



**Accessibility Renovations,
former Lakefield Post Office,
Queen Street, Lakefield, Ontario
"ISSUED FOR TENDER"**

Project 19152

DATE July 15, 2022



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PART 1 GENERAL

1.1 General

- .1 Stipulated Price tenders are invited for the supply of all labour, material, equipment and services to complete the work for the **Accessibility Renovations – former Lakefield Post Office, 12 Queen Street, Lakefield, Ontario**, in accordance with the Drawings and Specifications prepared by Barry Bryan Associates
- .2 Tenders from General Contractors, executed and signed under seal, will be received no later than **11.59.59 am (according to the Administration lobby clock), on Tuesday, August, 9, 2022.**
- .3 Submit Tender to the following Delivery Address (do not mail – courier or hand delivery only):
Township of Selwyn
1310 Centre Line,
Selwyn, Ontario
K9J 6X5
- .4 The Tender Documents including the Contract Form (Canadian Standard Form of Agreement between Owner and Contractor, Canadian Standard Construction Document CCDC 2, 2020), as amended by the Supplementary General Conditions, the Instructions to Bidders, Specifications, Tender Form, and the Drawings are all complementary and shall be read together.
- .5 A **mandatory** pre-bid meeting for General Contractors will take place at **10.00 a.m. on Tuesday, July 26, 2022 at 12 Queen Street, Lakefield, Ontario**. Failure to attend the meeting will disqualify the prospective bidder's tender. Each bidder will have the opportunity to examine the site, all areas and services which may affect the proper execution of the work. No claim for extra payment will be allowed for work or difficulties encountered due to conditions of the site which were visible or reasonably inferable prior to the date of submission of tenders.
- .6 Only tenders received in accordance with these Instructions will be accepted.
- .7 Contact with Council members is prohibited and can be considered as grounds for disqualification from the selection process.
- .8 Each Bidder shall examine the Tender Documents as soon as possible after receipt thereof, and should he discover any errors or omissions therein he shall notify the Consultant as soon as possible so that further instructions and/or Drawings may be issued to all Tenderers before the date set for receiving Tenders.
- .9 Individual drawings, partial sets of drawings and individual sections of the specifications are not available.
- .10 Bidders shall be responsible for the distribution of all Contract Documents and Addenda to all Subcontractors and suppliers.
- .11 No claims for payment will be accepted because of failure on the part of the Owner, the Consultant or their representatives to supply any Subcontractor with all or part of the Contract Documents and Addenda thereto, which will have been supplied to the Bidder up to the closing date.
- .12 The Contractor shall obey all Federal, Provincial and Municipal Laws, Acts, Ordinances, Regulations, Orders-in-Council and By-laws which could in any way pertain to the work outlined in the Contract or to the employees of the Contractor. Without limiting the generality of the foregoing, the Contractor shall satisfy all statutory requirements imposed by the Occupational Health and Safety Act and Regulations made thereunder, on a supplier, a Constructor and/or

Employer with respect to or arising out of the performance of a Contractor's obligations under this contract.

- .13 The Contractor shall be aware of and conform to all governing regulations, including those established by the Owner, related to employee health and safety. The Contractor shall keep employees and sub-contractors informed of such regulations.
- .14 The successful bidder shall at their own expense within 10 days of notification of acceptance and prior to the commencement of work, obtain and maintain until the termination of the contract or otherwise stated, provide the Owner with evidence of:
 - .1 Commercial General Liability Insurance issued on an occurrence basis for an amount of not less than \$5,000,000 per occurrence / \$5,000,000 annual aggregate for any negligent acts or omissions by the contractor relating to its obligations under this Agreement. Such insurance shall include but is not limited to bodily injury and property damage including loss of use; personal injury; contractual liability; premises, property & operations; non-owned automobile; broad form property damage; broad form completed operations; owners & contractors protective; occurrence property damage; products; employees as Additional Insured(s); contingent employers liability; tenants legal liability; cross liability and severability of interest clause.
 - .1 Such insurance shall add the Corporation of the Township of Selwyn and Barry Bryan Associates as Additional Insured with respect to the operations of the contractor. This insurance shall be non-contributing with and apply as primary and not as excess of any insurance available to the Corporation of the Township of Selwyn and Barry Bryan Associates. The successful contractor shall indemnify and hold the Corporation of the Township of Selwyn and Barry Bryan Associates harmless from and against any liability, loss, claims, demands, costs and expenses, including reasonable legal fees, occasioned wholly or in part by any negligence or acts or omissions whether willful or otherwise by the contractor, their agents, officers, employees or other persons for whom the contractor is legally responsible.
 - .2 Automobile Liability Insurance respect to owned or leased vehicles used directly or indirectly in the performance of the services covering liability for bodily injury, death and damage to property with a limit of not less than \$2,000,000 inclusive for each and every loss.
 - .3 The Policies shown above shall not be cancelled unless the Insurer notifies the Owner and Barry Bryan Associates in writing at least thirty (30) days prior to the effective date of the cancellation. The insurance policy will be in a form and with a company which are, in all respects, acceptable to the Owner.

1.2 Tender Submissions

- .1 The Tender Form, on the forms provided shall be filled in exactly as required.
- .2 Bidders shall complete and return one (1) set of Tender Forms.
- .3 Tenders must be submitted in a sealed envelope clearly identified with the project name, and the name and address of the tenderer.
- .4 Bidders shall ensure submissions are time received stamped upon delivery to the Owner, at the address noted above.
- .5 Tender Forms shall be completed in a legible manner without alterations or erasures. Incomplete tenders will not be considered.
- .6 The onus unequivocally remains with the Bidder to ensure that tenders are delivered to the Township of Selwyn, at the address shown above by the deadline for submission, in accordance with the submission instructions. Misdirected tenders received after the deadline for submission

will not be accepted and will be returned unopened. Requests for adjustments to submitted tenders by telephone, fax or electronically will not be considered.

- .7 The use of courier services for delivery of a tender will be at the risk of the Bidder. The tender must come into the possession of the above-mentioned representative of the Owner before the deadline for submission or the tender will be returned to the Bidder unopened.
- .8 Tenders may not be submitted by e-mail, telegram, facsimile, telephone or orally.
- .9 Late tenders will not be accepted and will be returned unopened.
- .10 Each Tender shall state the stipulated PRICE/PRICES for which the Bidder will undertake to carry out all the Work as described and/or shown in the Tender Documents.
- .11 Bidders shall furnish all information requested and fill in all blanks in the Tender Form and should any uncertainty arise as to the proper manner of completing the form, the requisite information will be given by the Consultant.
- .12 Bidders are required to include with their Tender submission, a copy of their most recent Workplace Safety and Insurance Board Firm Detail Profile Report (CAD-7), NEER or Cost & Frequency Record. This report will be a consideration in the evaluation and award of the tender.
- .13 Incorporated Companies must attach Corporate Seal and Signatures of proper officers.
- .14 All prices (unless otherwise specifically requested in the Tender Documents) shall be "Work completed" prices, and shall be understood to include all material, labour and other expenses including fees, insurance, compensation and other items required by governing regulations, as well as overhead and profit for the work concerned.
- .15 It shall be understood that the Stipulated Price shall be open for acceptance and irrevocable for a period of sixty (60) days.
- .16 Tenders received in accordance with these instructions will be opened publicly immediately following the deadline for the submissions in the Township of Selwyn Municipal Offices, 1310 Centre Line, Selwyn, Ontario.

1.3 Addenda

- .1 Bidders may, during the tendering period, be advised by Addenda of required additions to, deletions from, clarifications to, or alterations in the requirements of the Tender Documents. All such changes shall become an integral part of the Tender Documents and shall be allowed for in the Stipulated Price.
- .2 Insert, in the space provided in the Bid Form, the Addenda numbers of all Addenda received during bidding period. If no Addenda have been received, the word "NONE" shall be inserted in the space provided.
- .3 Failure to acknowledge addenda shall result in a rejected tender.

1.4 Queries During Bidding Period

- .1 All communication from Bidders in respect with this Tender will cease at 12:00 noon on Tuesday, July 26, 2022. Address queries regarding Bid Documents during bidding period to:

Barry Bryan Associates
250 Water Street
Suite 201
Whitby, Ontario L1N 0G5
Attention: Mr. Chris Earle

Telephone No.: (905) 666-5252 ext. 234

Facsimile No: (905) 666-5256

Email: cearle@bba-archeng.com

1.5 Base Bid Tenders

- .1 Materials and equipment are specifically described and named in this Specification to establish a standard of materials and workmanship to which the Bidders shall strictly adhere. Where manufacturer's trade names are used, the Stipulated Price shall be based on the use of such materials and equipment as specified, no substitutions will be allowed.
- .2 Bidders may submit with their tender alternatives based on the use of alternative material equivalent to the materials or equipment specified in quality and performance and provided clearances and dimensions shown on the drawings are maintained. For all such alternative proposals the Bidder shall include the appropriate information in Appendix 'A' to the Tender form and supplementary information as follows:
 - .1 Item Specified.
 - .2 Proposed Substitution or Addition including manufacturer's name, supplier's name, and product identification.
 - .3 Change in price if any.
 - .4 A letter attached to Appendix 'A' including the reason for the proposed substitution and a detailed description of alternative including identification of differences from specified products along with a statement assuming full responsibility that any equipment shall not exceed the space requirements allocated on the drawings. The successful Bidder shall be responsible for any additional architectural or engineering costs as may be incurred by the Consultant, and any installation cost resulting from the acceptance of a substitute piece of equipment or product.
 - .5 The Tenderer further agrees to submit product material specifications, samples, technical data, references or any other supporting documentation upon request, as may be necessary for the Owner and Consultant to evaluate any proposed Alternative.
 - .6 Under no circumstances shall the value of an alternative material or equipment be included in the Stipulated Price.
 - .7 Under no circumstances will alternatives submitted after the closing of Tenders be considered.
 - .8 The Owner reserves the right to accept or reject proposed alternatives as he sees fit, and also to claim for himself the financial benefit of a substitution, if a substitution is accepted. A rejection by the Owner of the proposed alternative is final and the Owner does not become obligated to give any reason for his action.

1.6 Tenders Not Necessarily Accepted

- .1 The Owner reserves the right to:
 - .1 Cancel the Tender at any time prior to acceptance of a bid.
 - .2 Evaluate submissions based on past performance, timely project completion, appropriate manpower, equipment and facilities.
 - .3 Reject any or all Proposals or to accept any Proposal should it be deemed to be in its best interest to do so.

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- .4 Reject any tender where satisfactory evidence of sufficient capital, plant capacity and experience to successfully prosecute and complete the work in the specified time, is not furnished by the bidder;
 - .5 Not consider a bidder who has been terminated by the Owner or has been deemed by the Owner to have provided unsatisfactory performance on any previous or current contract, or based on previous dealings between the Owner and the bidder;
 - .6 Not consider a bidder who is currently involved in or responsible for litigation of any kind against the Owner; and
 - .7 Not accept the lowest or any tender.
- .2 Contact with Council members is prohibited and can be considered as grounds for disqualification from the selection process.
 - .3 Tenders containing escalation clauses will not be considered.
 - .4 Without limiting the generality of the foregoing, any tender which is incomplete, illegible or obscure, or which contains alterations not called for, or irregularities of any kind, may be rejected.
 - .5 Should a dispute arise from the terms and conditions of this contract regarding meaning, intent or ambiguity, the decision of the Owner shall be final.
- 1.7 Taxes
- .1 All prices quoted shall include applicable customs duty, freight, insurance and all other charges of every kind attributable to the work. Award of Contract shall be based on the lowest compliant bid EXCLUDING applicable taxes.
 - .2 Applicable taxes are to be shown separately.
- 1.8 Time of the Essence
- .1 Bidders are cautioned that time is of the essence in this Contract and that the ability to complete the Work within the stipulated time period will be one of the factors considered in the award of the Contract.
 - .2 Upon commencing work on site, all work must continue until completion without delay or work stoppage unless instructed otherwise by the Owner.
 - .3 The Contractor shall perform the work on a Monday to Saturday basis between the hours of 7:00 am and 6.00 pm., and on Sundays between the hours of 12.00 noon and 7.00 pm., unless otherwise directed by the Owner. The Owner may require that work be restricted at certain times, and will provide a minimum of 3 days written notice of such times.
 - .4 The Contractor shall refrain from work on Statutory Holidays recognized by the Owner. Under special circumstances, approval may be given for work on Statutory Holidays, at the discretion of the Owner. The Contractor will submit written notification at least four (4) days in advance of the Statutory Holiday on which he desires to work, indicating the location and nature of the work to be performed. The Contractor must obtain written permission from the Owner authorizing work on a specific Statutory Holiday.
 - .5 Work shall be completed in accordance with the following schedule:
 - .1 Commencement Date: September 19, 2022
 - .2 Substantial Performance Date: March 31, 2023.
 - .3 Total Performance Date: April 30, 2023

- .6 The Contractor will be required to provide all labour, material and equipment and direct his subcontractors and suppliers to work the number of shifts and days that are necessary to meet the Owner's schedule.
- .7 Bidders shall allow in their Stipulated Price for all premium time and other costs as necessary to meet the required completion date.

