacturer.
- .3 Acceptable manufacturers:
  - .1 Mohawk Group.

- .2 Alternates to *Consultant's* approval. Alternates shall be submitted prior to *Bid* Closing. Submit alternates in accordance with Section 01 25 00.
- .3 CPT1:
  - .1 Tile size: 36" x 12"
  - .2 Model: Timeless Tailored Collection
  - .3 Refer to finish schedule in *Contract Documents*

## 2.2 ADHESIVES

- .1 Carpet tile adhesive: Pressure sensitive, low VOC adhesive in accordance with carpet manufacturer's installation instructions.
- .2 Transition trim adhesive:
  - .1 Low VOC adhesive in accordance with transition material manufacturer's written installation instructions.

## 2.3 MISCELLANEOUS MATERIALS

- .1 Latex crack filler: Compatible with adhesive and recommended by carpet manufacturer.
- .2 Base: resilient base in accordance with Section 09 65 13.
- .3 Transition trim:
  - .1 Resilient transition trim:
    - .1 Tapered vinyl type as manufactured by Johnsonite or Finercraft to suit site condition for smooth transition.
    - .2 Colour as noted on the Contract Drawings.
- .4 Water vapour reduction system:
  - .1 100% solids epoxy one coat system, 0 VOC, suitable for application to 100% RH floors per ASTM F2170-11, designed to protect moisture sensitive adhered flooring systems from elevated moisture and alkalinity levels, warranted by manufacturer to cover subsequent flooring materials and labour, compatible with finish flooring products.
  - .2 ASTM E96/E96M-10 water vapour transmission (wet methods) performance shall be documented by independent testing laboratory at a minimum 97% for water vapour transmission reduction compared to untreated concrete.
  - .3 ASTM E96/E96M-10 perm rating shall not exceed a 0.10 Perm rating.
  - .4 ASTM D1308-02(2013) insensitivity to alkaline environment up to, and including, pH 14 in a 14 day bath test.
  - .5 Manufacturer certifies acceptance and exposure to continuous topical water exposure after final cure.
  - .6 Water vapour reduction system shall be a single coat, stand alone system with no requirements for additional components such as sand broadcast for adhesion of flooring systems.

- .7 System shall reduce Calcium Chloride readings of up to 25lbs/1000 ft<sup>2</sup>/24 hrs by 97% in one coat. System must be able to perform as required with RH Probe readings of 100%.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- .1 Ensure that environmental conditions have been provided as requested and specified
- .2 Ensure that substrates have been provided as specified without holes, protrusions, cracks or unfilled control joints or depressions that would telegraph in finished carpet installation.
- .3 Substrates shall be firm, structurally sound, sufficiently porous, and dry.
- .4 Examine substrate to ensure clean lines, correct level and freedom from cracks, ridges, dusting, scaling and carbonation.
- .5 Examine floors in advance of application of flooring to ensure that floors are protected against entry of water and moisture.
- .6 Report conditions contrary to requirements preventing proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- .7 Failure to call attention to defects or imperfections will be construed as acceptance and approval of the substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- .8 Defective work resulting from application to unsatisfactory surfaces will be considered the responsibility of those performing the work of this section.

#### **3.2 PREPARATION**

- .1 Comply with recommendations of ASTM F710-11.
- .2 Substrates shall be free of wax, oil, silicone, soap, grease, dust, solvents, sealers, curing compounds, hardeners, alkaline salts, excessive carbonation or laitance, mould, mildew, paints, varnish, asphalt, residual adhesives, adhesive removers, or other contaminants or deleterious material that may inhibit bond strength or act as a bond breaker. Remove such contaminants and deleterious material using mechanical methods recommended by manufacturer. Do not use chemical abatement methods.
- .3 Flooring substrates shall be smooth and level within a tolerance of 3 mm (1/8") in a 3m (10'-0") radius.
- .4 Concrete substrates that are loose, sandy, scaly, or have a white powdery surface are not acceptable. Substrates shall be mechanically prepared.
- .5 Fill surface cracks, holes, score marks, depressions, and grooves, and repair surface spalls with Portland cement patching or levelling compound.
- .6 At door opening locations where finished flooring is adjacent to weather-stripping or automatic door bottoms *Provide* trowel-applied levelling compound to *Provide* full contact between finished flooring and weather-stripping or automatic door bottoms. Taper trowel-applied levelling compound to transition with adjacent flooring substrate to be *Provide* smooth and seamless transition at maximum slope of 3:1000 (height to distance) ratio.
- .7 Expansion joints, isolation joints, and other movement joints in substrates shall not be filled with patching or levelling compound.

- .8 Remove bumps, high spots, peaks and ridges to produce a uniform and smooth substrate.
- .9 Prepare substrates so that installation of flooring shall not show telegraphing of substrate.
- .10 Remove chalking and dusting and loose material from concrete surfaces with wire brushed or by scraping.
- .11 Sweep and vacuum clean substrates minimum 24 hours prior to alkalinity, moisture, and adhesion testing. Do not use sweeping compounds.
- .12 Notify *Consultant* of any substrate or levelling compound defects or installation conditions that may result in unsatisfactory performance.
- .13 Alkalinity, moisture, and adhesion testing:
  - .1 Perform moisture and alkalinity tests and adhesive bond test.
  - .2 Test substrates after mechanically preparing subfloor or applying patching and levelling compounds.
  - .3 Where concrete substrate exhibits higher than permitted moisture and alkalinity levels, *Provide* water vapour reduction system and repeat moisture and alkalinity tests and adhesive bond tests.
  - .4 Proceed with installation only after substrates pass testing. Document tests performed and submit in writing to *Consultant*.
  - .5 Moisture testing:
    - .1 Test for moisture vapour transmission in accordance with paragraph 1.5 Environmental Requirements.
  - .6 Alkalinity testing:
    - .1 Test for surface pH in accordance with paragraph 1.5 Environmental Requirements.
  - .7 Adhesion bond test:
    - .1 Proceed with bond test after substrates have been prepared and alkalinity and moisture test have been completed.
    - .2 Select six substrate test areas, each 915 mm (3'-0") x 915 mm (3'-0") in size. Test areas shall be spaced a minimum 1220 mm (48") apart.
    - .3 Using the specified adhesive, glue down each panel using adhesive manufacturer's recommended trowel.
    - .4 After 72 hours, attempt to remove the panels of flooring by pulling up from the corners.
- .14 Allow carpet tile to relax in the installation area for a minimum of 24 hours at a temperature between 18-35°C.
- .15 Water vapour reduction system:
  - .1 Where concrete substrate exhibits higher than permitted moisture and alkalinity levels, *Provide* water vapour reduction system to protect moisture sensitive flooring system from elevated moisture and alkalinity levels.
    - .1 Shot blast floors to a International Concrete Repair Institute (ICRI) Concrete Surface Profile (CSP) #3 or #4 and clean surfaces with an industrial vacuum cleaner and remove

residues from the substrate. Grinding is allowed only in areas not accessible by shot blasting. Remove defective materials, and foreign matter such as dust, adhesives, levelling compounds, paint, dirt, floor hardeners, bond breakers, oil, grease, curing agents, form release agents, efflorescence, laitance, and other deleterious substances. Repair cracks, expansion joints, control joints, and open surface honeycombs and fill in accordance with water vapour reduction system manufacturer's recommendations.

- .2 Reinforcing fibres, if applicable, that are visible after shot blasting shall be removed and vacuumed leaving no fibres left on the concrete surfaces.
- .3 Repair concrete prior to moisture vapour reduction system installation by using water vapour reduction system manufacturer's recommended bonding emulsion with approved concrete repair materials. Comply with requirements as listed in water vapour reduction system manufacturer's technical data information. Consult with vapour reduction manufacturer.
- .4 Shot blast a small test area and review surface profile with the finished flooring applicator. As the water vapour reduction system is not a levelling material, *Provide* feather finish or levelling material to "flatten" or level the water vapour reduction system treated concrete prior to the flooring installation.
- .5 Apply moisture vapour reduction system monolithically to manufacturer's recommended spreading rate in number of coats to achieve manufacturer's recommended thickness.
- .6 Consult with vapour reduction manufacturer and comply with requirements as listed in water vapour reduction system manufacturer's technical data information.
- .7 Review surface profile with the finished flooring applicator. As the water vapour reduction system is not a levelling material, *Provide* feather finish or levelling material to "flatten" or level the water vapour reduction system treated concrete prior to the flooring installation. Flooring installation shall not show telegraphing of substrate. Flooring installation shall be homogenous free of substrate lines, pockets, bumps and unevenness.
- .8 Verify proper adhesion of flooring adhesives, coatings, and levelling compounds to the final vapour reduction coating system for acceptability.
- .9 Do not proceed with finished flooring installation if moisture vapour transmission exceeds maximum permitted rates.
- .16 Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation. Do not use sweeping compounds.
- .17 Where flooring adjoins thicker floor materials, apply levelling screed, feather out to make up difference in level between materials.
- .18 Spray paints, permanent markers and other indelible ink markers shall not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and permanently stain the flooring material. If such contaminants are present on the substrate they shall be mechanically removed prior to the installation of the flooring material.

### 3.3 INSTALLATION

- .1 Comply with CRI – Carpet Installation Standard – 2011.
- .2 Select the appropriate adhesive and trowel notch configuration recommended by the carpet, and adhesive manufacturers.

- .3 Determine quadrants by grid line of area using standard tile laying methods, or use laser alignment.
- .4 Pressure sensitive adhesive:
  - .1 Use a 200 mm (8") wide paint roller to apply adhesive full spread over substrate area.
  - .2 Allow adhesive to set until surface becomes tacky to the touch but no adhesive is transferred.
- .5 Install carpet tile in patterns as indicated.
- .6 Lay carpet tiles accurately and firmly along centre lines of selected quadrants. Follow with subsequent tiles within quadrant using 'stair-step' techniques.
- .7 As tiles are installed, frequently check all joints with fingers to ensure proper alignment. Do not install tiles that are out of alignment.
- .8 Measure out 11 carpet tiles to attain the cumulative space gained over 10 joints, which shall not exceed 6 mm (1/4"). Repeat frequently throughout installation.
- .9 Carefully butt tiles together, avoiding too much pressure which may cause peaks or buckles. Brush back face pile and tip tile into place to avoid pile being caught in joint. Anchor all cut tile and perimeter tiles with release adhesive.
- .10 Make cuts from backs of tiles using templates for fitting around columns, service cut-outs and the like.
- .11 Finish and adhere securely along the wall line; with a smooth, neat appearance where no wall base materials are indicated; and concealed beneath base materials where wall base materials are indicated. Base materials shall be installed after installation of carpet.
- .12 Install carpet accurately fitted at perimeter of rooms, cut with precision at columns, door frames and at other obstructions. At columns and other penetrations, cut carpet with maximum possible coverage.
- .13 Extend carpet tile into recesses and closets and around fixtures and service devices.
- .14 Allow no traffic over installation until adhesives have fully cured, minimum 24 hours.
- .15 Installed carpet shall be free from perceptible variance in colour, stains, baldness, tears, fraying, patchwork, and other defects detrimental to good performance and appearance.

### **3.4 INSTALLATION - TRANSITION TRIM**

- .1 Coordinate transitions with work of other sections and install transition trim to transitions between carpet tile flooring and adjacent flooring.
- .2 Allow coiled vinyl material to lay flat for at least 24 hours at 21°C prior to installation.
- .3 Set to ensure installation is free of gaps.
- .4 Install in longest lengths possible.
- .5 Install straight to maximum allowable variation of 1:1000.
- .6 Scribe and fit to obstructions.
- .7 Fit joints tightly, straight and vertical as applicable and not less than 610 mm (24") from corners.
- .8 Cope mitre corners.



### **3.5 SERVICE MARKING**

- .1 *Provide* +/-25 mm (1") diameter contrasting colour dots of carpet, inserted using a carpet punch to mark electrical and mechanical access panels in floors. *Provide* cut-out and carpet tile inserts to suit access panels.

### **3.6 FIELD QUALITY CONTROL**

- .1 Conduct quality control in accordance with Section 01 45 00.

### **3.7 ADJUSTING AND CLEANING**

- .1 After installation is completed, clean and vacuum carpet of dirt, dust and foreign materials. Remove spots with suitable spot remover, remove cuttings, vacuum carpet thoroughly using approved commercial type equipment and leave clean.
- .2 Cover with protective membrane, lapping joints 100 mm (4") with adhesive tape.