1.9 Execute Contract

- .1 The Successful Bidder shall execute the Contract Documents within ten (10) calendar days of receipt of notification of Acceptance of Tender from the Owner.
- .2 The Successful Bidder shall commence the Work at the site within three (3) calendar days of receipt of Notification to Commence Work, and complete all construction to the satisfaction of the Owner and the Consultant as indicated in Section 7 herein.
- .3 Failure by the Successful Bidder to meet the above requirements will entitle the Owner to cancel the award of the Contract. The Owner may then award the Contract to one of the other bidders or to take such other action as he chooses.

1.10 Location

- .1 The site is located at 12 Queen Street, Lakefield, Ontario

1.11 Bid Security

- .1 A bid deposit in the form of cash, certified cheque or Bid Bond made payable to the Corporation of the Township of Selwyn, in the amount of 10% of the Total Stipulated Tender Price shall accompany the Tender submission. This shall constitute a deposit which shall be forfeited to the Owner if the successful contractor fails to execute the contract. Failure to provide the required bid deposit will result in rejection of the bid.
- .2 All tender deposits will be returned to the respective bidders within ten (10) days after Tenders have been opened, except that of the second low bidder which the Township of Selwyn will retain until the successful bidder has executed the Contract Documents.
- .3 The bid security deposit of the successful bidder will be returned when he has fully complied with the conditions set forth in the Tender Documents with regards to the execution of a Contract.

1.12 Completion Security

- .1 The successful Contractor shall provide a Performance Bond, and a Labour and Materials Payment Bond, each in an amount equal to 50% of the total contract sum as accepted, to guarantee his faithful performance of this Contract and his fulfilment of all obligations in respect of payment for labour and materials used on this work. Bonds shall be issued by a Guarantee Surety Company, licensed to issue such instruments in the Province of Ontario, having been properly executed and in other respects acceptable to the Owner.
- .2 An "Agreement to Bond" from a surety acceptable to the Owner, ensuring that a Performance Bond and/or Labour and Materials Payment Bond can be supplied constitutes part of the Tender and must be completed, duly signed and executed, and returned with the Tender in the enclosed envelope. Failure to provide the required Agreement to Bond Form will result in rejection of the bid.

1.13 Workplace Safety and Insurance Board

- .1 The Contractor will be required to submit to the Owner a statement from the Workplace Safety & Insurance Board, that all assessments the Contractor is liable to pay under the Act or successor legislation have been paid. Such statement or Certificate of Clearance shall be provided prior to the issuance of the Contractor's last payment and at any other time when requested to do so.

1.14 Procedures to be Used if the Tender Exceeds Owner's Budget

- .1 The procedures recommended in CCDC Document 23 will be used.
- .2 In the event that all Bids received exceed the Owner's budget, the Owner will negotiate changes in the scope of the work with the bidder submitting the lowest acceptable Bid. When the negotiations result in a Contract Price acceptable to both parties, no re-bidding of the project is necessary and the Contract should be awarded at the negotiated price.
- .3 If negotiations fail to produce a Contract Price acceptable to both parties, or if, in the first instance, the changes contemplated result in a value in excess of 15%, the Bid Documents may be amended and invitations to re-bid be restricted to the three (3) lowest acceptable Bids on the original Bid Call.

1.15 Cash Allowances

- .1 Include in the Stipulated Price, the following cash allowances:
 - .1 Independent inspection and testing \$ 12,000.00
 - .2 Supply only of Finishing Hardware \$ 35,000.00
 - .3 TOTAL CASH ALLOWANCES \$ 47,000.00

End of Section

Project: 19152
Description: Accessibility Renovations – former Lakefield Post Office,
12 Queen Street, Lakefield, Ontario

BID FORM
Section 00 41 13

**Accessibility Renovations – former Lakefield Post Office,
12 Queen Street, Lakefield, Ontario**

Name of Firm

Address

Postal Code

Telephone No.

Fax Number

Email Address

Name of Person Signing for Firm

TENDERS RECEIVED BY:
Township of Selwyn
1310 Centre Line,
Selwyn, Ontario
K9J 6X5

To: Township of Selwyn
1310 Centre Line,
Selwyn, Ontario
K9J 6X5

Re: Tender - **Accessibility Renovations – former Lakefield Post Office, 12 Queen Street, Lakefield, Ontario**

1.1 We, the undersigned, having examined the Bid Documents for the above-named project/contract, including Addenda listed Article 1.10 below, and having visited the Place of the Work, hereby offer to perform the Work in accordance with the Bid Documents, for the stipulated price of:

\$_____ in Canadian dollars,
excluding Value Added Taxes. *amount in figures*

1.2 H.S.T. in the amount of \$ _____ is not included in the Stipulated Price.

1.3 Our Stipulated Price includes Cash Allowances in the Total Amount of \$47,000.00 (Forty Seven Thousand Dollars) as listed in the Instructions to Bidders.

1.4 In the event that work extra to that included in the Contract is required, and is authorized in writing by the Owner, the Contractor shall be allowed a mark-up for overhead and profit calculated as follows:

- .1 ten percent (10%) on Work performed by the Contractor's own forces, and
- .2 five percent (5%) on Work performed by Subcontractors.

1.5 We agree that the municipality reserves the right to request additional data or information after the Proposal is received, if such data or information is considered pertinent, in the Township's sole view, to aid the review and evaluation process.

1.6 We submit the following SEPARATE PRICES which **are not included** in the Total Stipulated Price:

ITEM	DESCRIPTION	PRICE
1.	Clean, prepare, paint and re-putty all exterior surfaces of wood window frames (ground and second floor).	\$ _____
2.	Remove existing concrete basement slab for extent indicated on Plan 1/S201, excavate down to suitable soil, place crushed stone fill and replace concrete slab as indicated on structural drawings. All new concrete floor to be finished with sealer. Includes removal and replacement of floor drains and sanitary piping as noted on mechanical drawings.	\$ _____

1.7 We submit the following ITEMIZED PRICES which **are included** in the Total Stipulated Price:

ITEM	DESCRIPTION	PRICE
1.	Removal and replacement of existing EPDM roofing and all associated wood curbs, metal flashing, roof drain, roof hatch and accessories.	\$ _____

2.	Supply and install Loose Fill Insulation in attic space as specified in Section 07 21 23.	\$ _____
3.	Supply and installation of new Vertical Wheelchair Lift.	\$ _____

1.8 Unit Rates:

- .1 We agree that, when requested by the Owner, additional work will be performed at following unit prices exclusive of Overhead and Profit which shall cover all charges for labour and materials, supervision, plant and tools. The Owner reserves the right, at his sole discretion, to negotiate unit rates, or request lump sum cost estimates for changes to the work in lieu of using unit rates. Deletions will be deducted from additions before these unit prices are applied. Credits will be deducted from extras before charges for overhead and profit are added. All work will be performed in accordance with the Contract Documents. HST is not included in these unit prices.

.2 Unit Prices for Additions and Deletions

	Nature of Work	Additions	Deletions
1.	OPSS Granular 'A' backfill (supply, place and compact) per cu. metre		
2.	OPSS Granular 'B' backfill (supply, place and compact) per cu. metre		
3.	25 MPA concrete, in place per cubic metre.		
4.	32 MPA concrete, in place per cubic metre.		
5.	Supply and install bird control wire as specified in Section 10 81 13 per lineal foot.		

1.9 List of Subcontractors

- .1 We, the above-named bidder, propose to use for the above-named project/contract, the Subcontractors named below:

Item of Work	Name of Subcontractor	Address
Designated Substances removal and disposal.		
Excavation and Backfilling		
Masonry		
Structural Steel and Metal Fabrications		
Cabinetwork		
Roofing and Sheet Metal		
Metal Doors and Frames		
Aluminum Doors and Screens		
Drywall and Acoustics		
Ceramic Tile		

Resilient Flooring and Carpet		
Painting		
Vertical Wheelchair Lift		
Mechanical		
Electrical		

1.10 Declaration

- .1 I/WE DECLARE that this Tender is made without any connection, knowledge, comparison of figures or arrangements with any other company, firm or person making a Proposal for the same purchase and is in all respects fair and without collusion or fraud.
- .2 I/WE DECLARE that all matters stated in the submitted Tender are in all respects true.
- .3 The undersigned have carefully read the Requirements as per the Tender, and have satisfied ourselves as to the conditions under which the transaction and subsequent items to be supplied, timelines to be met, and do hereby submit a Tender to the Corporation of the Township of Selwyn for **Accessibility Renovations – former Lakefield Post Office, 12 Queen Street, Lakefield, Ontario**, for the Township of Selwyn Community & Corporate Services/Clerks Department.
- .4 I/WE acknowledge that _____ addenda have been received and that it is my/our ultimate responsibility to ensure all addenda issued have been received.
- .5 If selected as the successful bidder, I/We agree to abide by the terms as set out in the Tender Qualifications and Price with its Specifications and provisions for the price shown.
- .6 The price submitted shall be firm for a period of not less than sixty (60) calendar days from the closing date of this Tender.
- .7 Wherever the plural is used herein, the same shall be read and construed as if the singular had been used where the facts and context so requires and as if all necessary grammatical changes had been made.

1.11 Signature and Seal of Bidder:

By my signature hereunder, I hereby agree to supply all of the labour, material, equipment and services required to complete the work specified for the Accessibility Renovations – former Lakefield Post Office, 12 Queen Street, Lakefield, Ontario in accordance with all of the terms and conditions of this tender.

Dated this _____ day of _____, 2022

Name of Company

Street Address

Signature of Company Official
(I have the authority to bind the Company)

City or Town

Name and Title

Postal Code

Signature of Company Official
(I have the authority to bind the Company)

Telephone No.

Name and Title
SEAL

Facsimile No.

E-mail Address

H.S.T. Registration No

If the bidding firm is a limited company, the company seal must appear on this Bid Form with the signature(s) of the proper signing official(s).

End of Section

PART 1 GENERAL

1.1 General

- .1 The Agreement, Definition and General Conditions of this Contract shall be the Canadian Standard Construction Document CCDC-2, 2020, Stipulated Price Contract, except as amended by the Supplementary General Conditions, Section 00 54 00.

End of Section

1.1 The Standard Construction Document for Stipulated Price Contract, CCDC2-2020 English version, consisting of the Agreement Between Owner and Contractor, Definitions, and General Conditions of the Stipulated Price Contract, Parts 1 to 12 inclusive, governing same is hereby made part of these Contract Documents, with the following amendments, additions and modifications. Where these amendments, additions, and modifications specifically reference a change to the Agreement, Definitions, or General Conditions, these amendments, additions and modifications shall govern.

1.2 Article A-6 - RECEIPT AND ADDRESSES FOR NOTICES IN WRITING

.1 Delete Article A-6 and substitute new article 6.1:

6.1 Notices in Writing between the parties or between them and the Consultant shall be considered to have been received by the addressee on the date of receipt if delivered by hand or by commercial courier or if sent during normal business hours by fax and addressed as set out below. Such Notices in Writing will be deemed to be received by the addressee on the next business day if sent by fax after normal business hours or if sent by overnight commercial courier. Such Notices in Writing will be deemed to be received by the addressee on the fifth Working Day following the date of mailing, if sent by prepaid registered post, when addresses as set out below. An address for a party may be changed by Notice in Writing to the other party setting out the new address in accordance with this Article.

1.3 DEFINITIONS

.1 Add the following definitions:

16a. *Request for Information:*

Requests for Information (RFI's) are documents issued by the Contractor to the Consultant requesting clarification or to obtain additional information where the intent of the Contract Documents is unclear or information is missing.

19a. *Submittals:*

Submittals are documents or items required by the Contract Documents to be provided by the Contractor, such as:

- Shop Drawings, samples, models, mock-ups to indicate details or characteristics, before the portion of the Work that they represent can be incorporated into the Work; and
- As-built drawings and manuals to provide instructions to the operation and maintenance of the Work.

1.4 GENERAL

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

1.5 GC 1.1 CONTRACT DOCUMENTS

.1 Add to the end of subparagraph 1.1.2.2:

“except where the Consultant shall be indemnified as a third party beneficiary as provided in subparagraphs 9.2.7.4, 9.5.3.4 and in 12.1.3.”

.2 Add new subparagraph 1.1.7.5:

1.1.7.5 In case of discrepancies, noted materials and annotations shall take precedence over graphic representations in the Contract Documents.

- .3 Delete from paragraph 1.1.8 the words "sufficient copies of the Contract Documents to perform the work" and replace with: "six (6) sets of the drawings and specifications upon which the Contract is based exclusive of those required by jurisdictional authorities and the executed Contract Documents. Additional copies of Contract Documents will be furnished to the Contractor at the Contractor's expense."

1.6 GC 2.2 ROLE OF THE CONSULTANT

- .1 Add at the end of paragraph 2.2.9. "The Owner and the Contractor shall waive any claims against the Consultant arising out of the making of such interpretations and findings made in accordance with paragraphs 2.2.7., 2.2.8. and 2.2.9".
- .2 Delete the comma after the word "submittals" and add the words "which are provided" before the words "in accordance" in paragraph 2.2.14.

1.7 GC 2.4 DEFECTIVE WORK

- .1 Add new subparagraphs 2.4.1.1 and 2.4.1.2:
- 2.4.1.1 The Contractor shall rectify, 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.
- 2.4.1.2 The Contractor shall prioritize the correction of any defective work which, in the sole discretion of the Owner, adversely affects the day to day operation of the Owner.

1.8 GC 3.1 CONTROL OF THE WORK

- .1 Add new paragraph 3.1.3:
- 3.1.3 Prior to commencing individual procurement, fabrication and construction activities, the Contractor shall verify, at the Place of the 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 in writing and obtain written instructions from the Consultant before proceeding with any part of the affected work.

1.9 GC 3.4 DOCUMENT REVIEW

- .1 Delete paragraph 3.4.1 in its entirety and substitute new paragraph 3.4.1:
- 3.4.1 The Contractor shall review the Contract Documents and shall report promptly to the Consultant any error, inconsistency or omission the Contractor may discover. Such review by the Contractor shall comply with the standard of care described in paragraph 3.14.1 of the Contract. Except for its obligation to make such review and report the result, the Contractor does not assume any responsibility to the Owner or to the Consultant for the accuracy of the Contract Documents. The Contractor shall not be liable for damage or costs resulting from such errors, inconsistencies, or omissions in the Contract Documents, which the Contractor could not reasonably have discovered. If the Contractor does discover any error, inconsistency or omission in the Contract Documents, the Contractor shall not proceed with the work affected until the Contractor has received corrected or missing information from the Consultant.

.2 Add new paragraph 3.4.2:

3.4.2 The Contractor shall request clarification of information where the intent of the Contract Documents is unclear or information is missing through the use of Requests for Information.

.3 Add new paragraph 3.4.3:

3.4.3 Requests for Information shall be issued using a form acceptable to the Consultant. Each Request for Information shall deal with a single topic.

.4 Add new paragraph 3.4.4:

3.4.4 Requests for Information shall include at least the information noted in the specifications as being required.

.5 Add new paragraph 3.4.5:

3.4.5 The Contractor shall issue Requests for Information to the Consultant in a timely manner and sufficiently in advance so as to cause no delay in the Work or in the work of other contractors.

.6 Add new paragraph 3.4.6:

3.4.6 The Contractor shall review all Requests for Information before issuing them to the Consultant. The Contractor shall confirm that the Contractor has reviewed the Contract Documents and determined that the information being requested is not in the Contract Documents.

.7 Add new paragraph 3.4.7:

3.4.6 The Consultant shall review and respond to Requests for Information with reasonable promptness so as to cause no delay in the Work or in the work of other contractors.

1.10 GC 3.8 LABOUR AND PRODUCTS

.1 Add new paragraphs 3.8.4, 3.8.5 and 3.8.6:

3.8.4 The Contractor is responsible for the safe on-site storage of Products and their protection (including Products supplied by the Owner and other contractors to be installed under the Contract) in such ways as to avoid dangerous conditions or contamination to the Products or other persons or property and in locations at the Place of the Work to the satisfaction of the Owner and the Consultant. The Owner shall provide all relevant information on the Products to be supplied by the Owner.

3.8.5 Manufactured materials and equipment which are specified by their proprietary names or by part of catalogue numbers shall be provided. Where a number of proprietary materials are specified for one use the Contractor may select any of the materials specified. No substitute for the materials specified will be allowed unless written approval of alternate material equipment is authorized by the Consultant prior to signing of the Contract.

3.8.6 The Contractor shall use and/or install all proprietary materials and equipment in strict accordance with the manufacturer's printed instructions.

1.11 GC 3.10 SHOP DRAWINGS

- .1 Add the words “AND OTHER SUBMITTALS” to the Title after SHOP DRAWINGS.
- .2 Add “and Submittals” after the words “Shop Drawings” in paragraphs 3.10.1, 3.10.2, 3.10.4, 3.10.7, 3.10.8, 3.10.8.2, 3.10.9, 3.10.10, 3.10.11, and 3.10.12.
- .3 Delete 3.10.3 in its entirety and substitute new paragraph 3.10.3

3.10.3 Prior to the first application for payment, the Contractor and the Consultant shall jointly prepare a schedule of the dates for submission and return of Shop Drawings and any Submittals.
- .4 Delete the words “with reasonable promptness so as to cause no delay in the performance of the Work” and replace with “within 10 working days or such longer period as may be reasonably required” in paragraph 3.10.12.
- .5 Add new paragraph 3.10.13:

3.10.13 Samples: Reviewed Samples will be returned to the Contractor and shall be maintained at the Place of the Work. Products installed into the Work must match reviewed Samples. Any products, whether incorporated in the Work or not, which do not match reviewed Samples, shall be removed and replaced at the Contractor's expense.

1.12 GC 3.11 USE OF THE WORK

- .1 Add new paragraph 3.11.3:

3.11.3 The Owner shall have the right to enter and occupy the Work in whole, or in part, for the purpose of placing fittings and equipment or for other uses before completion of the Contract. Such entry and occupation shall not be considered as acceptance of the Work or in any way relieve the Contractor from his responsibility to complete the Contract.

1.13 GC 3.14 PERFORMANCE BY CONTRACTOR

- .1 Add new paragraph 3.14.1:

3.14.1 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 that throughout the Contract, the Contractor's obligations, duties and responsibilities shall be interpreted in accordance with this standard. The Contractor shall exercise the same standard of due care and diligence in respect of any Products, personnel, or procedures which it may recommend to the Owner.
- .2 Add new paragraph 3.14.2:

3.14.2 The Contractor further represents, covenants and warrants to the Owner that:
 - .1 The personnel it assigns to the Project are appropriately experienced;
 - .2 It has a sufficient staff of qualified and competent personnel to replace its designated supervisor and project manager, subject to the Owner's approval, in the event of death, incapacity, removal or resignation.

1.14 GC 4.1 CASH ALLOWANCES

- .1 Delete paragraph 4.1.4 in its entirety and substitute new paragraph 4.1.4:

4.1.4 Where costs under a cash allowance exceed the amount of the allowance, unexpended amounts from other cash allowances shall be reallocated at the Consultant's direction to cover the shortfall.

- .2 Delete paragraph 4.1.5 in its entirety and substitute new paragraph 4.1.5:

4.1.5 The net amount of any unexpended cash allowances, after providing for any re-allocations as contemplated in paragraph 4.1.4, shall be deducted from the Contract Price by Change Order.

- .3 Delete paragraph 4.1.7 in its entirety and substitute new paragraph 4.1.7.

4.1.7 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 3.5, 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.

- .4 Add new paragraph 4.1.8:

4.1.8 The Owner reserves the right to call, or to have the Contractor call, for competitive bids for portions of the Work, to be paid for from cash allowances. When directed by the Owner or Consultant, the Contractor shall sign the assigned bidders as normal Subcontractors and assume full responsibility for supervision, scheduling, guarantees and payment for this portions of the Work so assigned.

- .5 Add new paragraph 4.1.9

4.1.9 Where the actual cost under any cash allowance exceeds the amount of the allowance and unexpended amounts from other cash allowances, the Contractor shall be compensated only for the excess incurred and substantiated. There shall be no adjustment to the Contractor's fee or other expenses such as overhead or profit, it being understood and agreed that the Contract Price includes the Contractor's expenses and profit for all cash allowances whether or not they are exceeded.

1.15 GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

- .1 Delete General Condition GC 5.1 entirely.

1.16 GC 5.2 APPLICATIONS FOR PROGRESS PAYMENT

- .1 Delete paragraph 5.2.7 and substitute the following

5.2.7 No application may be made for payment for Products delivered to the Place of the Work but not yet incorporated into the Work.

- .2 Add new paragraph 5.2.8:

5.2.8 With the second and all subsequent applications for payment, the Contractor shall submit a sworn statement that all accounts for products, labour, construction equipment, and other

indebtedness which may have been incurred by the Contractor for work done and Products supplied under the Contract and for which the Owner might in any way be held responsible, have been paid in full, except for amounts properly retained as a holdback under the lien legislation applicable to the Place of Work or as an identified amount in a dispute.

.3 Add new paragraph 5.2.9:

5.2.9 The Contractor agrees that the Owner shall be under no obligation to have recourse to the right afforded to it under subsection 24(2) of the Construction Act, R.S.O. 1990, c. C.30, as amended, and that the Owner is under absolutely no obligation to make any payment to the Contractor in the face of either a registered lien or a notice of lien until same is discharged.

1.17 GC 5.3 PROGRESS PAYMENT

.1 Delete the words "before 20 calendar days" and replace with "before 30 calendar days" in paragraph 5.3.1.3

.2 Add new paragraph 5.3.2:

5.3.2 The Consultant shall deduct, on each certificate of payment, after the lien holdback has been deducted in accordance with the lien legislation applicable to the Place of Work, a further 1%, which will be set aside and held as a Contract Completion Security Account. The accumulated amount in this account shall be released to the Contractor one year following Substantial Performance of the Work. Partial releases of the Contract Completion Security Account will not be made. If, within fifteen (15) days of written notification by Owner at any time after Substantial Performance of the Work, the Contractor does not reach Total Performance of the Work, by failing to completely finish outstanding work, the Owner shall have the right to complete such work and deduct the cost for such work together with an appropriate administration fee from the Contract Completion Security Account.

1.18 GC 5.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

.1 Delete paragraph 5.5.3 entirely.

1.19 GC 5.6 PROGRESSIVE RELEASE OF HOLDBACK

.1 Delete paragraph 5.6.1 and replace with the following:

5.6.1 Holdback monies will not be released until 46 days after Substantial Performance of the Work.

1.20 GC 5.7 FINAL PAYMENT

.1 Delete the words "than 5 calendar days" and replace with "than 30 calendar days" in paragraph 5.7.4.

1.21 GC 5.8 WITHHOLDING OF PAYMENT

.1 Add new paragraph 5.8.2:

5.8.2 The Consultant may determine that certain RFIs issued by the Contractor are unnecessary and shall, in responding to such unnecessary RFIs, give the reasons for the determination in each case;

.1 if the Contractor continues to issue unnecessary RFIs, the Consultant, after having

identified a minimum of five RFIs as unnecessary, will invoice the Owner for the additional administrative cost of responding to each of the subsequent unnecessary RFIs;

- .2 the Consultant will notify the Contractor and Owner each time such an additional administrative cost is charged;
- .3 the Owner shall reimburse the Consultant for the monthly total of such additional administrative costs; and
- .4 the monthly total of such additional administrative costs shall be charged to the Contractor by showing the monthly total as a credit on each subsequent Certificate for Payment. This constitutes a change to the contract price and must be handled as a Change Order.

1.22 GC 6.1 CHANGES IN THE WORK

- .1 Add new paragraphs 6.1.3, 6.1.4, 6.1.5, 6.1.6, 6.1.7, 6.1.8, 6.1.9, 6.1.10 and 6.1.11:
 - 6.1.3 Where a change in the Work involves additions, deletions, or other revisions to the Work, the Contract Price shall be increased only by the net actual value of the change in the Work, including taxes, but excluding Value Added Taxes, plus the allowance for overhead and profit as permitted and agreed by the Owner.
 - .2 If a Subcontractor retains another subcontractor (sub-subcontractor), no additional mark-up shall be charged to the Owner for the sub-subcontract work.
 - .3 Overhead and profit may not be charged on changes in the Work where there is a net decrease to the Contract Price.
 - 6.1.4 Costs for the following items shall be considered to be included in the Contractor's allowance for overhead:
 - .1 Contractor's site and head office expenses.
 - .2 Wages of project managers, superintendents, assistants, watch persons and administrative personnel.
 - .3 Temporary site office, including costs for telephone and facsimile machine.
 - .4 Small tools (valued less than \$2,000).
 - .5 Insurance and bonding premiums.
 - .6 Record drawings.
 - .7 Clean-up and disposal of waste materials.
 - 6.1.5 Labour costs shall be the actual, prevailing rates at the Place of the Work paid to the workers, plus statutory charges on labour including statutory workers' insurance, employment insurance, Canada Pension, vacation pay, medical and health benefits.
 - 6.1.6 Quotations for changes in the Work shall be accompanied by itemized breakdowns together with detailed, substantiating quotations or cost vouchers from Subcontractors and Suppliers, submitted in a format acceptable to the Consultant.
 - 6.1.7 The Contractor is obliged to review and consider the value and validity of Subcontractors and Suppliers quotations to be used as backup for proposed Change Order pricing before submission to the Consultant. The Contractor shall ensure that only valid, and fair and reasonable costs are submitted to the Consultant. The Consultant will not directly negotiate with Subcontractors and Suppliers on behalf of the Contractor. The Contractor shall maintain financial oversight of the Subcontractors and Suppliers and filter out unreasonable claims.
 - 6.1.8 Unit and alternative prices included in the Contract include supply, installation, Products, Construction Equipment, services, materials, labour, overhead and profit, but exclude Value Added Taxes and Provincial Sales Tax.

6.1.9 The Owner, through the Consultant, reserves the right to authorize payment for changes in the Work by means of cash allowance disbursement authorizations.

6.1.10 When additions, deletions, or other revisions to the Work covering related work or substitutions are involved in a change to the Work, payment, including overhead and profit, shall be calculated on the basis of the net difference to the Contract Price, if any, with respect to the change in the Work.