**END OF SECTION**

## **PART 1– GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Closeout Submittals
- .6 1.6 Quality Assurance
- .7 1.7 Delivery, Storage, and Handling
- .8 1.8 Field Conditions
- .9 1.9 Extended Warranty
- .10 2.1 Performance/Design Requirements
- .11 2.2 Materials
- .12 3.1 Examination
- .13 3.2 Preparation
- .14 3.3 Application - Primers
- .15 3.4 Installation
- .16 3.5 Mechanical and Electrical Items
- .17 3.6 Field Quality Control
- .18 3.7 Patching
- .19 3.8 Adjusting and Cleaning
- .20 3.9 Schedules
- .21 3.10 Schedule - Interior Finishes
- .22 3.11 Schedule - Exterior Finishes
- .23 3.12 Schedule – Colours

### **1.3 SUMMARY**

- .1 Section Includes
  - .1 Interior painting.
  - .2 Exterior painting.
- .2 Extent of *Work*
  - .1 Paint and finish "paintable" surfaces for area of the *Work* indicated in the *Contract Documents* except those exempt by the *Contract Documents*.
  - .2 The following surfaces are considered "non-paintable" for purposes of this *Contract*. Omit painter's finishes from following items:
    - .1 Material and equipment furnished completely prime and finish painted by manufacturer;

- .2 Internal surfaces of steel tanks and stacks;
- .3 Exterior concrete including building walls, building floors and pavements, except as otherwise scheduled.
- .4 Weathering steel, copper, bronze, chromium plate, nickel, anodized or lacquered aluminum, monel metal;
- .5 Exposed insulation, glass, plastic, brick, stone, resilient floors, treads and bases, tile and hardware;
- .6 Prefinished metals, unless required to be colour coded.
- .7 Metallic and mastic insulation finishes;
- .8 Abrasive material finishes on floors, stair treads, stair nosings and landings;
- .9 Insulated electric cables;
- .10 Machined parts of machinery and equipment.
- .11 Concealed surfaces.

#### 1.4 SUBMITTALS

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data and list of Products:
  - .1 At least 60 Days before the work of this section commences, submit name of paint manufacturer whose Products are proposed for use in the *Work* along with a complete list of Products intended for use in *Work*, prepared by paint manufacturer. Indicate manufacturer's official certification that Products listed thereon are the top quality made by the company unless otherwise indicated herein.
  - .2 List shall indicate name of paint manufacturer, the catalogue number, grade, and quality of the Products proposed for use, and be correlated to the schedule furnished by the *Consultant*.
  - .3 List shall be accompanied by manufacturer's *Product* data sheets for each *Product* listed.
  - .4 Products delivered to the *Place of the Work* shall conform to the reviewed list of Products.
- .3 Samples:
  - .1 Submit samples of various finishes for the *Consultant's* approval, at least 30 Days before materials are required.
  - .2 Sample surfaces:
    - .1 Use 50 mm (2") concrete block for finishes over concrete or concrete masonry surfaces.
    - .2 Use 3.2 mm (1/8") thick plate steel for finishes over metal surfaces.
    - .3 Use 12.7 mm (1/2") thick birch plywood for finishes over wood surfaces.
    - .4 Use 12.7 mm (1/2") gypsum board for finishes over gypsum board and other smooth surfaces.

- .3 Where possible identify each sample as to project, finish, formula, colour name, number, sheen name and gloss values, date and name of the *Contractor* and painting *Subcontractor*.
- .4 Resubmit as required until colours and gloss value are approved.
- .4 Colours:
  - .1 Prior to beginning painting work, *Contractor* will be furnished with paint colour numbers and copies of colour schedule for surfaces to be painted. Colours will be selected by the *Consultant*.
- .5 Master Painters Institute (MPI) Architectural Painting Specification Manual (MPI Manual):
  - .1 Submit 1 copy of MPI Manual – latest edition and maintain at site office for reference.

## 1.5 CLOSEOUT SUBMITTALS

- .1 Submit closeout submittals in accordance with Section 01 77 00.
- .2 Operation and maintenance data:
  - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.
- .3 Maintenance materials
  - .1 *Provide* two sealed containers, each of four litres (one gallon) capacity of each paint product in each colour used in the work for the *Owner's* maintenance use. Containers shall be new, clearly labelled with manufacturer's name, type of paint, colour and colour number. Store at the *Place of the Work* where directed by the *Owner*.

## 1.6 QUALITY ASSURANCE

- .1 Qualifications
  - .1 Installers / applicators / erectors:
    - .1 Applicators shall have minimum of 5 years proven satisfactory painting experience of projects of similar size and class subject to the *Consultant's* approval.
- .2 Mock-ups:
  - .1 *Provide* full finished mock-up installation of each paint colour, for indicated surfaces and mock-up size, showing colour and finish selected by the *Consultant*, under lighting conditions matching final area lighting, for acceptance by the *Consultant*. Locate at the *Place of the Work* as part of finished installation if accepted.
    - .1 Concrete block, concrete and gypsum board: 9.3 m<sup>2</sup> (100 ft<sup>2</sup>).
    - .2 Hollow metal doors and frames: 1 door and frame for each finish specified.
    - .3 *Site* painted structural steel.
  - .2 Upon completion and approval, sample finishes shall serve as a standard for the balance of the work of this section. Subsequent work carried out and not in the *Consultant's* opinion equal to the standard shall be repainted without charge.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver materials to the *Place of the Work* in sealed original containers with labels intact and store in space directed by *Consultant*. Keep stored materials covered at all times. The presence of any unauthorized material or containers for such at the *Place of the Work* shall be sufficient cause for rejection of all paint materials at the *Place of the Work* at that time.
- .2 Exercise extreme caution in the storage of materials to prevent fire or that may create fire hazards. Thinners and solvents shall be stored in CSA approved metal safety containers in accordance with governing fire and safety regulations.
- .3 In areas of storage protect floor and wall surfaces from paint drips. Protect floors with sheets or clean plywood or metal pans where mixing is being carried out. *Provide* and maintain fire extinguishers, accessible in storage and mixing areas.
- .4 Leave storage areas clean and free from evidence of occupancy when these are required for intended use.
- .5 Keep waste rags in metal drums containing water and remove from the *Place of the Work* at the end of each *Working Day*.
- .6 *Provide* labels on each container, correlated to the reviewed list of Products, with the following information
  - .1 Name of title of *Product*.
  - .2 Manufacturer's stock number.
  - .3 Manufacturer's name.
  - .4 Contents by volume, for major pigment and vehicle constituents.
  - .5 Thinning instructions.
  - .6 Application instructions.

## 1.8 FIELD CONDITIONS

- .1 Comply with environmental requirements of MPI Manual.
- .2 Areas shall be clean and dust free before painting is commenced.
- .3 Make thorough examination of the complete the *Contract Documents* to determine intent, extent, materials, types of surfaces, and locations requiring painting and be fully cognizant of requirements.
- .4 Use sufficient clean drop cloths and protective coverings for full protection of floors, furnishings and work not being painted. Protect mechanical, electrical and special equipment and all other components of building which do not require painting from paint spotting and other soiling during painting process. Mask adjoining work adjacent to work being painted or carefully cut in without overlaps. Clean surfaces soiled by spillage of paint and paint spatters. If cleaning operations damage the surface, repair or replace damaged work at no extra cost to the *Owner*.
- .5 Do not paint over dust, rust, scale, grease, moisture, scuffed surfaces or conditions otherwise detrimental to the formation of a durable paint film.
- .6 Be responsible for damage to the work of this section until the building is complete and accepted by the *Consultant*. In cases of damage, surfaces shall be cleaned and repainted to the *Consultant's* approval.

- .7 Do not paint exterior surfaces at temperatures below 10°C for latex products and below 10°C for solvent based products, nor in rainy conditions or high humidity (maximum relative humidity shall be 85%). Avoid applying paint to surfaces when exposed to direct sunlight. Do not paint interior surfaces at temperatures under 10°C, nor on surfaces where condensation has or will form due to presence of high humidity and lack of proper ventilation.
- .8 *Provide* ventilation to remove odours, evaporating solvents and moisture.
- .9 Check moisture content of surfaces to be painted using electronic moisture meter approved by paint manufacturer, and the *Consultant*, or other approved method. Maximum moisture contents shall be in accordance with manufacturer's recommendations and as follows:
  - .1 Concrete and concrete masonry: Maximum 12% to 14% for solvent coatings, and as recommended by manufacturer for water-based coatings.
  - .2 Gypsum board and plaster: Maximum 12% to 14%.
  - .3 Wood: Maximum 15%.

## 1.9 EXTENDED WARRANTY

- .1 Warrant work of this, in accordance with Section 01 78 36.
- .2 Throughout the warranty period, painting systems shall remain free from failure due to causes including: material failure; surface preparation less than that specified; and paint film thickness less than that specified, or when not specified, less than that coverage recommended by manufacturer.
- .3 Presence of any of following during the warranty period shall constitute failure: visible corrosion; film peeling, blistering, checking, scaling, embrittling or general film disintegration; and poor adhesion as determined by tape "peel-off" test procedures.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE/DESIGN REQUIREMENTS

- .1 Except where more stringent requirements are specified, the following reference standard shall govern the work of this section:
  - .1 Master Painters Institute (MPI) Architectural Painting Specification Manual (MPI Manual), including Identifiers, Evaluation, Systems, Preparation and Approved *Product* List, latest edition, and referenced herein as the MPI Manual, as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
- .2 CAN/CGSB 85.100 Painting.
- .3 Materials, preparation and workmanship shall conform to requirements of latest edition of Architectural Painting Specification Manual by the Master Painters Institute (MPI) (hereafter referred to as the MPI Painting Manual) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.

### 2.2 MATERIALS

- .1 Acceptable Products:
  - .1 Products by ICI Paints, Benjamin Moore Co. Ltd., Sherwin-Williams Co., or Pratt & Lambert Ltd. or equivalent shall be used in the *Work*.

- .2 Paints and coatings materials used within the weatherproofing system shall not exceed the VOC content limits of the following criteria.
  - .1 Interior paints and coatings: to following Green Seal GS-11 VOC limits:
    - .1 Flat coating type: 50 gm/L.
    - .2 Non-flat coating type: 100 gm/L.
  - .2 Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates: Green Seal Standard GC-03, Anti-Corrosive Paints.
  - .3 Clear wood finishes, floor coatings, stains, and shellacs applied to interior elements: South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings
- .3 Paint and finishing materials shall be highest grade, manufacturer's first line quality (not "*Contractor's*" first line).
- .4 Paint and coating materials for each system shall be Products of a single manufacturer.
- .5 *Provide* safe and adequate equipment, scaffolding, ladders, plant, tools, brushes, rollers, clean drop cloths and other items required for the completion of the work.
- .6 Undercoatings and primers shall be made for the purpose by the manufacturer of the finishing materials being used, or as approved by same.
- .7 Brushes, rollers, and the like shall be the best of their respective kinds, clean and suitable for the work.
- .8 Joint sealants: in accordance with Section 07 92 00.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- .1 Prior to commencement of work of this section, thoroughly examine surfaces scheduled to be painted.
- .2 Check surfaces with electric moisture meter and do not proceed if reading is higher than 12-15% or as otherwise required by paint or coating manufacturer.
- .3 Check surfaces to determine if pH of surfaces meet manufacturer's requirements.
- .4 Inspect surfaces to be coated for gouges, marks, nibs, and other defects and properly prepare patching, filling, smoothing or other surface preparation necessary to ensure satisfactory finish.
- .5 Report in writing any condition adversely affecting this work.
- .6 Proceed with work only when surfaces and conditions are satisfactory. Remove dust, grease, rust, scale and extraneous matter, tool and machine marks and insects from all surfaces which could be detrimental to a satisfactory and acceptable finish.

### **3.2 PREPARATION**

- .1 Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- .2 Prepare existing surfaces to be repainted in accordance with Article 6.2 of CAN/CGSB 85.100-93.
- .3 Clean floors, adjacent surfaces and surfaces to be painted before work is commenced.

- .4 Before commencement of work, remove electric plates, surface hardware, canopies of lighting fixtures, and other escutcheons and appurtenances. Mask adjacent items that are not removable. Replace items removed, when paint is dry and clean them. Use cleaning methods that will not damage finish.
- .5 Use sufficient drop cloths and protective coverings for the full protection of work not to be painted or coated.
- .6 Keep waste rags in covered metal drums containing water and remove from building at end of each *Day*.
- .7 Shut down motors, fans, and mechanical ventilation systems during spray painting. Shut down air intakes in affected areas and ventilate to exterior, when applying noxious smelling or VOC containing paints and coatings.
- .8 Exposed concrete and concrete block walls which are scheduled to be painted or sealed shall not be painted or sealed until the sealant has been applied at control joints and joints with hollow metal frames.
- .9 Materials shall be thoroughly mixed before application and applied without cutting or admixture except as indicated in writing by the manufacturer.
- .10 Metal:
  - .1 Clean unpainted and shop primed metal to *Provide* satisfactory surfaces to receive overcoats and *Provide* permanent adhesion of coatings. Remove rust and scale with emery paper and wire brushes. Prime bare metal, make good shop primed metal where abraded, feather out edges to make touch-up patches inconspicuous. Thoroughly clean metal surfaces including piping and ductwork of oil and grease with mineral spirits.
  - .2 Remove loose paint and scale from shop primed metal work.
- .11 Concrete and Masonry:
  - .1 Thoroughly clean form oil, parting compounds, curing compounds and other incompatible materials from concrete surfaces.
  - .2 Thoroughly clean masonry and concrete surfaces to be painted free of mortar droppings, concrete spotter and extraneous matter.
  - .3 Check concrete and masonry surfaces to be painted for alkalinity with pink litmus paper or other recognized method. Where extreme alkalinity occurs (6.8 - 8.0 range) wash surface with tetra potassium solution where latex base paint is to be used and with zinc sulphate solution where oil base paints are to be used. Rinse with clean water and allow to dry thoroughly prior to application of primer.
- .12 Metal Surfaces; Galvanized:
  - .1 Apply cold phosphate surface treatment to SSPC-PT2-82 to unpassivated zinc- coated metal.
  - .2 For passivated zinc-coated metal ("white rusted"), power wire brush or vigorously hand wire brush to scuff galvanize thoroughly, and solvent clean to SSPC-SP1- 82.
  - .3 Prepare exterior exposed galvanized steel and galvanized steel at wet areas to SSPC-SP7 – Sweep Blast.
- .13 Woodwork:



- .1 Sand wipe off dust and grit before prime coat application. Putty nail holes and minimal cracks after primer has dried; sand between primer and top coats with No. 300 sandpaper and remove dust.