6.1.11 If any change or deviation in, or omission from the Work is made by which the amount of Work to be performed is decreased, or if the whole or a portion of the Work is dispensed with, no compensation is claimable by the Contractor for any loss of anticipated profit in respect thereof.

1.23 GC 6.2 CHANGE ORDER

- .1 Change paragraph 6.2.2 to read:

6.2.2 The Contractor shall present in a form acceptable to the Consultant an amount of adjustment for the Contract Price, if any, and an adjustment in the Contract Time, if any, for the changes covered by a Change Directive. The procedures of evaluation including applicable overhead and profit mark-up provisions shall be as described under GC 6.3 CHANGE DIRECTIVE.

- .2 Add new paragraph 6.2.3:

6.2.3 The procedures of evaluation including applicable overhead and profit mark-up provisions for Change Orders shall be as described under GC 6.1 CHANGES IN THE WORK.

- .3 Add new paragraph 6.2.4:

6.2.4: When submitting a price in response to a Proposed Order related to time and materials or costs in respect of a Change Directive, the Contractor shall be allowed a mark-up for overhead and profit calculated as follows:

- (1) ten percent (10%) on Work performed by the Contractor's own forces, and
- (2) five percent (5%) on Work performed by Subcontractors.

1.24 GC 6.3 CHANGE DIRECTIVE

- .1 Delete paragraph 6.3.2 and replace with the following:

6.3.2 Upon receipt of a Change Directive, the Contractor shall proceed promptly with the change in the Work. The adjustment in the Contract Price for a change carried out by way of a Change Directive shall be determined in one of the following methods:

- .1 Estimate and acceptance in a lump sum;
- .2 Unit prices set out in the Contract or subsequently agreed upon;
- .3 Actual cost of expenditures and savings to perform the work attributable to the change plus a fixed or percentage mark-up.

- .2 Delete paragraph 6.3.3 and replace with the following:

6.3.3 In the case of a change in the Work to be valued in accordance with method (.1) of paragraph 6.3.2, the Contractor shall present to the Consultant for approval a detailed estimate of the costs of the Contractor and the involved Subcontractors including products, labour itemized by man hours, labour burden and the overhead and profit of each of the involved Subcontractors shown separately.

.1 In the case of a change to be valued under methods prescribed in Paragraphs 6.3.2.2 and 6.3.2.3, the form of the presentation of costs and methods of measurement shall be agreed to by the Owner, through the Consultant, and the Contractor before proceeding with the change.

.3 Change paragraph 6.3.4 to read:

6.3.4 When method prescribed in Paragraph 6.3.2.3 is used to determine the value of a change in the Work, the Contractor shall keep and present, in such form as the Consultant may require, an itemized accounting of the actual cost of expenditures and savings together with supporting data. The cost of performing the work attributable to the Change Directive shall be limited to the actual cost of the items contained in Paragraphs 6.3.4.1 to 6.3.4.17.

.4 Delete paragraph 6.3.6 entirely and replace with the following:

6.3.6 The procedures of evaluation including applicable overhead and profit mark-up provisions for Change Directives shall be as described under GC 6.1 CHANGES IN THE WORK.

1.25 GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

.1 Add new paragraph 6.4.5:

6.4.5 The Contractor confirms that, prior to bidding the Project, it has carefully investigated the Place of the Work and applied to that investigation the degree of care and skill described in paragraph 3.14.1, given the amount of time provided between the issue of the bid documents and the actual closing of bids, the degree of access provided to the Contractor prior to submission of bid, and the sufficiency and completeness of the information provided by the Owner. The Contractor is not entitled to compensation or to an extension of the Contract Time for conditions which could reasonably have been ascertained by the Contractor by such careful investigation undertaken prior to the submission of the bid.

1.26 GC 6.5 DELAYS

.1 Delete the period at the end of paragraph 6.5.1, and substitute the following words:

“, but excluding any consequential, indirect or special damages.”

1.27 GC 6.6 CLAIMS FOR A CHANGE IN CONTRACT PRICE

.1 Add the words “as noted in paragraph 6.6.3” after the words “of the claim” in paragraph 6.6.5 and add the words “and the Consultant”, at the end of paragraph 6.6.5.

1.28 GC 8.2 NEGOTIATION, MEDIATION AND ARBITRATION

.1 Add the following new paragraphs 8.2.9, 8.2.10, 8.2.11, 8.2.12, 8.2.13, and 8.2.14.

8.2.9 Within five days of receipt of the notice of arbitration by the responding party under paragraph 8.2.6, the Owner and the Contractor shall give the Consultant a written notice containing:

a) a copy of the notice of arbitration b) a copy of supplementary conditions 8.2.9 to 8.2.14 of this Contract, and; c) any claims or issues which the Contractor or the Owner, as the case may be, wishes to raise in relation to the Consultant arising out of the issues in dispute in the arbitration

8.2.10 The Owner and the Contractor agree that the Consultant may elect, within ten days of receipt of the notice under paragraph 8.2.9, to become a full party to the arbitration under paragraph 8.2.6 if the Consultant:

- a) has a vested or contingent financial interest in the outcome of the arbitration;
- b) gives the notice of election to the Owner and the Contractor before the arbitrator is appointed;
- c) agrees to be a party to the arbitration within the meaning of the rules referred to in paragraph 8.2.6, and,
- d) agrees to be bound by the arbitral award made in the arbitration.

8.2.11 If an election is made under paragraph 8.2.10, the Consultant may participate in the appointment of the arbitrator and, notwithstanding the rules referred to in paragraph 8.2.6, the time period for reaching agreement on the appointment of the arbitrator shall begin to run from the date the respondent receives a copy of the notice of arbitration.

8.2.12 The arbitrator in the arbitration in which the Consultant has elected under paragraph 8.2.10 to become a full party may:

- a) on application of the Owner or the Contractor, determine whether the Consultant has satisfied the requirements of paragraph 8.2.10, and;
- b) make any procedural order considered necessary to facilitate the addition of the Consultant as a party to the arbitration.

8.2.13 The provisions of paragraph 8.2.9 shall apply mutatis mutandis to written notice to be given by the Consultant to any sub-consultant;

8.2.14 In the event of notice of arbitration given by the Consultant to a sub-consultant, the sub-consultant is not entitled to any election with respect to the proceeding as outlined in 8.2.10, and is deemed to be bound by the arbitration proceeding.

1.29 GC 9.1 PROTECTION OF WORK AND PROPERTY

- .1 Delete subparagraph 9.1.1.1 in its entirety and substitute new subparagraph 9.1.1.1:

9.1.1.1 errors in the Contract Documents which the Contractor could not have discovered applying the standard of care described in paragraph 3.14.1;

- .2 Delete paragraph 9.1.2 in its entirety and substitute the following new paragraph 9.1.2:

9.1.2 Before commencing any Work, the Contractor shall determine the locations of all underground utilities and structures indicated in the Contract Documents, or that are discoverable by applying to an inspection of the Place of the Work the degree of care and skill described in paragraph 3.14.1.

1.30 GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

- .1 Add to paragraph 9.2.6 after the word "responsible", the following new words: or whether any toxic or hazardous substances or materials already at the Place of the Work (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the Contractor or anyone for whom the Contractor is

responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damage to the property of the Owner or others,

- .2 Add “and the Consultant” after the word “Contractor” in subparagraph 9.2.7.4.
- .3 Add to paragraph 9.2.8 after the word “responsible”, the following new words: or that any toxic or hazardous substances or materials already at the Place of the Work (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the Contractor or anyone for whom the Contractor is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damage to the property of the Owner or others,

1.31 GC 9.5 MOLD

- .1 Add “and the Consultant” after “Contractor” in subparagraph 9.5.3.4.

1.32 GC 10.1 TAXES & DUTIES

- .1 Add the following to paragraph 10.1.2:
 - .1 The Contractor must provide a detailed breakdown of additional taxes if requested by the Owner in a form satisfactory to the Owner.
 - .2 Profit and overhead shall not be included in the increase or decrease in costs incurred by the Contractor due to changes in the aforementioned taxes and duties.

1.33 GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

- .1 Delete from the first line of paragraph 10.2.5 the word, “The” and substitute the words: “Subject to paragraph 3.14.1, the”.

1.34 GC 11.1 - INSURANCE

- .1 Refer to paragraph 11.1.1(1): change “Two Million (\$2,000,000.00) to read: “Five Million (\$5,000,000.00).

1.35 GC 11.2 – CONTRACT SECURITY

- .1 Add new paragraph 11.2.3:

11.2.3 The bonds shall cover payment of all obligations occurred in the event of the Contractor's default, including the following:

Payment of all legal, architectural, mechanical, electrical and structural engineering expenses incurred by the Owner in determining the extent of work executed and work still to be executed and any additional work required as a result of the interruption of the work.

Payment of additional expenses to the Owner in the form of Watchmen's services, light, heat, power, etc., payable over the period between the default of the original contract and commencement of the new contract.

1.36 GC 12.1 INDEMNIFICATION

- .1 Add new clause 12.1.1.3.

12.1.1. 3. The Contractor shall indemnify and hold harmless the Consultant, its agents and employees from and against claims, demands, losses, costs, damages, actions, suits, or proceedings by third parties that arise out of, or are attributable to, the Contractor's performance of the Contract, provided such claims are attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property, and caused by negligent acts or omissions of the Contractor or anyone for whose acts the Contractor may be liable, and made in writing within a period of 6 years from the date of Substantial Performance of the Work as set out in the certificate of Substantial Performance of the Work, or within such shorter such period as may be prescribed by any limitation statute or the province or territory of the Place of Work.

1.37 GC 12.3 WARRANTY

- .1 Delete from the first line of paragraph 12.3.2 the word, "The" and substitute the words: "Subject to paragraph 3.14.1, the...".
- .2 Add the following to GC 12.3.3:

"The term "defect" shall not be construed as embracing such imperfections as would naturally follow misuse, failure to perform recommended maintenance, accident, or the wear and tear of normal use.

Generally, any manufactured item or material, which when used as directed, must be capable of such use for the duration of the specified warranty period. Failure to comply with this requirement shall be considered as being a "defect".

The costs of investigations, tests, repairs and/or replacement and the making good of any resulting damage shall be borne by the Contractor. The Contractor shall be responsible to see that all required work is performed without undue delay.

The carrying out of the replacement work and making good of defects shall be executed at such times as convenient with the Owner, which may entail overtime work on the part of the Contractor. The Owner shall give notice of observed defects promptly. Additional charges for overtime work in this regard must be borne by the Contractor. Prior to the expiry of the Warranty Period the Owner reserves the right to carry out a detailed and exhaustive inspection of the building with regard to all work carried out under the terms of this contract and the Contractor shall be required to make good the defective or unsatisfactory materials and/or workmanship observed."

- .3 Add new paragraphs 12.3.7, 12.3.8, 12.3.9 and 12.3.10:

12.3.7 If extended warranties in excess of one year are required elsewhere in the Contract Documents, the provision of this article shall also apply for such extended periods.

12.3.8 Any material 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 The Contractor shall make good in a permanent manner, satisfactory to the Owner, any

and all damage to the work both during construction and during the period of warranty as aforesaid. The Contractor shall commence repairs on any work identified as defective within 48 hours or receipt of notice from the Owner or the Consultant.

12.3.10 The decision of the Owner and Consultant shall be final as to the necessity for repairs or for work to be done under this Section.