### 3.3 APPLICATION - PRIMERS

- .1 Completely prime surfaces of exterior wood to receive paints or coatings.
- .2 Apply primer coats to steel and galvanized steel surfaces that have and have not received shop coat or primer.
- .3 Finish and back prime wood components prior to their installation.
- .4 When primer sealer is dry, touch up visible suction spots before the next coat is applied and do not proceed with the work until suction spots are sealed.
- .5 Use high-build type primer/sealers at glass mat finished gypsum board substrate.

### 3.4 INSTALLATION

- .1 Apply to surfaces scheduled to be finished. Apply materials in accordance with manufacturer's printed directions.
- .2 Paint and coating finishes shall be free of defects in materials and workmanship affecting appearance and performance. Defects shall include but not be limited to improper cleaning and preparation of surfaces, entrapped dust and dirt, alligators, blisters, peeling, drips, runs, uneven coverage, misses, poor cutting in, improper use or application of materials.
- .3 Paint shall be applied by means of brushes, except for wall and ceiling surfaces that shall be applied by rollers or spray application. Apply varnish by brush. Apply stain by wiping.
- .4 *Consultant* shall have the right to prohibit the use of spray painting for such reasons during application as carelessness, poor masking or protective measures, drifting paint fog, disturbance to other trades or failure to obtain a dense even opaque finish.
- .5 Apply coats only when the previous coat is dry/cured, in accordance with manufacturer's printed installation instructions.
- .6 Apply materials evenly, in full coats free from brush and roller marks, sags, runs, crawls, ridges, and other defects. Completed paint or coating shall be uniform in finish, sheen, colour, and texture.
- .7 Areas exhibiting incomplete or unsatisfactory coverage shall have the entire plane painted. Where cutting and patching work has been performed, shall have the entire plane painted. Patching will not be acceptable.
- .8 Permit paint to dry before applying succeeding coats, touch up suction spots and prepare previous coats in accordance with manufacturer's printed instructions. Remove dust of sanding.
- .9 Arrange to have traffic barred from completed areas wherever possible or *Provide* adequate protection to prevent contamination of paints or coatings with foreign substances.
- .10 Tint filler to match wood to receive clear finishes, where filler is required. *Work* filler well into grain and before it has set wipe excess from surface.
- .11 Prime woodwork designed for painting as soon as possible after woodwork is delivered to site. Prime surfaces of such woodwork, exposed and semi-exposed, before installation. Back-prime

woodwork indicated to receive transparent finish with 1 coat of specified transparent finish reduced 25%.

- .12 Sand semi-gloss, medium and high gloss finishes lightly between coats. Sand and dust between each coat to remove defects visible from distance of 1.5 m (5 ft).
- .13 Reseal cut edges of wood doors and seal unfinished tops and bottoms of wood doors with 3 coats polyurethane sealer.
- .14 Finishes and number of coats indicated are the minimum required. Apply further coats until complete uniform coverage is achieved to suit paint products and colours.
- .15 Priming coat shall be colour toned lighter than second coat and the second coat shall be toned lighter than finish coat. Only the finish coat shall match the colour of the accepted samples.
- .16 Paint inside surfaces of light coves white unless otherwise indicated in the *Contract Documents*.
- .17 Grilles and perforated items shall be spray painted. Do not block perforations and apply evenly to present consistent appearance free from defects visible from distance of 1.5 m (5 ft)
- .18 Do not apply paints and coating over fire rating labels.
- .19 Do not apply paints and coatings over identification labels on mechanical and electrical equipment.
- .20 Paint removable and operable items, such as access panels and doors, grilles, and similar items, while the item is removed or open, so as to not create a paint seal at the juncture of the opening or removable item and its fixed frame or substrate.
- .21 Keep sprinkler heads, fire detection equipment, and smoke detection equipment free of paint.
- .22 Repaint existing surfaces and finishes where scheduled, where alterations or renovations have been carried out, and where surfaces have been disturbed by the alterations or renovations. Repaint surfaces entirely between changes of plane.
- .23 Paint both sides and edges of plywood backboards for equipment before installation.

### **3.5 MECHANICAL AND ELECTRICAL ITEMS**

- .1 Finish paint primed mechanical and electrical items with 2 coats of paint. Include for the following list unless otherwise indicated in the *Contract Documents*:
  - .1 Conduit
  - .2 Ductwork
  - .3 Hangers
  - .4 Stacks
  - .5 Vents
- .2 Prime and paint exposed insulated and bare pipes. Prime and paint exposed conduits and electrical raceways, fittings, outlet boxes, junction boxes, pull boxes and similar items. Use heat resistant epoxy paint on pipes and surfaces where operating surface temperature exceeds 65°C.
- .3 Coordinate the painting of pipes, and coverings with mechanical contractor applying colour banding, flow arrows and pipe identification after the painting of pipes and coverings.
- .4 Paint work to match adjacent walls and ceilings unless directed otherwise.

- .5 Paint interior surfaces of air ducts and pipe trenches including heating pipes and elements that are visible through grilles and louvres with one coat of flat metal paint to limit of sight-line. Paint to be black or white as directed by the *Consultant*.
- .6 Gas pipes, whether concealed or exposed, shall be painted in yellow-orange colour, in accordance with gas code.
- .7 Paint fire protection piping for sprinklers with self priming rust paint, Para Paint colour 1133 Red in the following locations:
  - .1 Apparatus bays.
  - .2 Utility room.
  - .3 Generator room.
  - .4 Elsewhere where exposed.
- .8 Paint gas piping with self priming rust paint, yellow colour in the following locations:
  - .1 Apparatus bays.
  - .2 Utility room.
  - .3 Generator room.
  - .4 Elsewhere where exposed.

### **3.6 FIELD QUALITY CONTROL**

- .1 Field quality control shall be in accordance with Section 01 45 00, as supplemented herein.

### **3.7 PATCHING**

- .1 Do retouching to ensure that the work is handed over to the *Owner* in proper condition, free of runs, spatter, finger marks, rust, watermarks, scratches, blemishes or other disfiguration, with full, even coverage.
- .2 After fully painting, retouching and finishing a room or area, notify the *Consultant*. After review and acceptance by the *Consultant*, post sign "Painting Complete - No Admittance Without Permission".

### **3.8 ADJUSTING AND CLEANING**

- .1 Promptly as the work proceeds and on completion of the work, remove paint where spilled, splashed or spattered during the progress of the work keep the premises free from unnecessary accumulation of tools, equipment, surplus materials and debris; at the conclusion of the work leave the premises clean.

### **3.9 SCHEDULES**

- .1 Finish Schedule:
  - .1 Assume full responsibility for painting and varnishing of all materials of the contract exposed in the finished work which do not already have finished surfaces and that normally require paint or varnish finish. Inspect surfaces over which the work of this section is dependent for unevenness, cracks, surface defects, moisture, cleanliness, roughness and other irregularities detrimental to the application and performance of the work. Confirm conditions satisfactory before proceeding. Failure in complying with above or failure to have

- unsatisfactory conditions corrected before proceeding, shall not relieve the *Contractor* of responsibility for required results.
- .2 Exposed means visible in complete work including interiors of cupboards and closets, tops of doors, trim, and the like, whether in sight line or not, including behind surface mounted fixtures and heating units.
  - .3 In instances where materials specified are not suitable for particular application or are contrary to manufacturer's recommendations for use on particular surface, immediately bring to attention of the *Consultant* for clarification and instructions.
  - .4 Where finishing formula for surfaces requiring paint is not specified, follow recommendations of MPI Manual as follows:
    - .1 Interior painting: Custom Grade.
    - .2 Exterior painting: Custom Grade.
  - .5 The *Consultant* shall have right to make changes in colour tone of finishes prior to final coat to obtain desired results without additional cost to the *Owner*.
  - .6 Unless otherwise noted or scheduled in the *Contract Documents*, walls shall be painted the same colour within a given area.
  - .7 Access doors, prime coated butts and other prime painted hardware, registers, radiators and covers, exposed piping and electrical panels shall be painted to match adjacent surfaces in terms of colour, texture and sheen, unless otherwise indicated.
- .2 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI values:

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

### 3.10 SCHEDULE - INTERIOR FINISHES

- .1 System references listed are based on MPI Manual and are Custom Grade, Low VOC (Green Seal GS-11), unless otherwise indicated in the *Contract Documents*:
  - .1 Formula 1: for concrete block walls, except those noted for PWF:
    - .1 One coat latex block filler.
    - .2 Two coats latex semi-gloss.
  - .2 Formula 2: for concrete block walls noted to receive PWF gloss finish coat:
    - .1 One coat latex block filler.

- .2 Two coats high build epoxy coating.
- .3 Formula 3; for gypsum board walls apply:
  - .1 One coat latex primer sealer.
  - .2 Two coats latex semi-gloss.
- .4 Formula 4: for gypsum board ceilings apply:
  - .1 One coat latex primer sealer.
  - .2 Two coats latex semi-gloss.
- .5 Formula 5: for wood to receive paint finish apply:
  - .1 One coat stain blocking/adhesion promoting primer (waterborne).
  - .2 Two coats latex semi-gloss.
- .6 Formula 6: for primed ferrous metal surfaces apply:
  - .1 One coat latex dryfall.
  - .2 High traffic surfaces – custom system:
    - .1 One coat high performance primer (waterborne).
    - .2 Two coats latex S/G.
- .7 Formula 7: for galvanized and zinc coated metal apply:
  - .1 One coat galvanized primer (waterborne).
  - .2 Two coats latex S/G.
  - .3 For ceiling and ductwork areas apply:
    - .1 One coat galvanized primer (waterborne).
    - .2 One coat latex dryfall.
- .8 Formula 8: for woodwork to receive stained finish apply custom system:
  - .1 One coat stain.
  - .2 Three coats waterborne polyurethane clear.
- .9 Formula 9: for woodwork to receive natural finish apply:
  - .1 Three coats waterborne polyurethane clear.
- .10 Formula 10: for insulation covering apply:
  - .1 One coat latex primer sealer.
  - .2 Two coats latex S/G.

### **3.11 SCHEDULE - EXTERIOR FINISHES**

- .1 System references listed are based on MPI Manual and are Custom Grade, unless otherwise indicated in the *Contract Documents*:
  - .1 Formula 12 (Alkyd): for shop primed ferrous exterior metal surfaces noted for paint, apply:
    - .1 Touch-up with shop primer as provided by fabricator.
    - .2 One coat oil alkyd metal primer.
    - .3 Two coats exterior alkyd enamel.
  - .2 Formula 13 (Alkyd): for galvanized and zinc coated exterior metal surfaces noted for paint:
    - .1 One coat cementitious primer.
    - .2 Two coats exterior alkyd enamel.

### **3.12 SCHEDULE – COLOURS**

- .1 Refer to the Drawings for painting color and location.
- .2 All exposed exterior and interior Steel shall be painted. The *Contractor* shall confirm color with the *Consultant*.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Delivery, Storage, and Handling
- .6 2.1 Accessories
- .7 2.2 Fabrication
- .8 3.1 Installation
- .9 3.2 Barrier Free Installation Heights
- .10 3.3 Installation of Washroom Accessories
- .11 3.4 Installation Tolerances
- .12 3.5 Adjusting and Cleaning

### **1.3 SUMMARY**

- .1 Section Includes
  - .1 Washroom accessories.
  - .2 Janitor room accessories.

### **1.4 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section.
- .3 Samples:
  - .1 Submit duplicate samples of each finish specified.
- .4 Shop drawings:
  - .1 Clearly indicate fabrication details, plans, elevations, hardware and installation details.
- .5 Templates:
  - .1 The *Contractor* shall ensure that their *Subcontractors* submit templates for use by their installers and fabricators as required for proper location and installation of hardware.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Package or crate, and brace products to prevent distortion in shipment and handling. Label packages and crates and protect finish surfaces by sturdy wrappings.
- .2 The *Contractor* shall ensure that their *Subcontractors* deliver products to location at the *Place of the Work*

## PART 2 - PRODUCTS

### 2.1 ACCESSORIES

- .1 Incorporate reinforcing, fastenings and anchorage required for building-in of Products.
- .2 Specified manufacturer's catalogue references are the minimum acceptable standards for work of this section. Where two manufacturers or Products are specified for a given accessory, select one or the other for installation in the *Work*, but not both.
  - .1 Acceptable product manufacturers: Subject to compliance with requirements, *Provide* products by one of the following:
    - .1 ASI Watrous Inc.
    - .2 Bobrick Washroom Equipment, Inc.
    - .3 Swish Maintenance Ltd.
    - .4 Uline Canada
    - .5 Frost Products Ltd.
    - .6 Wet Style.
    - .7 GAMCO Commerical Restroom Accessories
    - .8 Or as noted on the drawings
    - .9 Or equivalent
  - .3 Lettering:
    - .1 for identification of accessories and operation instructions shall be silk screened using international symbols unless otherwise specified.
  - .4 Washroom Accessory Schedule
    - .1 locations as indicated or scheduled in the *Contract Documents*. Exact locations determined by the *Consultant*:

### 2.2 FABRICATION

- .1 Fabricate Products with materials and component sizes, metal gauges, hardware, reinforcing, anchors, and fastenings of adequate strength to ensure that washroom accessories will remain free of warping, buckling, opening of joints and seams, and distortion within limits of intended use.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- .1 Supply manufacturer's handling instructions, anchorage information, roughing-in dimensions, templates and service requirements for installation of the work of this section, and assist or



supervise, or both, the setting of anchorage devices and construction of other work incorporated with Products specified in this section in order that they function as intended.

- .2 Install work to meet manufacturers' recommended specifications, true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation.
- .3 Include reinforcing, anchorage and mounting devices required for the installation of each *Product*.
- .4 Fit joints and junction between components tightly and in true planes, conceal and weld joints where possible.

### **3.2 BARRIER FREE INSTALLATION HEIGHTS**

- .1 Install accessories to permit operable parts and controls to be accessed at 1100 mm (43") maximum above finished floor, unless otherwise indicated.

### **3.3 INSTALLATION OF WASHROOM ACCESSORIES**

- .1 Install and secure fixtures rigidly in place using expansion shields in solid masonry or concrete, toggle bolts in hollow masonry or sheet metal screws at metal studs.
- .2 Insulate surfaces to prevent electrolytic action due to contact with dissimilar metals, or concrete or masonry if required. Use bituminous paint or other approved means.
- .3 Install in accordance with manufacturer's installation instructions, on built-in concealed solid backing materials. Grab bar installation shall be able to withstand 250 kg downward force.
- .4 Verify locations and mounting heights with the *Consultant* before roughing-in.
- .5 Install plumb, level, straight, tight and secured.

### **3.4 INSTALLATION TOLERANCES**

- .1 Install plumb, level, tight and secured. Comply with the following maximum tolerances:
  - .1 Plumb and level: 3 mm (1/8").
  - .2 Variation from indicated position: 3 mm (1/8").

### **3.5 ADJUSTING AND CLEANING**

- .1 Verify under work of this section that installed Products function properly and adjust them accordingly to ensure satisfactory operation. Test mechanisms, hinges, locks, and latches and adjust and lubricate to ensure washroom accessories are in perfect working order.
- .2 Do not remove protective coatings until final cleaning, or earlier if directed by the *Consultant*.
- .3 Refinish damaged or defective work so that no variation in surface appearance is discernible. Refinish work at the *Place of the Work* only if approved.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Closeout Submittals
- .6 1.6 Quality Assurance
- .7 1.7 Delivery, Storage, and Handling
- .8 1.8 Extended Warranty
- .9 2.1 Acceptable Manufacturers
- .10 2.2 Hardware – Manual Controlled Shades
- .11 2.3 Assembly
- .12 2.4 Shade Mounting System
- .13 2.5 Aluminum Finish
- .14 2.6 Shade Fabric Types
- .15 2.7 Fabrication
- .16 3.1 Installation
- .17 3.2 Adjusting and Cleaning
- .18 3.3 Closeout Activities

### **1.3 SUMMARY**

- .1 Section Includes
  - .1 Roller window sunshades at interior locations.
  - .2 Roller window room darkening (black-out) shades at interior locations.

### **1.4 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section.
  - .2 Submit manufacturers' installation instructions.
- .3 Shop drawings:
  - .1 Submit shop drawings or fully dimensioned catalogue cuts.
  - .2 Window treatment schedule: Use same designations indicated on the *Contract Documents*.

- .3 Clearly indicate general construction, configurations, jointing methods and locations, fastening methods, handing of controls, required blocking locations, banding (tandem shades), and installation details.

- .4 Samples:

- .1 Submit samples of each material and finish colour selected and each accessory.

## 1.5 CLOSEOUT SUBMITTALS

- .1 Submit closeout submittals in accordance with Section 01 77 00.
- .2 Operation and maintenance data:
  - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.

## 1.6 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Manufacturers:
    - .1 Company specializing in manufacturing the Products specified in this section, with a minimum of 10 years' experience.
  - .2 Installers / applicators / erectors:
    - .1 *Work* of this section shall be by forces in the direct employ or under control of the system manufacturer, skilled, trained, and experienced in work of similar scope and complexity.
- .2 Mock-ups:
  - .1 Erect 1 full size mock-up each roller shade type at the *Place of the Work* for review. Completed and accepted mock-up shall act as the standard to which balance of the work of this section will be judged.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Before delivery to the *Place of the Work*, check each shade for operation; remove finger marks and smudges.
- .2 Package Products to prevent distortion in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings.

## 1.8 EXTENDED WARRANTY

- .1 Warrant work of this section in accordance with Section 01 78 36 for a period of 2 years.

## PART 2- PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- .1 Subject to compliance with requirements, *Provide* products by one of the following manufacturers:
  - .1 MechoShade Systems, Inc.
  - .2 Solarfective Products Ltd.
  - .3 SunProject Inc.

- .4 Sun Glow
- .5 Or equivalent (substitutions in accordance with Section 01 25 00)

## 2.2 HARDWARE – MANUAL CONTROLLED SHADES

- .1 Chain operated, with infinite positioning. Left or right hand operation and banding as applicable to suit *Place of the Work* condition.
  - .1 Drive assembly:
    - .1 Must allow finger tip control and include a built in shock absorber system to prevent chain breakage under normal operating conditions;
    - .2 Factory set for the size and travel of the shades;
    - .3 Capable of being field adjusted from the exterior of the shade unit without having to disassemble the hardware.
    - .4 Drive Chain: No. 10 stainless steel bead chain formed in a continuous loop. The chain shall have passed a 40 kg (90 lb) load test. Chain may be positioned at either, or both, ends of the shade without disassembly of the shade unit.
    - .5 *Provide* counter balancing mechanism designed to offset the weight of the shade and give fingertip control.
  - .2 Control shades and room darkening shades independently.

## 2.3 ASSEMBLY

- .1 *Provide* fully factory assembled shade unit consisting of 2 shade brackets, shade tube, extruded aluminum fascia, hembar and fabric as specified.
- .2 Fabric shall hang straight, without shifting sideways more than 3 mm (1/8") in either direction due to warp distortion or weave design.
- .3 Factory modify housings where necessary to bypass columns.
- .4 End brackets: a two piece molded ABS construction with nylon drive sprocket. Bracket colour shall coordinate with the fascia colour.
- .5 Shade tube: Minimum 1.52 mm (0.060") thick extruded aluminum with three equally spaced continuous stiffening fins, non-sag design, maximum deflection under full load of fabric L/700.
- .6 Fascia: Minimum 1.5 mm (1/6") thick extruded aluminum.
- .7 Hembar: Extruded aluminum with matching plastic end finials.
- .8 Mounting: Removal of shade system shall not require the disassembly of the shade unit.
- .9 Room darkening shade features: 13 mm (1/2") pile mounted in prefinished 38 mm x 28 mm (1-1/2" x 1-1/8") extruded aluminum side and bottom channels finished to match mullions. Include Dynamic hembar to allow for variance in window sill level.

## 2.4 SHADE MOUNTING SYSTEM

- .1 Extruded aluminum bracket designed to accept preassembled shade system.
  - .1 Brackets to be used to facilitate the alignment with shade opening.

- .2 Modular construction: Shades must be removable as a complete modular unit without any component disassembly required.

## **2.5 ALUMINUM FINISH**

- .1 Exposed aluminum: Clear anodized AA-M12C22A31.
- .2 Unexposed aluminum: mill finish.

## **2.6 SHADE FABRIC TYPES**

- .1 Sun control fabric; dimensionally stable shade fabric:
  - .1 Acceptable Products; 3% open area:
    - .1 Solarfective 'Solarblock 300 Series' or equivalent.
  - .2 Colour: as selected by the *Consultant* from the manufacturer's full range.
- .2 Performance: Fabric shall hang flat, without buckling or distortion. Edge, where trimmed, shall hang true and straight, without shifting sideways more than 3 mm (1/8") in either direction due to warp distortion or weave design.
- .3 Flammability:
  - .1 Certified by an independent Laboratory to pass CAN/ULC S109-03 Large Flame Test.

## **2.7 FABRICATION**

- .1 Finished assemblies shall be, square, true to size and free from distortion, twist, or other defects that could affect their strength, operation or appearance. Factory applied finish shall be uniform, smooth and without blemishes.
- .2 The fabric shall be colour fast, retain its shape, not be affected by moisture or heat, and shall be non-flammable. Cut fabric to eliminate glare and reflection from shining surfaces while maintaining exterior view. The top of the fabric is retained in recessed spline of the shade roller and the bottom of the fabric is retained by the hem bar.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- .1 Install shade systems in plumb, squared, adequately anchored, maintaining uniformed clearances, accurate alignment levels, and parallel with the window plane. Fabric shall not travel more than 3 mm (1/8") in either direction within channels after installation.
- .2 Fabric shall be pre-measured and manufactured off-*Site*.
- .3 Shades shall be snapped into place without screws or visible fasteners.
- .4 Incorporate reinforcing, fastening and anchorage required for installation of shades.
- .5 Securely attach installation fittings to their mounting surfaces with stainless steel or hardened aluminum screws of proper length and type, and durable anchors.
- .6 Install shade roller true and level, and with cloth to hang flat without buckling or distortion.
- .7 Room darkening shades (black-out) to be installed to eliminate passage of light from exterior.

### **3.2 ADJUSTING AND CLEANING**

- .1 Verify that installed shade system functions properly, and adjust it accordingly to ensure satisfactory operation.
- .2 Refinish damaged or defective work so that no variation in surface appearance is discernible.

### **3.3 CLOSEOUT ACTIVITIES**

- .1 Demonstration
  - .1 Before acceptance of system, arrange for demonstration of equipment with authorized representatives of the *Owner*, to be performed by representative of shade manufacturer to assure proper function, operation and explanation.
  - .2 Conduct comprehensive demonstration for the *Owner's* staff on operation and care of interior window treatments.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Performance Requirements
- .5 1.5 Administrative Requirements
- .6 1.6 Submittals
- .7 1.7 Quality Assurance
- .8 1.8 Delivery, Storage, and Handling
- .9 1.9 Warranty
- .10 2.1 Manufacturers
- .11 2.2 Lightshelves
- .12 2.3 Accessory Materials
- .13 2.4 Fabrication
- .14 2.5 Aluminum Finishes
- .15 3.1 Examination
- .16 3.2 Installation
- .17 3.3 Adjusting, Cleaning and Protection

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Interior Daylighting Device, light shelves are anchored directly to the vertical curtain wall.

### **1.4 PERFORMANCE REQUIREMENTS**

- .1 Structural Performance:
  - .1 Dead load on Lightshelf is designed to hold its own weight only.
  - .2 Panel deflection shall not exceed  $L/120$  of span length.
  - .3 Mullion spacing not to exceed 6' (1.83 m).
  - .4 Panel projection not to exceed 30" (762 mm).
- .2 Daylighting Performance:
  - .1 Design will allow for tiltability of the panel in the anchor to allow for cleaning of the reflecting surface.

- .2 Design of standard configurations will allow for minimal direct sunlight to show through the gaps between two adjacent shelves based on project location, latitude, altitude, building orientation, surrounding conditions, and aesthetic requirements.
- .3 Design shall allow for flexibility of either using opaque aluminum composite panels or translucent polycarbonate panels as panel material.
- .4 Design will allow for coverage around 90° corner conditions by providing for attachment method on specified corner conditions.
- .3 Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures:
  - .1 Temperature Change (Range): 120°F (49°C), ambient; 180°F (82°C), material surfaces.
- .4 Environmental Product Declarations (EPD): Shall have a Type III Product-Specific EPD.