End of Supplementary General Conditions

LIST OF DRAWINGS

Dwg. No.	Title	Issue No.	Rev. No.	Issue Date
ARCHITECTURAL				
A000	Cover Sheet & OBC Matrix	1	-	July 15, 2022
A101	Site Plan – Existing and Demolition	1	-	July 15, 2022
A102	Site Plan & Site Details	1	-	July 15, 2022
A201	Basement & Ground Floor Demolition Plans	1	-	July 15, 2022
A202	Second Floor & Tower Demolition Plans	1	-	July 15, 2022
A203	Basement & Ground Floor Plan	1	-	July 15, 2022
A204	Second Floor & Tower Floor Plans	1	-	July 15, 2022
A205	Ground & Second Floor Reflected Ceiling Demolition Plans	1	-	July 15, 2022
A206	Ground & Second Floor Reflected Ceiling Plans	1	-	July 15, 2022
A207	Basement Demo & New reflected Ceiling Plans	1		July 15, 2022
A208	Roof Plans	1	-	July 15, 2022
A301	East & South Elevations	1	-	July 15, 2022
A302	North & West Elevations	1	-	July 15, 2022
A401	Building Sections	1	-	July 15, 2022
A402	Building Sections	1	-	July 15, 2022
A403	Building Section and Details	1	-	July 15, 2022
A404	Building Sections	1		July 15, 2022
A501	Stair Plans, Sections and Details	1	-	July 15, 2022
A701	Enlarged Washroom Plans & Elevations	1	-	July 15, 2022
A801	Millwork	1	-	July 15, 2022
A901	Schedules	1	-	July 15, 2022
STRUCTURAL				
S101	General Notes	1	-	July 15, 2022
S102	Schedules & Typical Details	1	-	July 15, 2022
S201	Foundation Plans	1	-	July 15, 2022
S202	Ground Floor Framing Plans	1	-	July 15, 2022
S203	Second Floor Framing Plans	1	-	July 15, 2022
S204	Attic Framing Plan	1	-	July 15, 2022
S501	Details	1	-	July 15, 2022
MECHANICAL				

Dwg. No.	Title	Issue No.	Rev. No.	Issue Date
M1	Ground Floor and Basement Demolition	1	-	July 15, 2022
M2	Ground Floor and Basement Sanitary	1	-	July 15, 2022
M3	Second Floor Sanitary	1	-	July 15, 2022
M4	Ground Floor and Basement Domestic	1	-	July 15, 2022
M5	Second Floor Domestic	1	-	July 15, 2022
M6	Ground Floor and Basement HVAC	1	-	July 15, 2022
M7	Second Floor HVAC	1	-	July 15, 2022
M8	Mechanical Specifications	1	-	July 15, 2022
ELECTRICAL				
E1	Ground Floor and Basement Power	1	-	July 15, 2022
E2	Ground Floor and Basement Lighting	1	-	July 15, 2022
E3	Second Floor Power and Lighting	1	-	July 15, 2022
E4	Electrical Specifications	1	-	July 15, 2022
E5	Ground Floor and Basement Demolition	1	-	July 15, 2022
E6	Second Floor Demolition	1	-	July 15, 2022

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Work covered by contract documents
- .2 Owner
- .3 Location of the site
- .4 Scheduling requirements
- .5 Site access .
- .6 Work sequence
- .7 Contractor use of premises
- .8 Pre-ordered materials and equipment
- .9 Work by others
- .10 Engineer design
- .11 Hazardous material discovery
- .12 Building smoking environment
- .13 Special conditions
- .14 Site security
- .15 "By Others"
- .16 Protection of Drawings

1.2 Work Covered by Contract Documents

- .1 Work of this Contract comprises the construction of the Accessibility Renovations – former Lakefield Post Office as indicated on the drawings and specifications.

1.3 Owner

- .1 Corporation of the Township of Selwyn.

1.4 Location of Site

- .1 The Work of this Contract is located at 12 Queen Street, Lakefield Ontario.

1.5 Scheduling Requirements

- .1 Refer to Instructions to Bidders

1.6 Site Access

- .1 Access to the site to be arranged by the Owner.
- .2 Maintain access to municipal roads, sidewalks and crossings.
- .3 Provide secure construction fencing as specified.

1.7 Work Sequence

- .1 Construct Work continuously.

1.8 Contractors Use of Premises

- .1 Contractor has restricted use of site until Substantial Performance.

1.9 Engineer Design

- .1 Where specifications require work to be designed by an engineer, engage an engineer licensed in the Province of Ontario to design such work. Refer to Section 01 78 00.

1.10 Designated Substances: ACM and Others

- .1 Refer to Designated Substances Survey - 12 Queen Street, Lakefield, Ontario dated June 6, 2022 and prepared by Cambium Inc. (Cambium Reference number 15392-001).
- .2 The General Contractor shall ensure that a copy of the ACM survey is provided to each contractor and subcontractor who will be working in the space.
- .3 Any findings of undeclared ACM, or damaged ACM that could pose a risk to workers is to be brought to the attention of the Owner immediately, and work is to be stopped.
- .4 All project design and construction activities must be carried out in compliance with the applicable Legislation and Regulations.
- .5 No asbestos-containing materials, as defined by O. Reg. 278/05, may be specified or used in any project.

1.11 Verification

- .1 All dimensions shall be verified on site, and all necessary modifications and adjustments shall be made as necessary to suit.

1.12 Building Smoking Environment

- .1 Smoking and vaping are prohibited in all work places within the Owner's buildings and on the Owner's property.

1.13 Special Conditions

- .1 The following general and special conditions apply:
 - .1 All existing surfaces and finishes are to be repaired wherever damaged during the course of the Work.
 - .2 Wherever existing floor and wall finishes are to be removed, include full removal down to the existing substrate of all tile, base, mortars, grouts, underlayment and adhesives in accordance with TTMAC recommended procedures. Patch and repair existing substrate to the quality required by the new finish material manufacturer for the installation of their products.
 - .3 All openings in existing fire rated assemblies or fire separations which are created by the removal of existing services, plumbing, conduit, ductwork, fittings fixtures or accessories are to be firestopped to maintain the integrity of the existing construction.
 - .4 All exposed interior surfaces except prefinished surfaces shall be painted whether referred to in the specifications and drawings or not.

1.14 Site Security

- .1 Daily Inspection: Provide inspection of the work areas daily while the work is in progress and take whatever measures are necessary to secure the construction zones from theft, vandalism and unauthorized entry.

1.15 "By Others"

- .1 The term "by others" where it is used in the contract documents means that work shown or described in the contract documents and labeled with this designation is not included in the specific sub-trade's scope of work but will be required to be done within the General Contractor's

contract.

1.16 Use of Drawings

- .1 Drawings are not to be scaled.
- .2 Copies of architectural and structural “issued for construction” drawings in digital format will be made available for the contractors use under the following conditions.
 - .1 Copyright remains with BBA.
 - .2 The drawings will only be used for shop drawings for this project and not be put to any other use.
 - .3 BBA assumes no liability for errors or omissions in the drawings. The Contractor assumes all risk and expenses associated with the use of drawings in the production of his work.
 - .4 References to BBA and other Consultants must be deleted from the title block.
 - .5 The Contractor signs a release available from BBA that addresses the above items in more detail.
- .3 Arrangements for use of sub-consultant drawings must be made with the appropriate sub-consultant.

1.17 Protection of Drawings

- .1 Copyright of electronic document belongs to the Consultant. Electronic documents may not be forwarded to others, transmitted, downloaded or reproduced in any format, whether print or electronic, without the express, written permission of the copyright owner.
- .2 Drawings, specifications and other contract related documents which are posted on Contractor controlled websites for access by sub-trades and suppliers, shall be posted only on password expressed interest in the Project.
- .3 Provide Consultant and Owner with access to such websites as noted above.

PART 2 PRODUCTS

3.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.2 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Cash Allowances

1.2 References

- .1 Canadian Construction Documents Committee CCDC2-2020 Stipulated Price Contract including the Supplementary Conditions.

1.3 Cash Allowances

- .1 Refer to General Conditions, GC4.1.
- .2 Unless otherwise specified, Cash Allowances shall cover the cost of the materials and equipment delivered F.O.B. job site, and all applicable taxes, except Harmonized Sales Tax. The Contractor's handling costs on the site, labour, installation costs, overhead and profit and other expenses shall be included separately in the Stipulated Price and not in the Cash Allowance.
- .3 Where it is specified that a Cash Allowances is to include both supply and installation costs, such allowances shall cover the cost of the materials and equipment delivered and unloaded at the site, all applicable taxes and the contractor's handling costs on the site, labour and installation costs and other expenses, except overhead and profit which shall be included separately in the Stipulated Price.
- .4 If the cost of the Work covered by Cash Allowances, when determined, is more or less than the allowance, the Contract Sum shall be adjusted accordingly.
- .5 In the event that the cost of the work covered by Cash Allowances should exceed the cash allowance, while the Contract Sum will be adjusted in conformity therewith, there shall be no adjustment to the Contractor's fee or other expenses such as overhead or profit, it being understood and agreed that the contract sum includes the Contractor's expenses and profit for all Cash Allowances whether or not they are exceeded.
- .6 Progress payments on accounts of work authorized under Cash Allowances shall be included in monthly certificate for payment.
- .7 Expenditures from Cash Allowances shall be authorized by Change Directive or Change Order.
- .8 Cash Allowance for independent inspection and testing shall cover the cost of such services as provided by independent testing agency only. The Contractor's cost for labour, overhead and other expenses related to independent inspection and testing shall be included separately in the Stipulated Price and not in the Cash Allowance.
- .9 Cause the work covered by Cash Allowances to be performed for such amounts and by such persons as the Consultant may select and direct or as required by the project drawings and specifications.
- .10 Refer to Instructions to Bidders, Section 00 21 13, for list of Cash Allowances.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

Project: 19152
Description: Accessibility Renovations – former Lakefield Post Office,
12 Queen Street, Lakefield, Ontario

CASH ALLOWANCES
Section 01 21 13

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Requests for Substitution (RFS) prior to execution of contract.
- .2 Requests for Substitution (RFS) after execution of contract.

1.2 Definitions

- .1 Products Not Available: When all listed manufacturers products in the specification section are no longer manufactured.
- .2 Proprietary Specification: a specification which includes one or more proprietary names of products or manufacturers, or both, and may also include descriptive, reference standard, or performance requirements, or any combination thereof.
- .3 Non-proprietary Specification: a specification which includes descriptive, reference standard or performance requirements, or any combination thereof, but does not include proprietary names of products or manufacturers.
- .4 Substitution: a product or manufacturer not specified by proprietary name, which may be acceptable in place of a product or manufacturer which, is specified by proprietary name.

1.3 Subcontractor Procedures

- .1 Product Options:
 - .1 For products specified by non-proprietary specification:
 - .1 Select any product by any manufacturer, which meets requirements of Contract Documents.
 - .2 For products specified by proprietary specification:
 - .1 Select any product or manufacturer named, or
 - .2 Substitute an unnamed product or manufacturer in accordance with Substitutions – Manufacturers article of this Section.
 - .3 For products specified by proprietary specification and accompanied by words indicating that substitutions will not be accepted:
 - .1 Select any product or manufacturer named; substitutions are not permitted.
- .2 Substitution Requests Prior to Execution of Contract: Submit substitutions requests to Consultant no later than the time stated in the Instructions to Bidders.

1.4 Substitutions – Products

- .1 Substitute Products: Where substitute products are permitted, unnamed products may be accepted by the Consultant, subject to the following:
 - .1 Substitute products shall be the same type as, be capable of performing the same functions as, and meet or exceed the standards of quality and performance of the specified products.
 - .2 Substitutions for Cause: Changes proposed by Subcontractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - .3 Substitutions for Convenience: Changes proposed by Subcontractor or Contractor that are not required in order to meet other Project requirements but may offer advantage to Contractor or Subcontractor.

1.5 Substitutions – Manufacturers

- .1 Substitute Manufacturers: Where substitute manufacturers are permitted, unnamed manufacturers will be accepted by the Consultant, subject to the following:
 - .1 Substitute manufacturers shall have capabilities comparable to those of the named manufacturers.
 - .2 In making a substitution Contractor and the Subcontractor represents that they have:
 - .1 Investigated substitute product or manufacturer, or both, and determined it meets or exceeds the criteria of the specified product, and;
 - .2 Will provide the same warranty for the Substitution as for the specified product.
 - .3 Will make any changes to the Work necessitated by substitution as required for Work to be complete in all respects, and;
 - .4 Waives claims for additional costs and time caused by substitution which may subsequently become apparent.
 - .5 Will reimburse Consultant's services for review or redesign, additional studies, investigations, review of submittals, and associated contract administration.
 - .6 Received necessary approvals of authorities having jurisdiction.
 - .7 Investigated the proposed substitute to determine if license fees and royalties are pending.
 - .8 If accepted, the substitution will not adversely affect the Construction Schedule.
 - .3 Do not order or install requested Substitutions without Consultant's acceptance.
 - .4 If, in the Consultant's opinion, a substitution does not meet requirements of Contract Documents, Contractor shall, at no extra cost to Owner, provide a product which, in the Consultant's opinion, does meet requirements of Contract Documents.

1.6 Proprietary Specifications

- .1 Notwithstanding specified proprietary names of either or both products or manufacturers, products provided shall meet other applicable requirements of Contract Documents. Modify products if necessary, to ensure compliance with all requirements of Contract Documents.

1.7 Changes to Accepted Products and Manufacturers

- .1 Products and manufacturers accepted by the Consultant for use in performance of Work of Contract shall not be changed without Consultant's written consent. .
- .2 Submit requests to change accepted products and manufacturers to Consultant in writing, including product data indicated in Product Data article.

1.8 Product Data

- .1 When requested by the Consultant, submit complete data substantiating compliance of a product with requirements of Contract Documents. Include the following:
 - .1 Product identification, including manufacturer's name and address.
 - .2 Manufacturer's literature providing product descriptions, applicable reference standards, performance and test data, in form consistent with the Contract Documents and readily comparable with product being substituted and can provide the specified and indicated requirements.
 - .3 Samples, as applicable.

- .4 Name and address of projects on which product has been used and date of each installation.
- .5 Itemized comparison of substitution with named product(s). List significant variations.
- .6 Designation of availability of maintenance services and sources of replacement materials
- .7 Completed Substitutions Request Form. Incomplete forms will be rejected.

1.9 Consultant Procedure

- .1 In reviewing the supporting data submitted for substitutions, Consultant will use, for purposes of comparison, all the characteristics of the specified material or equipment as they appear in the manufacturer's published data even though all the characteristics may not have been particularly mentioned in the Specifications.
- .2 Consultant will review supporting data and will determine that the substitution in the Consultant's opinion is or is not able to meet or exceed the standards of quality, appearance and performance to the material specified.
- .3 Consultant will sign, date and issue the RFS indicating acceptance or refusal, with applicable pre-contract or contract documentation, to affected participants.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Requests for Information
- .2 Submittal Procedures
- .3 Screening of RFI's
- .4 Response to RFI's
- .5 Response Timing

1.2 Request for Information (RFI)

- .1 A request for information (RFI) is a formal process used during the Work to obtain an interpretation of the Contract Documents or to obtain additional information.
- .2 An RFI shall not constitute notice of claim for a delay.