## 1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
  - .1 Check dimensions at the *Place of the Work* before fabrication commences, and report to the *Consultant* in writing all discrepancies.
  - .2 Where dimensions are not available before fabrication commences, the dimension required shall be agreed upon between the various sections concerned.
- .3 Field Measurements:
  - .1 Verify actual locations of structural supports for lightshelves by field measurements before fabrication and indicate measurements on Shop Drawings.

## 1.6 SUBMITTALS

- .1 Submit required submittals in accordance with Section 01 33 00.
  - .2 *Product* data sheets:
    - .1 Submit manufacturer's *Product* data sheets for Products proposed for use in the work of this section.
  - .3 Shop Drawings:
    - .1 For aluminum lightshelves. Include plans, elevations, sections, and attachments to compatible systems.
  - .4 Samples for Initial Selection:
    - .1 For units with factory-applied color finishes.
  - .5 Samples for Verification:
    - .1 For each type of exposed finish required, in manufacturer's standard sizes
- Closeout Submittals

## 1.7 QUALITY ASSURANCE

- .1 Installer Qualifications:



- .1 Installer who has had successful experience with installation of the same or similar systems required for the project and other projects of similar size and scope.
- .2 Manufacturer Qualifications:
  - .1 A manufacturer capable of fabricating lightshelves, and glazed aluminum curtain walls and storefront systems that meet or exceed performance requirements.
- .3 Source Limitations:
  - .1 Obtain aluminum lightshelves and glazed aluminum curtain walls and storefront systems through one source from a single manufacturer.
- .4 Product Options:
  - .1 Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
    - .1 Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.
- .5 Mockups:
  - .1 Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
    - .1 Build mockups for type(s) of lightshelf elevation(s) indicated, in location(s) shown on Drawings.

## **1.8 DELIVERY, STORAGE, AND HANDLING**

- .1 Packing, Shipping, Handling, and Unloading:
  - .1 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- .2 Storage and Protection:
  - .1 Store materials protected from exposure to harmful weather conditions.
  - .2 Handle lightshelf materials and components to avoid damage.
  - .3 Protect lightshelf materials against damage from elements, construction activities, and other hazards before, during and after installation.

## **1.9 WARRANTY**

- .1 Manufacturer's Warranty:
  - .1 Submit, for Owner's acceptance, manufacturer's standard warranty.
- .2 Warranty Period:
  - .1 Two (2) years from Date of Substantial Completion of the project.

## **PART 2 – PRODUCTS**

## **2.1 MANUFACTURERS**

- .1 Basis-of-Design Product:
  - .1 InLighten™ Light Shelf System by Kawneer Company Inc.
- .2 Substitutions: Refer to Substitutions Section for procedures and submission requirements.

## **2.2 LIGHTSHELVES**

- .1 Lightshelf Members: Manufacturer's standard extruded or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
- .2 Panel Materials: Aluminum composite or polycarbonate materials.
- .3 Fasteners and Accessories: Nonmagnetic stainless steel to be non-corrosive and compatible with aluminum members, anchors, and other components.
- .4 Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

## **2.3 ACCESSORY MATERIALS**

- .1 Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil (0.762 mm) thickness per coat.

## **2.4 FABRICATION**

- .1 Form or extrude aluminum shapes before finishing.
- .2 Fabricate components that, when assembled, have the following characteristics:
  - .1 Profiles that are straight, and free of defects or deformations.
  - .2 Accurately fitted joints with ends coped or mitered.
  - .3 Physical and thermal isolation of glazing from framing members.
  - .4 Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - .5 Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- .3 Lightshelf: Fabricate components for assembly following approved shop drawings and/or manufacturer's standard installation instructions.
- .4 After fabrication, clearly mark components to identify their locations in Project according to approved shop drawings.

## **2.5 ALUMINUM FINISHES**

- .1 Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- .2 Factory Finishing: Color to be selected by Architect from manufacturers full range.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- .1 Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- .1 General:
  - .1 Comply with manufacturer's written instructions. Refer to installation instructions of the compatible curtain wall or storefront system.
  - .2 Please note that the installation instructions can differ from one compatible system to another one.
  - .3 Do not install damaged components.
  - .4 Fit joints to produce hairline joints free of burrs and distortion.
  - .5 Rigidly secure non-movement joints.
  - .6 Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
  - .7 Weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
  - .8 Seal joints watertight where shown on approved shop drawings and/or manufacturer's standard installation instructions.
- .2 Metal Protection:
  - .1 Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
  - .2 Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- .3 Install components plumb and true in alignment with established lines and grades.
- .4 Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- .5 Install glazing as specified in Division 08 Section "Glazing".

### **3.3 ADJUSTING, CLEANING AND PROTECTION**

- .1 Protection:
  - .1 Protect installed product's finish surfaces from damage during construction. Protect aluminum lightshelf system from damage from grinding and polishing compounds, plaster, lime, cement, acid and/or acid wash, or other harmful contaminants.
- .2 Cleaning:

- .1 Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.
- .3 Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 References
- .5 1.5 Requirements Of Regulatory Agencies
- .6 1.6 Submittals
- .7 1.7 Closeout Submittals
- .8 1.8 Quality Assurance
- .9 1.9 Delivery, Storage And Handling
- .10 1.10 Maintenance Service
- .11 1.11 Project Conditions
- .12 1.12 Warranty
- .13 2.1 Manufacturer And Installer
- .14 2.2 Commercial Lift
- .15 3.1 Examination
- .16 3.2 Preparation
- .17 3.3 Lift Installation
- .18 3.4 Arrangement Of Equipment
- .19 3.5 Adjusting And Cleaning
- .20 3.6 Protection
- .21 3.7 Closeout Activities

### **1.3 SUMMARY**

- .1 Section Includes
  - .1 Commercial Vertical Platform Lift

### **1.4 REFERENCES**

- .1 American Society of Mechanical Engineers (ASME) A17.1 - Safety Code for Elevators and Escalators.
- .2 American Society of Mechanical Engineers (ASME) A18.1 - Safety Standard for Platform and Stairway Chair Lifts.
- .3 CSA B44.1 - Elevator and Escalator Electrical Equipment.
- .4 CSA B355 - Lifts for Persons with Physical Disabilities.
- .5 CSA B613 - Private Residence Lifts for Persons with Physical Disabilities.

- .6 CSA - National Electric Code.
- .7 ICC/ANSI A117.1 - Accessible and Usable Buildings and Facilities.
- .8 NFPA 70 - National Electric Code.
- .9 U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)".

## **1.5 REQUIREMENTS OF REGULATORY AGENCIES**

- .1 Fabricate and install work in compliance with applicable jurisdictional authorities.
- .2 File shop drawings and submissions with local authorities as the information is made available. Company pre-inspection and jurisdictional authority inspections and permits are to be made on timely basis as required.

## **1.6 SUBMITTALS**

- .1 Submit under provisions of Section 01 30 00.
- .2 Product Data: Manufacturer's data sheets on each product to be used, including:
  - .1 Preparation instructions and recommendations.
  - .2 Storage and handling requirements and recommendations.
  - .3 Installation methods.
- .3 Shop drawings:
  - .1 Submit shop drawings showing the complete layout of the elevator equipment, location of machinery and apparatus, loads to be carried on building structure and design of elevator cab, hoistway entrances and signals in accordance with Section 01 33 00. Submit layout to authorities having jurisdiction before work proceeds. At the review of shop drawings, hoistway sizes and electrical current characteristics will be confirmed.
  - .2 Include on shop drawings:
    - .1 Complete elevations, ceiling plan, overall layout and details of the elevator car.
    - .2 Size and location of machine and controller.
    - .3 Size and location of car, hoisting beam, guide rails, buffers and other components in hoistway.
    - .4 Rail bracket spacing and maximum loads on guide rails.
    - .5 Reactions at points of support.
    - .6 Weights of principal components.
    - .7 Top and bottom clearance and over travel of car.
    - .8 Location of circuit breaker, switchboard panel or disconnect switch, light switch and feeder extension points in machine room.
    - .9 Location for connection of travelling cables.
    - .10 Location and size of access doors.

- .11 Loads on hoisting beams.
- .12 Expected heat generation of equipment in machine room.
- .13 Include on general arrangement drawings:
  - .1 Type, size, location of hoistway entrances showing details of fastening to hoistway structure.
  - .2 Complete elevations, ceiling plan, overall layout and details of the elevator car.
- .4 Samples
  - .1 Before fabrication, submit samples of materials which will be visible in the finish in accordance with Section 01 33 00. Samples shall fully represent the physical and chemical properties of the materials to be supplied and installed.
- .5 Submit information regarding power requirements, ventilation, requirements, cutouts, access requirements and lighting and outlet locations, within 2 weeks subsequent to Contract award.
- .6 Submit a completion schedule showing equipment delivery dates, and anticipated completion date for elevator.

#### **1.7 CLOSEOUT SUBMITTALS**

- .1 Submit closeout submittals in accordance with Section 01 77 00.
- .2 As-built records:
  - .1 Submit as-built records in accordance with Section 01 77 00.
  - .2 Record actual locations of equipment, names or equipment manufacturers and suppliers, concealed conduit and boxes, concealed devices, disconnects.
  - .3 Supply the Owner with as-builts drawings (elevator & mechanical) complete with maintenance and operating manuals, and tools, or devices (proprietary or otherwise) as required to maintain, service, and operate the elevators.
- .3 Operation and maintenance data
  - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 77 00.
  - .2 Include description of elevator system's method of operation and control including motor, door operation, signals, and special or non-standard features provided.
  - .3 Provide parts catalogues with complete list of equipment replacement parts with equipment description and identifying numbers.
  - .4 Legible schematic of wiring diagrams covering electrical equipment installed, including changes made in final work, with symbols listed corresponding to identity or markings on both machine room and hoistway apparatus.
  - .5 Lubrication chart.
  - .6 Planned maintenance tasks and their frequencies.
  - .7 Maintenance of special finishes.

- .8 Submit to the Owner any tools or devices that are required not only for basic operation and maintenance of the elevator, but also for troubleshooting or reprogramming. Include a user's guide/reference manual that effectively communicates to a qualified mechanic how to use the controller and/or tool, and that also defines and explains all respective error codes, including required fixes. The devices, tools, and user's manual so submitted shall be such as to allow any qualified maintenance service company to be able to provide proper maintenance services.
- .4 Log Book:
  - .1 Provide maintenance log book for recording maintenance activities.
- .5 Storage cabinet:
  - .1 Provide suitable prefinished metal storage cabinet mounted in machine room for proper protection and storage of as-built records, log book, spare parts, and operation and maintenance data.

## **1.8 QUALITY ASSURANCE**

- .1 Retain a Professional Engineer registered in the Place of the Work to design the work of this section; to prepare, seal and sign shop drawings; and to perform field review. Shop drawings shall show both design and installation requirements.
- .2 Qualifications:
  - .1 .1 Manufacturer:
    - .2 Elevators shall be manufactured by a firm with a minimum of 10 years of experience in fabrication of elevators equivalent to those specified.
  - .3 Installation:
    - .1 Elevators shall be installed by the manufacturer.

## **1.9 DELIVERY, STORAGE AND HANDLING**

- .1 Comply with manufacturer's recommendations for delivery, storage and handling.
- .2 If the construction site is not prepared to receive the elevator equipment at the agreed ship date, the General Contractor shall be responsible to provide a safe, dry, and easily accessible storage area on or off the premises. Additional labor costs for double handling will be the responsibility of the general contractor.
- .3 Delivered elevator materials shall be stored in a protected environment in accordance with manufacturer recommendations. A minimum storage area of 10 feet by 20 feet is required adjacent to the hoistway.

## **1.10 MAINTENANCE SERVICE**

- .1 The elevator manufacturer shall provide maintenance service consisting of regular examinations and adjustments of the elevator equipment for a period of 12 months after date of substantial completion. Replacement parts shall be produced by the original equipment manufacturer.
- .2 Maintenance service be performed during regular working hours of regular working days and shall include regular time call back service.
- .3 Maintenance service shall not include adjustments, repairs or replacement of parts due to negligence, misuse, abuse or accidents.



### **1.11 PROJECT CONDITIONS**

- .1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.
- .2 Do not install systems under environmental conditions outside manufacturer's recommended limits.

### **1.12 WARRANTY**

- .1 Provide manufacturer warranty for a period of two years. The warranty period is to begin upon Substantial Completion of the Contract.
- .2 Warranty covers defects in materials and workmanship. Damage due to ordinary use, vandalism, improper or insufficient maintenance, misuse, or neglect do not constitute defective material or workmanship.

## **PART 2- PRODUCTS**

### **2.1 MANUFACTURER AND INSTALLER**

- .1 Elevators and equipment of this Section shall be manufactured and installed by one manufacturer.
- .2 Acceptable manufacturers/installers:
  - .1 Savaria, which is located at: 2 Walker Drive, Brampton, ON, Canada, L6T 5E1; Toll Free Tel: 800-661-5112; Tel: 905-791-5555; Fax: 905-791-2222; Email: request info; Web: [www.savaria.com](http://www.savaria.com)
  - .2 Substitutions: Or equivalent

### **2.2 COMMERCIAL LIFT**

- .1 Hydraulic Vertical Platform Lifts: Savaria V1504-STD.
- .2 Hydraulic Vertical Platform Lift:
  - .1 The lift described here, manufactured by Savaria Lifts Inc, is a vertical platform lift consisting of a hydraulic tower with a lifting platform.
- .3 Work described in this section includes providing equipment, incidental material and labor required for complete, operable roped hydraulic wheelchair lift installation. Lifts shall be erected, installed, adjusted, tested and placed in operation by lift system manufacturer, or manufacturer's authorized installer.
  - .1 Lifts shall be in accordance:
    - .1 CSA B355 (Canada)
- .4 The following preparatory work to receive the lifts specified in this section is part of the work of other sections:
  - .1 Permanent 120 VAC, 20 amp single phase power to operate lift to be provided from a lockable fused/cartridge type disconnect switch with auxiliary contacts for battery operation. Refer to drawings for permanent power specifications and location of disconnects. Temporary power may be provided to expedite installation of lift.

- .2 Provide a plumb and square hoistway with smooth interior surfaces, including fascias or furring of the hoistway interior.
- .3 Provide rough openings per lift contractor's shop drawings.
- .4 Provide substantial, level pit floor slab as indicated on the lift contractor's shop drawings.
- .5 Characteristics:
  - .1 Rated Load: 750 lb (340 kg).
  - .2 Rated Speed: 20 fpm (0.10 m/s).
  - .3 Car Dimensions:
    - .1 42 inches W by 60 inches D (1067 mm by 1524 mm)
- .6 Levels Serviced:
  - .1 Levels: 2.
- .7 Car Configuration:
  - .1 Enter/Exit same side.
- .8 Travel: in accordance with contract documents.
- .9 Pit Depth:
  - .1 3 inches (76 mm) – Standard.
- .10 Powder Coat Finish
  - .1 To be selected by Architect from manufactures full color chart
- .11 Operation: Constant pressure.
- .12 Power Supply: 110 volt, 20 amp, 1 phase, 60 Hz.
- .13 Drive System: 2:1 Roller chain hydraulic.
- .14 Emergency Power:
  - .1 24VDC Battery raising and lowering
- .15 Controller: Relay logic based controller.
- .16 Motor/Pump: 3 HP (2.24 kw), gear type.
- .17 Manual Lowering: Outside the hoistway at lower landing.
- .18 Car Enclosure:
  - .1 Cab Configuration:
    - .1 Side Guards of platform shall have a steel frame with a powder coat finish and steel panel inserts to a minimum of 80 inches (2032 mm) above the upper landing. A steel ceiling with an egg crate insert and 4 x LED lights shall be provided.
- .19 Doors and Gates:
  - .1 First landing door:

- .1 Door type:
  - .1 80 inches high 1-1/2 hour UL/ULC fire-rated Prodoor with concealed hinges and a concealed electro/mechanical interlock.
  - .2 Flush closing operation with hoistway side.
  - .3 Operation
    - .1 Automatic - Surface 24 volt door opener with battery back-up for low profile aluminum door.
  - .4 Door Width:
    - .1 42 inches (1067 mm) clear opening
- .2 Upper Landing Door/Gate:
  - .1 Door:
    - .1 80 inches (2032 mm) high 1-1/2 hour UL/ULC fire-rated Prodoor with concealed hinges and a concealed electro/mechanical interlock.
    - .2 Flush closing operation with hoistway side.
    - .3 Operation
      - .1 Automatic – Surface mounted gate opener for low profile aluminum gate.
    - .4 Door Width
      - .1 42 inches (1067 mm)
- .20 Call Stations: Provide flush, surface or door frame mounted landing call/send stations.
  - .1 Call stations will be:
    - .1 Keyed (removable in on/off position).
- .21 Car Operation:
  - .1 Car Operating Panel shall consist of constant pressure buttons, emergency stop/alarm button, on/off key switch (when applicable) and emergency LED light mounted on a removable stainless steel panel (Type 304 #4 Stainless Steel Finish).
  - .2 Auxiliary lighting: The car shall be equipped with a battery operated LED light fixture. The battery shall be the rechargeable type with an automatic recharging system.
  - .3 Telephone:
    - .1 The car shall be equipped with an ADA Hands free phone.
- .22 Pumping Unit and Control:
  - .1 The pumping unit and control shall be enclosed in the tower. The controller and pump unit shall be pre-wired and tested prior to shipment. The controller is to be relay logic based operation for ease of maintenance and service. Pump unit shall incorporate the following features:
    - .2 Adjustable pressure relief valve.

- .3 Manually operable down valve to lower lift in the event of an emergency. This valve shall be activated from outside of the hoistway through a keyed box.
- .4 Pressure gauge isolating valve, manually operable.
- .5 Gate valve to isolate cylinder from pump unit.
- .6 Electrical solenoid for down direction control.
- .7 Emergency Operation - A manual lowering device shall be located outside the hoistway in a lockable box positioned at a lower landing.

.23 Cylinder And Plunger:

- .1 The cylinder shall be constructed of steel pipe of sufficient thickness and suitable safety margin. The top of the cylinder shall be equipped with a cylinder head with an internal guide ring and self-adjusting packing.
- .2 The plunger shall be constructed of a steel shaft of proper diameter machined true and smooth. The plunger shall be provided with a stop electrically welded to the bottom to prevent the plunger from leaving the cylinder.

.24 Roller Chains:

- .1 Two No.50 roller chains with 5/8 inch (16 mm) pitch. Minimum breaking strength 6100 lb (2773 kg) each.

.25 Leveling Device:

- .1 The lift shall be provided with an anti-creep device which will maintain the carriage level within 1/2 inch (12 mm) of each landing.
- .2 All limit switch and leveling device switches shall be located in a position to be inaccessible to unauthorized persons. They shall be located behind the mast wall and be accessible through removable panels.

.26 Guide Yoke:

- .1 The 2:1 guide yoke/sprocket assembly shall be supplied with idler sheaves, roller guide shoes, bearings and guards.

.27 Terminal Stopping Devices:

- .1 Normal terminal stopping devices shall be provided at top and bottom of runway to stop the car positively and automatically.

.28 Guide Rails and Brackets:

- .1 Steel 'C' guide rails and brackets shall be used to guide the platform and sling. Guide rails shall form part of the structural integrity of the unit and be integral to the mast enclosure, ensuring stability and minimum platform deflection when loaded.

.29 Car Sling:

- .1 Car sling shall be fabricated from steel tubing 44 inches (1116 mm) high with adequate bracing to support the platform and car enclosure. Roller guide shoes shall be mounted on the top and bottom of the car sling to engage the guide rails. Guide shoes shall be roller type with 3 inches (76 mm) diameter wheels. Nylon guide shoes shall not be used for better ride quality and durability.

.30 Wiring:

- .1 All wiring and electrical connections shall comply with applicable codes. Insulated wiring shall have flame-retardant and moisture-proof outer covering and shall be run in conduit or electrical wire ways if located outside the unit enclosure. Quick disconnect harnesses shall be used when possible.

.31 Materials:

- .1 Provide the following materials for exposed parts of the lift as indicated:
  - .1 Walls and Ceiling: Rolled steel sheet, ASTM A 1008/A 1008M, commercial steel, Type B, exposed, matte finish, 16 GA; or ASTM A 240/A 240M, Type 304. Powder coat paint.
  - .2 Floor: Rolled steel sheet, ASTM A 1008/A 1008M, commercial steel, Type B, exposed, matte finish, 11 GA reinforced with 3/16 inch (4.7 mm) steel edge. Anti-skid grey powder coat paint.
  - .3 Hoistway Doors: Aluminum extrusion 6063 with ASTM A653 galvanized steel panels, powder coat paint.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- .1 Field measure and examine substrates, supports, and other conditions under which elevator work is to be performed.
- .1 Do not proceed with work until unsatisfactory conditions are corrected.
- .2 Prior to start of Work, verify hoistway is in accordance with shop drawings. Dimensional tolerance of hoistway from shop drawings: -0 inches +2 inches. Do not begin work of this section until dimensions are within tolerances.
- .3 Prior to start of Work, verify projections greater than 2 inches (4 inches if ASME A17.1/CSA B44 2000 applies) must be beveled not less than 75 degrees from horizontal.
- .4 Prior to start of Work, verify landings have been prepared for entrance sill installation. Traditional sill angle or concrete sill support shall not be required.
- .5 Prior to start of Work, verify elevator pit has been constructed in accordance with requirements, is dry and reinforced to sustain vertical forces, as indicated in reviewed submittal. Verify that sumps or sump pumps located within pit will not interfere with installed elevator equipment.
- .6 Prior to start of Work, verify control space has been constructed in accordance with requirements, with access coordinated with elevator shop drawings, including Sleeves and penetrations.

#### **3.2 PREPARATION**

- .1 Coordinate installation of anchors, bearing plates, brackets and other related accessories.
- .2 Clean surfaces thoroughly prior to installation.
- .3 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

#### **3.3 LIFT INSTALLATION**

- .1 Comply with manufacturer's written instructions.

- .2 Set entrances true with plumb hoistway lines.
- .3 Erect elevator closures in accordance with labelling requirements.
- .4 Exposed work in cars and at entrances shall be fabricated in true planes, flat and straight, free of buckles, waves and other visible imperfections such as "oil canning". Joints shall be accurately fitted and properly aligned. Conceal fasteners. Welds shall be undetectable in finished work.
- .5 Lubricate operating parts of systems, including ropes (if required), as recommended by manufacturers.
- .6 Sound Isolation:
  - .1 Mount rotating and vibrating equipment on vibration-isolating mounts designed to minimize transmission of vibrations to structure and thereby minimize structure-borne noise from elevator system.
- .7 Welded construction:
  - .1 Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts.
- .8 Properly locate guide rails and related supports at locations in accordance with manufacturer's recommendations and approved shop drawings. Anchor to building structure using isolation system to minimize transmission of vibration to structure.
- .9 Alignment:
  - .1 Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with car. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
- .10 Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort. Adjust doors to prevent opening of doors at any landing on the corridor side unless the car is at rest at that landing or is in the levelling zone and stopping at that landing. Adjust automatic floor levelling feature at each floor to achieve within 9 mm of the landing.
- .11 Erect elevator closures in accordance with labelling requirements.
- .12 Exposed work in cars and at entrances shall be fabricated in true planes, flat and straight, free of buckles, waves and other visible imperfections such as "oil canning". Joints shall be accurately fitted and properly aligned. Fasteners shall be concealed unless prior approval is obtained from Consultant. Welds shall be undetectable in finished work.
- .13 Set sills flush with finished floor surface at landing. Fill space under sill solidly with non-shrink, non-metallic grout.
- .14 Remove dust and debris from machine rooms, elevator cars (interior and exterior), and elevator pits.
- .15 Perform fine tuning and adjusting to comply with the elevator code and this specification section.

### **3.4 ARRANGEMENT OF EQUIPMENT**

- .1 Arrange equipment in machine room so that equipment can be removed for repairs or replacement without dismantling or removing other equipment components.

- .2 Accommodate equipment in space indicated for hoisting width, depth, pit depth, overhead and machine room.

### **3.5 ADJUSTING AND CLEANING**

- .3 Upon completion, touch-up and restore to new condition any damaged or defaced factory finished surfaces.
- .1 Remove protective covering and clean exposed surfaces after completion and leave in undamaged condition.
- .2 Include in price for re-buffing stainless steel doors, after move-in, and finishes are installed.

### **3.6 PROTECTION**

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

### **3.7 CLOSEOUT ACTIVITIES**

- .1 Demonstration
  - .1 Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.
  - .2 Make a final check of each elevator operation, with Owner's personnel present, immediately before date of Substantial Performance of the Work. Determine that control systems and operating devices are functioning properly.
- .2 Check operation of each elevator with Owner's personnel present not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.
- .3 Testing:
  - .1 Acceptance testing: On completion of elevator installation and before permitting use (either temporary or permanent) of elevators, perform acceptance tests as required by governing regulations and agencies.
  - .2 Operating test:
    - .1 Load one elevator of each type, capacity, speed, and travel distance to rated capacity and operate continuously for 30 minutes over full travel distance, stopping at each level and proceeding after a 5 second delay to the next. Record temperature rise of elevator machine during 30-minute test period. Record failure to perform as required.
  - .3 Supply instruments and carry out performance checks of equipment, including control and operation system. Performance check shall be done in presence of Consultant and Owner. Notify Consultant and Owner in writing, at least 1 week prior to date of performance and operational inspection. This section shall be responsible for additional tests required because of outstanding deficiencies.
  - .4 Submit test and approval certificates issued by jurisdictional authorities.
  - .5 Notify Consultant and Owner in writing, 1 week prior to performance tests.

**END OF SECTION**



## **PART 1 - GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Quality Assurance
- .5 2.1 Materials
- .6 3.1 Examination
- .7 3.2 Tree Pruning
- .8 3.3 Tree Protection
- .9 3.4 Tree Repair and Replacement
- .10 3.5 Field Quality Control

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 This section includes the protection and trimming of existing trees that interfere with, or are affected by, execution of the Work, whether temporary or permanent construction.