1.3 Submittal Procedures

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Number RFI's consecutively in one sequence in order submitted, in numbering system as established by the Contractor.
- .3 Submit one distinct subject per RFI form. Do not combine unrelated items on one form.
- .4 RFI Form:
 - .1 Submit a draft "Request for Information" form to be approved by the Owner and Consultant.
 - .2 Submit RFI's to the Consultant on approved "Request for Information" form. The Consultant shall not respond to an RFI except as submitted on this form.
 - .3 Where RFI form does not have sufficient space to provide complete information thereon, attach additional sheets as required.
 - .4 Submit with RFI form all necessary supporting documentation.
- .5 RFI Log:
 - .1 Maintain log of RFI's sent to and responses received from the Consultant, complete with corresponding dates.
 - .2 Submit updated log of RFI's at each construction meeting and with each application for payment submission.
- .6 Submit RFI's 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 so will not be paid by the Owner.
- .7 Only the Contractor shall submit RFI's to the Consultant.
- .8 RFI's submitted by Subcontractors or Suppliers directly to the Consultant will not be accepted.

1.4 Screening of RFI's

- .1 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.

1.5 Response to RFI's

- .1 Consultant shall review RFI's from the Contractor submitted in accordance with this section with the following understandings:

- .1 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 RFI's. Responses to RFI's received from entities other than the Consultant shall not be considered.

1.6 Response Timing

- .1 Allow 5 Working Days for review of each RFI by the Consultant.
- .2 Consultant's review of RFI commences on date of receipt of RFI submission by the Consultant from Contractor and extends to date RFI returned by Consultant.
- .3 When the RFI submission is received by Consultant before noon, review period commences that day. When RFI submittal is received by Consultant after noon, review period begins on the next Working Day.
- .4 If, at any time, the Contractor submits a large enough number of RFI's or the Consultant considers the RFI to be of such complexity that the Consultant cannot process these RFI's within 5 Working Days, the Consultant will confer with the Contractor within 3 Working Days of receipt of such RFI's, 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 among the RFI's submitted. The Contractor shall accommodate such necessary time at no increase in the Contract Time and at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Preconstruction Conference
- .2 Project Meetings
- .3 On Site Documents
- .4 Closeout Procedures
- .5 Cost Breakdown

1.2 Preconstruction Conference

- .1 The Consultant will call for and administer a Preconstruction Conference at time and place to be announced.
- .2 Contractor, all major Subcontractors, and major suppliers shall attend the Preconstruction Conference.
- .3 Agenda will include, but not be limited to, the following items.
 - .1 Lines of communication and contact information
 - .2 Schedules
 - .3 Personnel and vehicle permit procedures
 - .4 Use of premises
 - .5 Location of any Contractor on-site facilities
 - .6 Security
 - .7 Housekeeping
 - .8 Submittal and RFI procedures
 - .9 Inspection and testing procedures, on-Site and off-Site
 - .10 Control and reference point survey procedures
 - .11 Health and Safety
 - .12 Contractor's Schedule of Values
 - .13 Contractor's Schedule of Submittals
- .4 The Consultant will distribute copies of minutes to attendees. Attendees shall have seven days to submit comments or additions to minutes. Minutes will constitute final documentation of results of Preconstruction Conference.

1.3 Project Meetings

- .1 The Contractor will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.
- .2 Meetings will be held minimum bi-weekly.

1.4 On-Site Documents

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract drawings.
 - .2 Specifications.

- .3 Addenda.
- .4 Reviewed shop drawings.
- .5 Requests for Information (RFI's)
- .6 Change orders.
- .7 Other modifications to Contract.
- .8 Field test reports.
- .9 Geotechnical reports
- .10 DSS reports
- .11 Approved Work schedule.
- .12 Manufacturers' installation and application instructions.
- .13 Safety Data Sheets (SDS).
- .14 Health and Safety Plan and other safety related documents.
- .15 Other documents as specified.

1.5 Cost Breakdown

- .1 Submit a detailed cost breakdown to Consultant at least ten working days prior to the submission of the first progress claim. After approval by Consultant the cost breakdown will be used as basis for progress payment.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Submittals
- .2 Schedules
- .3 Format
- .4 Submission
- .5 Critical Path Scheduling
- .6 Submittals Schedule

1.2 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

1.3 Schedules Required

- .1 Submit schedules as follows:
 - .1 Construction Progress Schedule.
 - .2 Submittal Schedule for Shop Drawings and Product Data.
 - .3 Submittal Schedule for Samples.
 - .4 Product Delivery Schedule.
 - .5 Cash Allowance Schedule for purchasing Products or Services.
 - .6 Shutdown or closure activity.

1.4 Format

- .1 Prepare schedule in form of a horizontal bar chart using Microsoft Project 2016 or later.
- .2 Provide a separate bar for each major item of work, trade or operation.
- .3 Split horizontally for projected and actual performance.
- .4 Provide horizontal time scale identifying first work day of each week.
- .5 Format for listings: chronological order of start of each item of work.
- .6 Identification of listings: By Systems description.

1.5 Submission

- .1 Submit initial format of schedules within 10 working days after award of Contract.
- .2 Submit schedules in electronic format, by email as PDF files.
- .3 Consultant will review schedule and return reviewed copy within 10 days after receipt.
- .4 Resubmit finalized schedule within 7 days after return of reviewed copy.
- .5 During progress of Work revise and resubmit schedule as directed by Consultant.
- .6 Submit revised progress schedule with each application for payment.
- .7 Distribute copies of revised schedule to:
 - .1 Job site office.

- .2 Subcontractors.
 - .3 Other concerned parties.
 - .4 Instruct recipients to report to Contractor within 10 days, any problems anticipated by timetable shown in schedule.
 - .8 Table current and up to date schedule at each regular site meeting.
- 1.6 Critical Path Scheduling
- .1 Include complete sequence of construction activities.
 - .2 Schedules shall represent a practical plan to complete the work within the Contract period, and shall convey the plan to execute the work. Schedules as developed shall show the sequence and interdependencies of activities required for complete performance of the work.
 - .3 The submittal of schedules shall be understood to be the Contractor's representation that the schedule meets the requirements of the Contract Documents and that the work will be executed in the sequence and duration indicated in the schedule.
 - .4 Failure to include any element of work required for performance of the Contract or failure to properly sequence the work shall not excuse the Contractor from completing all work within the Contract Time.
 - .5 All schedules shall be developed utilizing industry standard 'best practices' including, but not limited to:
 - .1 No open-ended activities.
 - .2 No use of constraints other than those defined in the Contract Documents without the prior approval of the Consultant.
 - .3 No negative leads or lags.
 - .4 No excessive leads or lags without prior justification and approval from the Consultant.
 - .5 For individual schedule construction activities, do not exceed 14 days in duration without prior approval of the Consultant. Subdivide activities exceeding 14 days in duration to an appropriate level.
 - .6 Sufficiently describe schedule activities to include what is to be accomplished in each work area. Express activity durations in whole days. Clearly define work that is to be performed by subcontract.
 - .7 Create the schedule in conformance with the work-hours and constraints set forth in these Contract Documents.
 - .6 Include dates for commencement and completion of each major element of construction.
 - .7 Show projected percentage of completion of each item as of first day of month.
 - .8 Indicate progress of each activity to date of submission schedule.
 - .9 Show changes occurring since previous submission of schedule:
 - .1 Major changes in scope.
 - .2 Activities modified since previous submission.
 - .3 Revised projections of progress and completion.
 - .4 Other identifiable changes.

- .10 Provide a narrative report to define:
 - .1 Problem areas, anticipated delays, and impact on schedule.
 - .2 Corrective action recommended and its effect.
 - .3 Effect of changes on schedules of other prime contractors.

1.7 Submittals Schedule

- .1 Include schedule for submitting shop drawings, product data, and samples. Indicate manufacture and delivery lead times into the shop drawing submittal schedule.
- .2 Indicate dates for submitting, review time, resubmission time, and last date for meeting fabrication schedule.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Administrative
- .2 Requests for Information (RFI's)
- .3 Shop Drawings and Product Data
- .4 Interference Drawings
- .5 Samples
- .6 Mock-Ups
- .7 Certificates and Transcripts

1.2 Administrative

- .1 Submit to Consultant submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Work affected by submittal shall not proceed until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in metric units.
- .4 Where items or information is not produced in metric units converted values are acceptable.
- .5 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Consultant in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent work are coordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant's review.
- .10 Keep one reviewed copy of each submission on site.

1.3 Requests for Information (RFI's)

- .1 Refer to Section 01 26 15 – Requests for Information

1.4 Shop Drawings and Product Data

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures, product data and other data which the Contractor provides to illustrate details of a portion of Work.
- .2 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.
- .3 Submit shop drawings bearing stamp and signature of qualified professional Engineer registered or licensed in the Province of Ontario where required by the individual specification sections. Each submittal and each resubmittal must bear the stamp of the Engineer

- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .5 Prior to submission to Consultant, review all submitted drawings. By this review, Contractor represents to have determined and verified field measurements, site conditions, materials, catalogue number and similar data and to have checked and coordinated each drawing with the requirements of Work and of Contract Documents. Contractor's review of each drawing shall be indicated by stamp, date and signature of a responsible person.
- .6 At time of submission, notify Consultant in writing of any deviations in drawings from the requirements of the Contract Documents.
- .7 Allow ten days for Consultant's review of each submission.
- .8 Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .9 Make any changes in submitted drawings which Consultant may require, consistent with Contract Documents and resubmit unless otherwise directed by Consultant. When resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.
- .10 Accompany submissions with transmittal letter containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .11 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.

- .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
 - .12 After Consultant's review, distribute copies.
 - .13 Submit one electronic copy in PDF format of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.
 - .14 Submit electronic copy in PDF format of product data sheets or brochures for requirements requested in Specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.
 - .15 Delete information not applicable to project.
 - .16 Supplement standard information to provide details applicable to project.
 - .17 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, copies will be returned, and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
 - .18 The review of shop drawings by the Consultant is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that the Consultant approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.
- 1.5 Interference Drawings
- .1 Prepare interference drawings to coordinate the installation of the work of all sections, within available space. Conflicts between trades which could be determined beforehand, by the careful coordination and preparation of interference drawings, shall be corrected at no expense to the Owner.
 - .2 Prepare interference drawings of all buried services as necessary to avoid conflicts with new or existing structures, foundations or services.
 - .3 Submit interference and equipment placing drawings as specified in Section 01 71 00, when requested by the Consultant.
- 1.6 Samples
- .1 Submit for review samples as requested in respective specification Sections. Label samples with origin, manufacturer, product information, applicable specification section, and intended use.
 - .2 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
 - .3 Where colour, pattern or texture is criterion, submit full range of manufacturer's samples.
 - .4 Adjustments made on samples by Consultant are not intended to change Contract Price. If

adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.5 Make changes in samples which Consultant may require, consistent with Contract Documents.

.6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.7 Mock-Ups

.1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

1.8 Certificates and Transcripts

.1 Immediately after award of Contract, Submit Workplace Safety and Insurance Board Experience Report.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Administrative
- .2 Fires
- .3 Disposal of Wastes
- .4 Drainage
- .5 Site Clearing and Plant Protection
- .6 Pollution Control
- .7 Unanticipated Soil Contamination

1.2 References

- .1 Statutes of Canada 1999 Chapter 33.
 - .1 Canadian Environmental Protection Act 1999.
 - .2 SOR/2003-289. Federal Halocarbon Regulations, 2003.
 - .3 Transportation of Dangerous Goods Act, 1992 (1992, c. 34)
- .2 OPSS 805 “Construction Specification for Temporary Erosion and Sediment Control Measures”.

1.3 Administrative

- .1 Comply with all federal, provincial, and municipal regulatory requirements and guidelines for environmental protection and natural resource conservation, including those referenced above.
- .2 Failure to comply with environmental requirements may result in a stop work order or assessment of damages commensurate with repair of damage.
- .3 It is the Contractor's responsibility to be aware of environmental requirements and the best management practices and pollution control measures necessary to meet them.
- .4 It is the Contractor's responsibility to obtain and abide by permits, licenses and compliance certificates at appropriate times and frequencies as required by the authorities having jurisdiction.
- .5 All hazardous materials are to be stored with secondary containment

1.4 Fires

- .1 Fires and burning of rubbish on site not permitted.

1.5 Disposal of Wastes

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.6 Drainage

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing deleterious substances into waterways, sewer or drainage systems.
- .3 Protect storm drains against entry by sediment, debris, oil, or chemicals.
- .4 Control disposal or runoff of water containing deleterious substances or other harmful substances in accordance with local authority requirements.