### **1.4 QUALITY ASSURANCE**

- .1 Qualifications: An experienced tree service firm, minimum 5 years experience, that has successfully completed tree protection and trimming work similar to that required for this Project and that will assign an experienced, qualified arborist to Project and present at the Place of the Work during execution of tree protection and trimming.
- .2 Tree Pruning Standard: Comply with ANSI A300 (Part 1), "Tree, Shrub, and other Woody Plant Maintenance—Standard Practices (Pruning)."

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- .1 Products and remedial care for protection of the trees and plants as specified are to be as recommended by a qualified arborist, must comply with references above, with approval of the Consultant.
- .2 Provide tree protection barrier alternative where indicated on the drawings and subject to the approval by Urban Forestry Services:
  - .1 Snow fencing to be standard 1220 mm (48") high orange safety fence, and 'T' iron rail stakes (38 mm (1-1/2") x 38 mm (1-1/2") x 5 mm (13/64")) primed with one coat of black zinc rich paint.
- .3 Mulch: Clean, straw mulch from local sources free of weeds and hazardous materials.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- .1 Examine the Place of the Work before commencement of work and inform Consultant if site conditions will not permit completion of tree and plant protection work as in accordance with the Contract Documents.
- .2 No ground breaking activities or demolition should occur until all tree preservation requirements have been met.
- .3 All Subcontractors, Suppliers, and site personnel shall be informed of the tree and plant protection measures and guidelines prior to their commencing any activities at the Place of the Work.
- .4 The Tree Protection Zone (TPZ) shall be posted with signs.
- .5 Within the Tree Preservation Zone (TPZ) there shall be:
  - .1 No construction;
  - .2 No altering of grade by adding fill, excavating, trenching, scraping, dumping or disturbance of any kind.
  - .3 No storage of construction materials, equipment, soil, construction waste or debris.
  - .4 No disposal of any liquids (i.e.: concrete sleuth, gas, oil, paint).
  - .5 No movement of vehicles, equipment or pedestrians.
  - .6 No parking of vehicles or machinery.
  - .7 No activity of any kind without permission of the arborist
  - .8 Activity of any kind without permission of the arborist

### **3.2 TREE PRUNING**

- .1 Prune trees and plants indicated to remain that are affected by temporary and permanent construction.
- .2 Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
- .3 Pruning Standards: Prune trees according to ANSI A300.
  - .1 Type of Pruning: Cleaning, Raising, and Reduction.
- .4 Cut branches with sharp pruning instruments; do not break or chop.
- .5 Chip removed tree branches and dispose of off-site.

### **3.3 TREE PROTECTION**

- .1 Protect trees to be preserved from damage during the Work in accordance with the following specifications and make good any damage at no expense to Owner.
- .2 The location of the tree preservation zone is clearly indicated on the Tree Preservation Plan. Trees to be protected will be confirmed by the Consultant.

- .3 Tree protection shall remain in place until all sitework has been completed, and may not be removed, relocated, or otherwise altered without the written permission of the Consultant.
- .4 The trees to be protected shall be fertilized with a deep root application of an approved fertilizer before construction commences on this project as well as a second fertilization in two years.
- .5 The trees to be protected shall be pruned in accordance with Tree Pruning paragraphs above in this section.
- .6 The arborist shall undertake proper root pruning when and if roots of retained trees are to be exposed, damaged or severed by construction activities. The arborist shall supervise the excavation of soil where roots are to be cut. All roots are to be cut cleanly at the excavation zone and backfilled with an appropriate soil mix. Exposed roots shall be covered with soil or mulch as soon as possible to prevent further damage and desiccation. Root pruning prior to excavation will help prevent unnecessary damage to tree roots.
- .7 In areas where mulch may remain following construction the trees shall have minimum 100 mm (4") of mulch installed over the root system before construction starts, and set back from the trunk by rodent guard. Mulch shall be spread evenly under the canopy to the dripline, to the limits of the protection fence, or as otherwise indicated in the Contract Documents.
- .8 There shall be a source of water provided to ensure that the trees get adequate water during the dry periods. It will be the responsibility of the Contractor to monitor for moisture content in the soil for the duration of the Work.
- .9 The protection zone shall not be breached in any way. There shall be no material stored in the preservation zones, no grade changes and no parking.
- .10 Ensure all trees are protected from compaction of roots or damage to trunk or limbs prior to receipt of permits for removal or remedial care as recommended by arborist.
- .11 Obtain necessary permits, reports, and approvals.
- .12 Proceed with execution of specified work, under direction of the Consultant.
- .13 No rigging cables will be wrapped around or installed in trees. Do not burn waste near trees and do not flush concrete trucks or cement mixing machines over root system.

### **3.4 TREE REPAIR AND REPLACEMENT**

- .1 Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
- .2 Remove and replace trees indicated to remain that die or are damaged during construction operations that Consultant and arborist determine are incapable or restoring to normal growth pattern.
  - .1 Provide new trees of same size and species as those being replaced; plant and maintain as specified by Consultant.
  - .2 Provide new trees of 150 mm (6") calliper size and of a species selected by Consultant when damaged trees more than 150 mm (6") in calliper size, measured 305 mm (12") above grade, are required to be replaced. Plant and maintain new trees as specified by Consultant.
- .3 Aerate surface soil, compacted during construction, 3048 mm (10 ft) beyond drip line and no closer than 914 mm (36") to tree trunk. Drill 50 mm (2") diameter holes a minimum of 305 mm (12") deep at 610 mm (24") on centre. Backfill holes with an equal mix of augured soil and sand.

- .4 General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicative existing tree to be replaced. Comply with ANSI Z60.1-2014; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in lead and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
  - .1 Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk, crossing trunks; cut-off limbs more than 19 mm (3/4") in diameter; or with stem girding roots will be rejected.
  - .2 Collected Stock: Do not use plants harvested from the wild, from native stands, from an established planting, or not grown in a nursery unless otherwise indicated.
- .5 Provide trees of sizes, grades, and all sizes complying with ANSI Z60.1-2014 for types and form of trees required. Plants of a larger size may be used if acceptable to Landscape Architect, with a proportionate increase in size of roots or balls.
- .6 Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1-2014. Root flare shall be visible before planting.

### **3.5 FIELD QUALITY CONTROL**

- .1 Conduct quality control in accordance with Section 01 45 00.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 SUMMARY**

- .1 Section includes:
  - .1 Concrete site work at exterior locations where not indicated on structural drawings.

### **1.2 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 Mix designs:
  - .1 Well in advance of the first supply of concrete to the project submit, using the standard RMCAO form for "Concrete Mix Design Submission Form", project concrete mix designs for review. Include following information:
    - .1 Concrete strength.
    - .2 Exposure class.
    - .3 Water-cement ratio.
    - .4 Maximum aggregate size.
    - .5 Slump range.
    - .6 Plastic air range.
  - .2 Describe in detail on the mix design summary and locations where each mix is to be placed in concrete site work.

### **1.3 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Installers / applicators / erectors: execute the work of this section only by a *Subcontractor*, with minimum 5 years experience, who has adequate equipment and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified.
- .2 Mock-ups:
  - .1 *Provide* 1500 mm x 1500 mm area selected by *Consultant*, complete with finish and pigment, in each required colour and finish, to act as trial area for acceptance of remainder of work of this section. When acceptable, quality of workmanship of balance of work of this section shall match or exceed quality of accepted mock-up area.

## **PART 2 - PRODUCTS**

### **2.1 PERFORMANCE/DESIGN REQUIREMENTS**

- .1 Construct municipal sidewalks to requirements of jurisdictional authorities.

### **2.2 MATERIALS**

- .1 Cement: to CSA A3000-03, type 10, normal.
- .2 Water and aggregates: to CAN/CSA A23.1/A23.2-09.
- .3 Admixtures: to ASTM C494/C494M-11 for air entraining admixtures.

- .4 Free Draining Granular Fill: OPSS 1010 - April 2004, Granular 'A' with less than 5% passing the 75 um sieve.
- .5 Granular Fill: OPSS 1010 - April 2004, Granular 'B'.
- .6 Joint filler: 12.7 mm (1/2") thick asphalt impregnated fibreboard to ASTM D1751- 04(2013) e1.
- .7 Joint filler: 12.7 mm (1/2") thick sponge rubber to ASTM D1752-04a (2013).
- .8 Lumber: plywood and wood formwork to CAN/CSA A23.1/A23.2-09, free of defects where exposed.
- .9 Form stripping agent: colourless, mineral oil, free of kerosene, with viscosity minimum 70, maximum 110 second Saybolt Universal at 38 °C, flashpoint minimum 150 °C open cup.
- .10 Curing compound: chlorinated rubber type compound to ASTM C309-11, Type 2 (White), Class A.
- .11 Welded wire fabric: to ASTM A1064 / A1064M-14.
- .12 Billeted steel bars: to CAN/CSA G30.18-09.

## 2.3 CONCRETE MIXES

- .1 Comply with CAN/CSA A23.1/A23.2-09 and as follows; concrete exposed to chlorides shall be defined as concrete subject to pedestrian and vehicular traffic:
  - .1 Structurally reinforced concrete exposed to chlorides with or without freezing and thawing conditions:
    - .1 Class of exposure (see Table 1): C-1.
    - .2 Minimum compressive strength (see Table 2): 35 MPa at 28 days.
    - .3 Maximum water-to-cementing materials ratio (see Table 2): 0.40.
    - .4 Air content category (see Table 4): Category 1.
  - .2 Non-structurally reinforced (i.e., plain) concrete exposed to chlorides and freezing and thawing:
    - .1 Class of exposure (see Table 1): C-2.
    - .2 Minimum compressive strength (see Table 2): 32 MPa at 28 days.
    - .3 Maximum water-to-cementing materials ratio (see Table 2): 0.45.
    - .4 Air content category (see Table 4): Category 1.
  - .3 Concrete in an unsaturated condition exposed to freezing and thawing but not to chlorides:
    - .1 Class of exposure (see Table 1): F-2.
    - .2 Minimum compressive strength (see Table 2): 25 MPa at 28 days.
    - .3 Maximum water-to-cementing materials ratio (see Table 2): 0.55.
    - .4 Air content category (see Table 4): Category 2.
- .2 Accelerating admixtures may be used subject to approval in cold weather. If approved by *Consultant*, use of admixture shall not relax cold weather placement requirements of CAN/CSA A23.1/A23.2-09. Use of calcium chloride is not permitted.

## 2.4 INSTALLATIONS

- .1 Cast-in-Place Concrete Curbs: Construct to dimensions and in locations as shown on the drawings.
- .2 Cast-in-Place Concrete Sidewalks: *Provide* to extents indicated, 150 mm (6") thick, unless otherwise indicated.
- .3 Flag Pole Bases: to be cast-in-place concrete, as indicated, with exposed formwork to be Classica 610R breakaway form as supplied by ArtFORMS International Inc., tel: 905- 642-3225.
- .4 Lamp Standard Bases: to be cast-in-place concrete, as detailed on the drawings, with exposed formwork to be Newavea 510R – High, as supplied by ArtFORMS International Inc., tel: 905-642-3225.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 Ensure that sub-grade of compacted fill conforms to elevations and sections before placing granular base material.

### 3.2 GRANULAR BASE

- .1 Place and compact fill materials in continuous horizontal layers not exceeding 200 mm (8") loose depth. Use methods to prevent disturbing or damaging buried services, foundation drainage system, waterproofing or dampproofing. Make good any damage.
- .2 Backfilling: Use granular material, either Granular 'B' or selected excavated material from the *Place of the Work* approved by geotechnical engineer, to subgrade level. Compact to at least 98% of its SPMDD. Use free draining Granular 'B'; against foundation walls.
- .3 Place Granular 'A' base to minimum 150 mm (6") compacted thickness, unless otherwise indicated.
- .4 Compact granular bases to 98% SPMDD to ASTM D698-12(2014) e1 Standard Proctor Maximum Dry Density (SPMDD).

### 3.3 FORMS

- .1 Construct wood forms for unsupported concrete edges, to *Provide* straight lines and smooth flowing curved lines as indicated. *Provide* architectural grade formwork and concrete ties in pattern and design as indicated or as approved by *Consultant*, for exposed concrete work. Apply form stripping agent to surfaces in contact with concrete. Remove forms when concrete fully cured.

### 3.4 CONCRETE

- .1 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .2 Screed concrete to required levels, to tolerance of 12.7 mm (1/2") in 3050 mm (10').
- .3 Finish concrete with consistent directional screeded broom finish.
- .4 Tooled crack control joints to walks at 1525 mm (5'0") centre/centre.
- .5 Apply curing compound to exposed concrete surfaces in accordance with manufacturer's installation instructions.

### **3.5 EXPANSION AND CONTRACTION JOINTS**

- .1 Install tooled transverse contraction joints after floating, when concrete is stiff, but still plastic, at intervals as indicated on the site plan and in accordance with Section 03 30 00.
- .2 Install expansion joints, 12.7 mm thick, at a maximum of 5000 mm on centre for sidewalks, 3600 mm on centre maximum for cast-in-place curbs, and 3000 mm on centre in both directions on the exterior concrete slab on grade.
- .3 Install expansion joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.
- .4 When sidewalk is adjacent to curb, make joints of curb, gutters and sidewalk coincide.
- .5 Place impregnated asphaltic expansion strips in expansion joints.

### **3.6 FIELD QUALITY CONTROL**

- .1 Conduct quality control in accordance with Section 01 45 00.

### **ADJUSTING AND CLEANING**

- .1 Clear away excess and waste materials and debris resulting from the work of this section.

**END OF SECTION**



## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including sections of Division 1.

### **1.2 Section Includes**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Description
- .4 1.4 Related *Work*
- .5 1.5 Scope Of *Work*
- .6 1.6 Source Quality Control
- .7 2.1 Materials
- .8 3.1 Preparation Of Planting Bed Mixture
- .9 3.2 Spreading And Fine Grading
- .10 3.3 Soil Amendments
- .11 3.4 Application Of Fertilizer
- .12 3.5 Surplus Material

### **1.3 DESCRIPTION**

- .1 This section specifies the layout, loading, hauling, spreading, rolling and fine grading of topsoil and planting bed mixture.

### **1.4 RELATED WORK**

- .1 Sodding Section 32 92 23

### **1.5 SCOPE OF WORK**

- .1 Topsoil and finished grading shall apply to all areas of the site designated on the construction drawings to receive sodding and planting.

### **1.6 SOURCE QUALITY CONTROL**

- .1 Inspection and testing of topsoil will be carried out by a testing laboratory chosen and paid for by the contractor and approved by the Consultant.
- .2 Acceptance of topsoil shall be subject to the soil analysis test results. Do not commence work until topsoil accepted by Consultant.
- .3 Test topsoil for clay, sand and silt, N, P, K, Mg, soluble salt content, pH value, growth inhibitors and soil sterilants.
  - .1 Use 25 mm diameter sampling tube or spade to take a minimum of six (6) samples. Mix samples together thoroughly before submitting for testing.
  - .2 Submit 0.5 kg sample of topsoil to testing laboratory and indicate present use, intended use, type of subsoil and quality of drainage. Prepare and ship sample in accordance with provincial regulations and testing laboratory requirements.

- .3 Determine required limestone treatment to bring pH value of soil 6.0 to 7.0 level.
- .4 Submit two copies of soil analysis and recommendations for corrections to *Consultant*.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- .1 Topsoil:
  - .1 Topsoil for fine grading shall conform to the following qualities: friable, neither heavy clay nor of very light sandy nature consisting of 45% sand, 35% silt, 20% clay and pH value of 6 - 7. Free from subsoil, roots, vegetation, debris, toxic materials, stones over 50 mm diameter.
- .2 On-site Topsoil:
  - .1 Topsoil that is present on the project site can be re-used if it conforms to the above requirements and is approved by the *Consultant*.
- .3 Peat Moss:
  - .1 Derived from partially decomposed fibrous or cellular stems and leaves of species of sphagnum mosses.
  - .2 Elastic and homogeneous, brown in colour.
  - .3 Free of wood and deleterious material which could prohibit growth.
  - .4 Shredded particle minimum size: 5mm.
- .4 Fertilizer:
  - .1 Complete commercial synthetic fertilizer with minimum 65% insoluble nitrogen.
  - .2 Formulation ratio: as recommended in soils report.
  - .3 Bonemeal: finely ground with a minimum analysis of 20% phosphoric acid.
- .5 Bonemeal:
  - .1 Commercial raw bonemeal, finely ground, with minimum analysis of 2% nitrogen and 11% phosphoric acid.
- .6 Manure:
  - .1 Well rotted, unleached cattle manure, not less than 8 months and not more than 2 years old, free of harmful chemicals and injurious substances, containing not more than 25% straw, leaves and other foreign matter.
- .7 Lime:
  - .1 Agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing a No. 8 sieve and a minimum 75 percent passing a No. 60 sieve. Provide lime in the form of dolomitic limestone.
- .8 Aluminum Sulfate:
  - .1 Commercial grade, unadulterated.

## **PART 3 – EXECUTION**

### 3.1 PREPARATION OF PLANTING BED MIXTURE

- .1 Thoroughly mix together 5 parts topsoil and 2 parts manure and 1 part peat moss. Shred to a fine, even texture.
- .2 Add bone meal at the rate of .58 kg per cubic metre and mix thoroughly.
- .3 Protect planting mixture to prevent deterioration.

### 3.2 SPREADING AND FINE GRADING

- .1 Prepare and compact sub-grade.
- .2 Have sub-grade approved by *Consultant* prior to commencing topsoil placement.
- .3 Scarify sub-grade surface to a minimum depth of 75mm to facilitate bonding.
- .4 Do not spread topsoil/ planting bed mixture when it is frozen or wet.
- .5 Remove and dispose of all stones, sticks, sub-soil, lumps or other debris in excess of 50mm diameter and all surface litter and live weeds.
- .6 Spread soil to the following minimum depths:
  - .1 100mm topsoil in areas to be sodded
  - .2 450mm planting bed mixture in planting beds
- .7 Maintain soil 15mm below top of curb, finished grades of pavement, etc., to allow for sodding.
- .8 Manually spread topsoil around existing trees and shrubs.
- .9 Fine grade topsoil/ planting bed mixture to eliminate rough and low areas to ensure positive surface drainage, blend smoothly with adjacent finished grade elevations and conform to the specified levels and profiles.
- .10 Grade swales and ditches evenly to ensure positive runoff to drainage inlets, without ponding and with smoothly rounded, uniform side slopes.
- .11 Roll topsoil surface of all areas to be seeded or sodded to produce a smooth, uniform surface that is firm against deep foot prints and with a fine, loose texture.
- .12 Have finished surfaces inspected by *Consultant* before placing seed or sod.
- .13 Dispose of surplus materials and debris off the site and clean up soil from all paved surfaces.

### 3.3 SOIL AMENDMENTS

- .1 Apply soil amendments at rate as specified and as determined from soil sample test.
- .2 Mix soil amendments into full depth of topsoil prior to application of fertilizer.

### 3.4 APPLICATION OF FERTILIZER

- .1 Spread fertilizer uniformly over entire area of topsoil at rate determined on basis of soil sample test.
- .2 Mix fertilizer thoroughly to full depth of topsoil.

### **3.5 SURPLUS MATERIAL**

- .1 Dispose of materials not required at an appropriate off-site facility.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1 DESCRIPTION

- .1 This section specifies the installation of sod.

### 1.2 RELATED WORK SPECIFIED ELSEWHERE

- .1 Topsoil Placement and Grading Section 32 91 21

### 1.3 QUALITY ASSURANCE

- .1 Engage an experienced Installer with a minimum of 5 years experience on comparable projects.
- .2 Require Installer to maintain an experienced full-time supervisor on the *Project* site during times that landscaping is in progress.

### 1.4 ACCEPTANCE

- .1 Sodded areas will be accepted at the date of Substantial Performance provided that:
  - .1 Sodded areas are properly established and in a vigorous growing condition.
  - .2 Sod is free of bare and dead spots and without weeds.
  - .3 No surface soil visible when grass has been cut to height of 50mm.
  - .4 Sodded areas have been cut twice.
- .2 Lawns sodded in fall will be accepted the following spring, one month after start of growing season, provided that the conditions of Section 1.4.01 are fulfilled.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Topsoil: see section 32 91 21 Topsoil Placement and Grading
- .2 Imported Topsoil: see section 32 91 21 Topsoil Placement and Grading
- .3 Grass Sod:
  - .1 Shall be a certified No. 1 Grade Turfgrass Nursery Sod, Kentucky Bluegrass/ Fine Fescue Sod (grown from a seed mixture containing 90-95% by weight Kentucky Bluegrass cultivars and 5-10% by weight creeping red, chewings of hard fescue cultivars), grown and sold in accordance with the classification of the Nursery Sod Growers Association of Ontario. At time of sale shall have a strong, fibrous root system and shall be free from stones and burned or bare spots.
- .4 Fertilizer:
  - .1 The *Contractor* shall be prepared to supply all necessary fertilizers, to eliminate any chemical deficiencies as indicated by the soil analysis report of imported topsoil.
  - .2 Fertilizers shall be complete, commercial fertilizers unless specified otherwise, containing not less than 60% urea\_formaldehyde and the following percentages by weight. The following rates shall be subject to adjustment upon receipt of the soil analysis report from the *Contractor*:

	LBS/100 SQ.YDS
NITROGEN	10-0
PHOSPHORIC	10-20

- |  |        |       |
|--|--------|-------|
|  | ACID   | 10-10 |
|  | POTASH | 20-12 |
- .3 Commercial superphosphates are acceptable and shall be finely ground with a minimum analysis of 20% P2O5 and shall be applied at a rate of 14kg per 100m<sup>2</sup> (25 lbs. per 100 sq. yds).
  - .5 Wooden Pegs:
    - .1 Sod on steep slopes shall be secured with hardwood pegs, 225mm long minimum and approximately 25mm x 25mm square, or approved equal. Pegs shall be of sufficient length to ensure satisfactory anchorage of the sod.
  - .6 Water:
    - .1 Potable, free of impurities.

### **PART 3 - EXECUTION**

#### **3.1 CUTTING, HANDLING AND STORAGE**

- .1 Sod shall be cut by approved methods in accordance with recommendations of the Nursery Sod Growers Association of Ontario.
- .2 Sod shall be rolled or folded prior to lifting in such a manner as to prevent tearing or breaking.
- .3 Sod shall be protected during transportation to prevent drying out and shall arrive at the site in a fresh and healthy condition.
- .4 Sod shall be installed immediately after arrival. If there is any delay in installation the sod shall be kept moist and cool at all times until installation.
- .5 All commercial fertilizer shall be packed in standard containers, clearly marked with the name of the manufacturer, weight and analysis.
- .6 Fertilizer shall be stored in a weatherproof storage place and in such a manner that it will stay dry and its effectiveness is not impaired.

#### **3.2 INSTALLATION**

- .1 All rough grading, filling, spreading of topsoil and fine grading and other preparation work required, shall be executed and completed as described in the appropriate sections of these specifications.
- .2 The specified fertilizer shall be applied to and well worked into the topsoil by discing, raking or harrowing, at the rate specified. This shall be done 48 hours before laying sod.
- .3 The finished surface shall be smooth, firm against footprints, with a fine, loose texture before sod is placed.
- .4 Sodding operations shall take place during suitable weather conditions and on ground which is free from frost, snow and water. Sod shall be laid as soon as possible after delivery to prevent deterioration. Sod shall be laid closely knit together in such a manner that no open joints are visible, or pieces are overlapping. Sod shall be laid smooth and flush with adjoining grass areas and paving and top surface of curbs unless shown otherwise on the drawings.
- .5 On any slopes of 3:1 and steeper, sod shall be laid perpendicular to the slope, and every row shall be pegged with wooden pegs at intervals of not more than 600mm. Pegs shall be driven flush with sod. For drainage swales place 5 pegs per square metre.

- .6 After installation of sod, the area shall be watered immediately with sufficient amounts to saturate the sod and upper 100mm of soil.
- .7 After sod and soil has dried sufficiently to prevent damage, the area shall be rolled with a roller providing 7325kg/m<sup>2</sup> pressure (1500 lbs./ft<sup>2</sup>), to ensure a good bond between sod and soil and to remove minor depressions and irregularities.
- .8 Protect all newly laid sod areas until vigorous, hardy, even growth is established to a growth height of 80mm.

### **3.3 MAINTENANCE**

- .1 Maintenance for sodded areas shall begin immediately after sod has been installed and shall continue until the date of Acceptance.
- .2 Maintenance shall include all measures necessary to establish and maintain sod in a vigorous growing condition, including but not limited to:
  - .1 Mowing:
    - .1 Shall be at regular intervals as required, to maintain grass at a maximum height of 65mm. Not more than 1/3 of blade shall be cut at any one mowing. Edges of sodded areas shall be neatly trimmed and hand clipped where necessary. Heavy clippings shall be removed immediately after mowing and trimming.
  - .2 Watering:
    - .1 Shall be carried out when required and with sufficient quantities to prevent grass and underlying soil from drying out.
  - .3 Rolling:
    - .1 Shall be carried out when required to remove any minor depressions or irregularities.
  - .4 Weed control:
    - .1 Shall be carried out when required. When herbicides are used they shall be applied in accordance with manufacturer's recommendations. Any damage resulting from *Contractor's* use of herbicides shall be remedied at his expense.
  - .5 Erosion:
    - .1 Erosion occurring as a result of faulty workmanship and/or materials on the part of the *Contractor* shall be repaired at his expense.
- .3 Any sodded areas which show deterioration or bare spots shall be repaired immediately.

**END OF SECTION**