1.7 Site Clearing and Plant Protection

- .1 Protect trees and plants on site and adjacent properties.
- .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
- .4 Prevent unnecessary disturbance of topsoil and underlying soil from vehicles and heavy equipment.
- .5 Minimize stripping of topsoil and vegetation.

1.8 Pollution Control

- .1 Maintain, inspect, and repair temporary erosion and pollution control features installed under this contract on a weekly basis. Submit inspection logs to the Owner when requested.
- .2 Control emissions from equipment and plant to conform to federal, provincial, and municipal requirements.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .4 Take all measures necessary to prevent material and mud tracking on adjacent roads and streets.
- .5 Use mechanical sweepers as often as necessary to keep adjacent roads and streets clean of material and mud that is deposited from this project.
- .6 On site disposal or clean out of concrete trucks is not permitted. Any spillage of concrete onto asphalt or other surfaces must be cleaned up before spillage sets.

1.9 Unanticipated Soil Contamination

- .1 Should unanticipated soil contamination be discovered:
 - .1 Stop work and assess the situation for safety.
 - .2 If situation does not appear to be safe, evacuate workers from area.
 - .3 If safe to do so, take immediate steps to control any spread of contamination, in accordance with Contractor's spill prevention and response plan.
 - .4 Immediately contact the Consultant.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 References
- .2 Owner's Regulations
- .3 Standards and Definitions
- .4 Designated Substances
- .5 Hazardous Materials
- .6 Spills Reporting
- .7 Protection of Water Quality
- .8 Potable Water Systems
- .9 Access for Inspection and Testing
- .10 Other Regulatory Requirements

1.2 References

- .1 Perform Work in accordance with Ontario Building Code (OBC), National Fire Code of Canada (NFC), the Canadian Electrical Code CSA C22.1-18, including all Supplements and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Where a material is designated in the Contract Documents for a certain application, unless otherwise specified, that material shall conform to standards designated in the Code. Similarly, unless otherwise specified, installation methods and standards of workmanship shall also conform to standards invoked by the aforementioned Code.
- .3 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.
 - .3 Manufacturer's instructions.
- .4 Where requirements of Contract Documents exceed Code requirements provide such additional requirements.
- .5 Where the Building Code or the Contract Documents do not provide all information necessary for complete installation of an item, then the manufacturer's instructions for first quality workmanship shall be strictly complied with.

1.3 Owner's Regulations

- .1 Conform to requirements, regulations and procedures of the Owner.

1.4 Standards and Definitions

- .1 Where a reference is made to specification standards produced by various organizations, conform to latest edition of standards, as amended and revised to date of Contract.
- .2 Have a copy of each specified standard which relates to your work available on the site to be produced immediately on Consultant's request.

1.5 Designated Substances

- .1 Known designated substances are identified in the Designated Substance Report.

- .2 Stop work immediately when material resembling asbestos, mould or any other designated substance which is not identified in the Designated Substance Report is encountered during the course of the work. Notify Owner and Consultant immediately.
- .3 The Owner will arrange for independent testing of suspected designated substances and removal of such substances encountered on the site during the course of the work which are not identified in the Designated Substance Report.

1.6 Hazardous Materials

- .1 Definition: "Hazardous Material" is material, in any form, which by its nature, may be flammable, explosive, irritating, corrosive, poisonous, or may react violently with other materials, if used, handled or stored improperly. Included are substances prohibited, restricted, designated or otherwise controlled by law.
- .2 Provide SDS for all materials brought to the Place of Work.
- .3 Hazardous Materials will not be introduced for experimental or any other use prior to being evaluated for hazards.
- .4 Make known to the Consultant those hazardous materials or designated substances intended to be used in the workplace and receive permission to use before introducing to the Owner's property.
- .5 Many common construction materials such as asbestos pipe and various insulations are designated substances and shall not be used under any circumstances.

1.7 Spills Reporting

- .1 Spills or discharges of pollutants or contaminants under the control of the Contractor, and spills or discharges of pollutants or contaminants that are a result of the Contractor's operations that cause or are likely to cause adverse effects shall forthwith be reported to the Consultant. Such spills or discharges and their adverse effects shall be as defined in the Environmental Protection Act R.S.O. 1999.
- .2 All spills or discharges of liquid, other than accumulated rain water, from luminaries, internally illuminated signs, lamps, and liquid type transformers under the control of the Contractor, and all spills or discharges from this equipment that are a result of the Contractor's operations shall, unless otherwise indicated in the Contract, be assumed to contain PCB's and shall forthwith be reported to the Consultant.
- .3 This reporting will not relieve the Contractor of his legislated responsibilities regarding such spills or discharges.

1.8 Protection of Water Quality

- .1 No waste or surplus organic material including topsoil is to be stored or disposed of within 30 metres of any watercourses. Run-off from excavation piles will not be permitted to drain directly into watercourses. Where this measure is not sufficient or feasible to control sediment entering the watercourses, sedimentation traps or geo-textile coverage will be required.
- .2 If de-watering is required, the water shall be pumped into a sedimentation pond or diffused onto vegetated areas a minimum of 30 metres from any watercourses and not pumped directly into the watercourses.
- .3 Provide all de-watering and sedimentation control required to properly complete the work of this contract.
- .4 Supply, install and maintain silt/sediment control fencing along the edge of the site to intercept construction runoff silt, to the satisfaction of the Owner.

1.9 Potable Water Systems

- .1 Potable water systems in completed buildings must meet criteria and guidelines established by Provincial and Municipal authorities, prior to occupancy by the Owner.
- .2 Upon completion, submit testing certificates verifying water quality and water systems meets all applicable Provincial and Legislated Standards

1.10 Access for Inspection and Testing

- .1 Cooperate fully with and provide assistance to, all outside authorities including Building Inspectors, utilities, testing agencies and consultants, with the inspection of the Work.

1.11 Other Regulatory Requirements

- .1 Conform to the requirements of the Ontario Ministry of Transportation, Regional and Local authorities regarding transportation of materials.
- .2 Obtain required road occupancy permits.
- .3 Pay any required roadway damage deposits required by the local municipality.
- .4 Conform to the requirements of the Ontario Ministry of the Environment.
- .5 Conform to the requirements of the Ontario Ministry of Labour.
- .6 Conform to the requirements of the Technical Standards and Safety Authority
- .7 Conform to the requirements of the Electrical Safety Authority.
- .8 Conform to the requirements of the local Conservation Authority.
- .9 Conform to all applicable local by-laws, regulations and ordinances.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Inspection
- .2 Independent Inspection Agencies.
- .3 Access to Work
- .4 Procedures
- .5 Rejected Work
- .6 Reports
- .7 Contractors Responsibilities
- .8 Tests and Mix Designs
- .9 Mock-Ups
- .10 Equipment and Systems.

1.2 Inspection

- .1 Contractor is responsible for Quality Control (QC).
- .2 Allow Owner and Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.
- .4 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .5 Consultant will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.

1.3 Independent Inspection Agencies

- .1 Independent Inspection and Testing Agencies will be engaged by Contractor for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the Contractor and paid from the cash allowances specified in Section 01 21 13. Refer to Section 01 29 83.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to Owner. Pay costs for retesting and re-inspection.

1.4 Access to Work

- .1 Allow inspection and testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.5 Procedures

- .1 Notify Owner and Consultant 48 hours in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples

1.6 Rejected Work

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other work damaged by such removals or replacements promptly.
- .3 If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Consultant will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Consultant.

1.7 Reports

- .1 Submit electronic .pdf format inspection and test reports to Consultant.
- .2 Provide copies to Subcontractor of work being inspected or tested or manufacturer or fabricator of material being inspected or tested.

1.8 Contractors Responsibilities

- .1 Be responsible for the execution of the Construction Quality Plan and is to pay all costs for the execution of the Construction Quality Plan. Designate an experienced site representative for carrying out the Construction Quality Plan.
- .2 Provide the Owner with a completed quality product for the Work. Contractor shall be responsible for any costs associated with re-testing and reperforming the Work as a result of the Contractor's poor performance or workmanship or other failure to comply with the Contract Documents.
- .3 All Work shall be done by persons qualified in their respective trades, and the workmanship shall be first-class in every respect. Contractor is responsible for ensuring employees are appropriately trained. All materials and equipment furnished shall be the best of their respective kinds for the intended use and unless otherwise specified, same shall be new and of the latest design.
- .4 The Consultant will have the authority to reject Work that does not conform to the Contract Documents or may require special inspection or testing, whether or not such Work is to be then fabricated, installed or completed.
- .5 Failure by a Contractor to conduct its operations, means and methods and coordinate proper sequencing of the Work may cause the Owner to withhold payment or any other means deemed necessary to correct non-conforming Work.
- .6 The Owner shall engage a testing firm to perform such engineering laboratory services and on-site inspection as deemed necessary by the Owner. The testing firm will determine compliance with the requirements of the Contract Documents. This Work will not be a service to the Contractors for the performing of tests and checking of materials required of the Contractors.
- .7 Copies of test and inspection reports will be furnished to the Contractor. The laboratory and its representatives will be instructed to promptly call to the attention of the Contractor, any instance of non-compliance with the requirements of the Contract Documents. Failure to so notify the Contractor shall not relieve the Contractor of any of its responsibilities for compliance or making good workmanship or materials which are not in compliance with the requirements of the Contract

Documents. The agency shall notify the Consultant and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services

- .8 Contractor's construction materials, procedures and work shall be subject to specified testing procedures and shall be in conformance with the Contract Documents as verified by Testing Agency.
- .9 Cooperate with the testing firm and provide labor to assist with sample preparations where applicable.
- .10 Except where specifically indicated to be provided by another entity as identified, inspections, tests, and similar quality control services including those specified to be performed by independent agency are the Contractor's responsibility, and costs thereof are not to be included in contract sum.
- .11 Cooperate with independent agencies performing required inspections, tests, and similar services. Provide auxiliary services as reasonably requested, including access to Work, the taking of samples or assistance with the taking of samples, delivery of samples to test laboratories, and security and protection for samples and test equipment at Project site.
- .12 Coordination: Contractor and each engaged independent agency performing inspections, tests, and similar services for project are required to coordinate and sequence activities so as to accommodate required services with minimum delay of Work and without the need of removal/replacement of work to accommodate inspections and tests. Scheduling of times for inspections, tests, taking of samples, and similar activities is Contractor's responsibility.
- .13 Where sampling and testing is required for Sections of Work listed in the Contract Documents, the tests shall be performed by an independent testing lab and paid for by the Contractor.
- .14 Test procedures to be used shall be submitted for approval of the Consultant where other than those specified are recommended by the testing agency.
- .15 Testing Agency Duties: The independent Testing Agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Owner, the Consultant and Contractors in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.
- .16 Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

1.9 Tests and Mix Designs

- .1 Furnish test results and mix designs as requested.

1.10 Mock Ups

- .1 Prepare mock-ups for Work specifically requested in specifications.
- .2 Construct in locations acceptable to Consultant.
- .3 Prepare mock-ups for Consultant's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Mock-ups may remain as part of Work unless indicated otherwise.

1.11 Equipment and Systems

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Temporary utilities

1.2 Installation and Removal

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

1.3 Dewatering

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.4 Water Supply

- .1 Existing sources of water can be made available to the Contractor at no charge, subject to operational requirements. Arrange for connection and pay all costs for installation, maintenance and removal. Conversions or alterations to existing sources of water to meet construction requirements are the responsibility of the Contractor.
- .2 The points of delivery and limits on amount available will be determined on site by the Owner whose written permission must be obtained before any connection is made.

1.5 Temporary Heating and Ventilation

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be flameless type. Solid fuel salamanders are not permitted, unless prior approval is given by the Consultant.
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Protect Work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Maintain temperatures of minimum 10° C in areas where construction is in progress.
- .5 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .6 Permanent heating system of building may not be used when available, unless there are savings to the contract price and Consultant's written permission is obtained stating conditions of use,

provisions relating to guarantees on equipment and operation and maintenance of system. Be responsible for damage to heating system if use is permitted.

- .7 On completion of Work for which permanent heating system is used, replace filters.
- .8 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.
- .9 Pay costs for maintaining temporary heat, when using permanent heating system. Owner will pay utility charges when temporary heat source is existing building equipment.
- .10 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform to applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct fired combustion units to outside.
- .11 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.6 Temporary Power and Light

- .1 Existing sources of electric power can be made available to the Contractor. Conversions or alterations to existing sources of electric power to meet construction requirements are the responsibility of the Contractor.
- .2 The points of delivery and limits on amount available will be determined on site by the Owner whose written permission must be obtained before any connection is made.
- .3 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Consultant provided that guarantees are not affected.
- .4 Provide and maintain temporary lighting throughout project. Lighting levels shall be sufficient to complete work including inspections. Provide minimum lighting levels of 400 lux at work areas. Lighting levels at floors and stairs not within work areas shall be not less than 160 lux at all times during construction activity.
- .5 All equipment used shall be CSA approved.
- .6 Wiring and method of installation shall conform to local power requirements and shall be reviewed by a licensed inspector prior to use.

1.7 Temporary Communication Facilities

- .1 Provide and pay for temporary telephone, fax, cellular data, lines and all equipment necessary for Contractor's own use.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Construction aids.
- .2 Site storage.
- .3 Construction Parking
- .4 Offices
- .5 Equipment, Tool and Material Storage.
- .6 Sanitary facilities.
- .7 Signage.
- .8 Shoring

1.2 References

- .1 CSA Group (CSA)
 - .1 CAN/CSA Z321-96 (R2006) Signs and Symbols for the Workplace
 - .2 CAN/CSA Z797-18 Code of Practice for Access Scaffold

1.3 Installation and Removal

- .1 Provide construction facilities in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.4 Scaffolding

- .1 Scaffolding in accordance with CSA Z797.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms and temporary stairs.
- .3 Enclose and heat scaffolding during cold weather.

1.5 Hoisting

- .1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment.
- .2 Hoists and cranes shall be operated by qualified operator.

1.6 Site Storage/Loading

- .1 Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.7 Construction Parking

- .1 Parking will be permitted on site at areas designated by the Owner provided it does not disrupt performance of Work or ongoing Owners operations.
- .2 Provide and maintain adequate access to project site.
- .3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

1.8 Offices

- .1 General Contractor and Subcontractors may provide their own offices as necessary and subject to site constraints. Direct location of these offices.
- 1.9 Equipment, Tool and Material Storage
 - .1 Provide and maintain, in a 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 on site in a manner to cause least interference with work activities.
- 1.10 Sanitary Facilities
 - .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
 - .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
- 1.11 Construction Signage
 - .1 Direct requests for approval to erect a Contractor signboard to Consultant.
 - .2 Signs and notices for safety and instruction shall be in English. Graphic symbols shall conform to CAN/CSA Z321.
 - .3 Post "Construction Zone" signage outside barrier and entrance to all work areas.
 - .4 Maintain approved signs and notices in good condition for duration of project and dispose of off-site on completion of project.
 - .5 Install signage to direct site traffic and deliveries to the Construction work areas.
- 1.12 Shoring
 - .1 Examine the site to determine the conditions under which work will be performed.
 - .2 Contractor shall formulate his own conclusions as to the extent of the existing conditions and shoring required.
 - .3 The method of shoring shall be according to the Contractor's and his Engineer's directions.
 - .4 All existing loads must be shored prior to commencement of demolition and removal of load bearing elements.
 - .5 All shoring and frame braces must be supplied with a safe load rating which must not be exceeded. Install in accordance with manufacturer's recommended procedures and safety guidelines. Ensure that the safe load conditions of the shoring are not exceeded by dead, live or construction loads.
 - .6 All shoring shall be subject to the Consultant's review and approval prior to commencing demolition work.
 - .7 Submit shoring drawings and a proposed installation procedure stamped by a professional engineer registered in the Province of Ontario. Procedures shall follow the information provided on these drawings. The shoring design engineer shall be retained and paid for by the Contractor. The shoring engineer shall review all existing conditions on site prior to completing shoring design.
 - .8 Removal of existing materials without proper engineered shoring is a safety hazard and will not be permitted.
 - .9 Make good all damage to the existing structure and adjoining structures and bear full responsibility for failure to provide adequate shoring.
 - .10 Completely remove all shoring after new structure is installed.
 - .11 The failure or refusal of the Consultant to suggest the use of shoring, shall not in any way or to any

extent relieve the Contractor of any responsibility concerning the condition of the work or of any of their obligations under the Contract, nor impose any liability on the Owner or their agents; nor shall any delay, whether caused by any action or want of action on the part of the Contractor, or by any act of the Owner, or their agents, or employees, relieve the Contractor from necessity of properly and adequately protecting the existing structure from collapse or damage, nor from and of his obligations under the Contract relating to injury to persons or property, nor entitle him to any claims for extra compensation or an extension in schedule.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Barriers.
- .2 Environmental Controls.
- .3 Traffic Controls.
- .4 Fire Routes.
- .5 Relics and Antiquities

1.2 Installation and Removal

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

1.3 Site Fencing

- .1 Contractor's lay-down area must be secure and there must be no access by unauthorized persons. Provide temporary fencing around whole work site. Use modular free-standing fencing: galvanized, minimum 1.8m high, chain link or welded steel mesh, pipe rail. Provide one lockable truck entrance gate and at least one pedestrian door as directed. Equip all gates with locks and keys. Maintain fence in good repair.

1.4 Guard Rails and Barricades

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs and wherever else necessary to prevent accidental falls.
- .2 Provide as required by governing authorities.

1.5 Traffic Barriers

- .1 Provide sufficient barriers as necessary to protect the public and Owner from construction traffic.
- .2 Remove barriers on completion.

1.6 Weather Enclosures

- .1 Provide weather tight 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; enclose building interior work for temporary heat.
- .3 Design enclosures to withstand wind pressure and snow loading.

1.7 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 public.
- .2 Maintain and relocate protection until such work is complete.

1.8 Protection for Off Site and Public Property

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.9 Protection of Building Finishes

- .1 Provide protection for finished and partially finished building finishes and equipment during

performance of Work.

- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Consultant locations and installation schedule 3 days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

1.10 Protection of Surrounding Work

- .1 Provide protection for finished and partially finished Work from damage.
- .2 Provide necessary cover and protection.
- .3 Be responsible for damage incurred due to lack of or improper or inappropriate protection.

1.11 Public Traffic Flow

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.12 Fire Routes

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.13 Relics and Antiquities

- .1 Protect relics, antiquities, items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during course of Work.
- .2 Give immediate notice to Owner and await Owner's written instructions before proceeding with Work in this area.
- .3 Relics, antiquities, and items of historical or scientific interest remain the Owner's property.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Definition- Basis of Design
- .2 Product quality, availability, storage, handling, protection, and transportation.
- .3 Manufacturer's instructions.
- .4 Quality of Work, coordination and fastenings.
- .5 Dielectric Separation
- .6 Tolerances for Execution of Work.
- .7 Protection of Work in progress.
- .8 Existing Utilities

1.2 Definition – Basis of Design

- .1 Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
 - .1 Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.
- .2 Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
 - .1 Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
 - .2 Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.
- .3 Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 013300 "Submittal Procedures."

1.3 Quality

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 Availability

- .1 Review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 Storage, Handling and Protection

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 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 Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Consultant.
- .9 Touch up damaged factory finished surfaces to Consultant's satisfaction. Use touch up materials to match original. Do not paint over name plates.

1.6 Transportation

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Owner will be paid for by Owner. Contractor shall be responsible for the unloading, handling and storage of such products.

1.7 Manufacturer's Instructions

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant may establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant to require removal and re installation at no increase in Contract Price or Contract Time.

1.8 Quality of Work

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.

- .2 Immediately notify Consultant if required Work is such as to make it impractical to produce required results.
- .3 Do not employ anyone unskilled in their required duties. Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.
- .4 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.

1.9 Coordination

- .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.10 Concealment

- .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation, inform Consultant if there is interference. Install as directed by Consultant.

1.11 Remedial Work

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.12 Location of Fixtures

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

1.13 Fastenings

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use noncorrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure 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.

1.14 Fastenings – Equipment

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where

vibrations occur. Use resilient washers with stainless steel.

1.15 Dielectric Separation

- .1 Ensure that a dielectric separator is provided in a permanent manner over entire contact surfaces to prevent electrolytic action (galvanic corrosion) between dissimilar materials. Similarly, prevent corrosion to aluminum in contact with alkaline materials such as contained in cementitious materials.

1.16 Tolerances for Execution of Work

- .1 Unless specifically indicated otherwise, Work shall be installed plumb, level, square and straight.
- .2 Unless acceptable tolerances are otherwise specified in specification sections, or are otherwise required for proper functioning of equipment, site services and mechanical and electrical systems:
 - .1 “Plumb and level” shall mean plumb or level within 1 mm in 1m.
 - .2 “Square” shall mean not in excess of 10 seconds lesser or greater than 90 degrees.
 - .3 “Straight” shall mean within 1 mm under a 1 m long straight edge.
 - .4 “Flush” shall mean within:
 - .1 6 mm for exterior concrete, masonry and paving materials.
 - .2 1 mm for interior concrete, masonry, tile and similar surfaces.
 - .3 0.5 mm for other interior surfaces.

- .3 Allowable tolerances shall not be cumulative

1.17 Protection of Work in Progress

- .1 Adequately protect 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 Consultant, at no increase in Contract Price or Contract Time.
- .2 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Consultant.

1.18 Existing Utilities

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

1.19 Hazardous Materials

- .1 Report any found or suspected hazardous materials to the Owner.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Safety Requirements
- .2 Fire Protection
- .3 Accident Reporting
- .4 Records on Site

1.2 References

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Fire Commissioners of Canada, FC 301, Standard for Construction Operations.
- .3 National Fire Protection Agency (NFPA)
 - .1 NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations
- .4 Occupational Health and Safety Act.
 - .1 R.R.O. 1990, Reg. 860: Workplace Hazardous Materials Information System (WHMIS)
- .5 Ontario Building Code.

1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit to Owner and Consultant copies of the following documents, including updates issued:
 - .1 Notice of Project filed with Provincial Ministry of Labour or equivalent for Place of Work
 - .2 Site-specific Health and Safety Plan prior to commencement of work on the work site. Plan shall include but not be limited to the following:
 - .1 Name and contact info of Contractor's Health and Safety Representative for Work Site; including twenty-four (24) hour emergency contact phone numbers.
 - .2 Phone numbers of local fire, police, and ambulance outside of 911 services.
 - .3 Location of nearest medical facility and level of injury that each can service.
 - .3 Submit to the Owner, Consultant and Municipal Fire Department, for review, a "Fire Safety Plan" conforming to Section 2.14 of the National Fire Code of Canada. Maintain a copy of the "Fire Safety Plan" on site.
 - .4 Copies of certification for all employees on site of applicable safety training including, but not limited to:
 - .1 WHMIS.
 - .2 Fall arrest and protection.
 - .3 Suspended Access Equipment.
 - .4 Erection of Scaffolding.
 - .5 License for powder actuated devices.
 - .5 On-site Contingency and Emergency Response Plan addressing:
 - .1 Standard procedures to be implemented during emergency situations.

- .2 Preventative planning and protocols to address possible emergency situations.
 - .3 Guidelines for handling, storing, and disposing of hazardous materials that maybe encountered on site, including measures to prevent damage or injury in case of an accidental spill.
 - .4 Incident and accident reports, promptly if and upon occurrence
 - .1 Reports or directions issued by authorities having jurisdiction, immediately upon issuance from that authority.
 - .2 Accident or Incident Reports, within 24 hours of occurrence.
 - .5 Submit other data, information and documentation upon request by the Consultant as stipulated elsewhere in this section.
- 1.4 Compliance Requirements
- .1 Comply with the latest edition of the Ontario Occupational Health and Safety Act, and the Regulations made pursuant to the Act.
- 1.5 Constructor
- .1 Notify all regulatory bodies required for construction activities, (i.e., Notice of Project, employer notification, etc.). Notifications shall include, but not be limited to, the notification requirements laid out in OHSA Sec 51-53 and the requirements of Ontario Regulation 213/91 for Construction Projects, Sections 5, 6 and 7. For the purpose of this contract the Contractor shall be the "Constructor".
 - .2 The "Constructor" will be solely responsible for the safety of all persons on the Site.
- 1.6 Safety Requirements
- .1 Observe and enforce all construction safety measures and comply with the latest edition and amending regulations of the following documents and in the event of any differences among those provisions, the most stringent shall apply:
 - .1 Occupational Health and Safety Act and Regulations for Construction Projects, August 1997, Ontario Regulation 213/91 including amendments.
 - .2 Hazardous Products Act and Canada Labour Code.
 - .3 The Workplace Safety and Insurance Board, O-Reg 454.
 - .4 Ontario Building Code Act, Ontario Regulation 332/12 including amendments.
 - .5 National Building Code of Canada, Part 8: Safety Measures on Construction and Demolition Sites.
 - .6 National Fire Code of Canada.
 - .7 NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2013 Edition
 - .8 Environmental Protection Act.
 - .9 The Power Commission Act.
 - .10 The Boiler and Pressure Vessels Act.
 - .11 The Elevators and Lifts Act.
 - .12 The Operating Engineer's Act.
 - .13 Municipal statutes.
 - .2 Obey all Federal, Provincial and Municipal Laws, Acts, Statutes, Regulations, Ordinances and

By-laws which could in any way, pertain to the work outlined in the Contract, or to any employees of the Contractor. Satisfy all statutory requirements imposed by the Occupational Health and Safety Act and Regulations made thereunder, on a Contractor, and Constructor and/or Employer with respect to or arising out of the performance of the Contractors obligations under this Contract.

- .3 Working at Heights: The supervisor of the project, will be responsible to ensure that his employees and subcontractors/suppliers have current Working at Heights and Fall Protection certification.
- .4 The supervisor of the project will be responsible for his employees and subcontractors/suppliers maintaining standard safety practices, as well as the specific safety rules listed below, while working on the Owner's property.
- .5 The Owner reserves the right to order individuals to leave the site if the individual is in violation of any safety requirement or any Act. Any expense incurred will be the responsibility of the Contractor.
- .6 Notify the Owner should any hazardous condition become apparent.
- .7 Enforce the use of CSA approved hard hats, reflective vests and safety boots for all persons entering or working at the construction site. Refuse admission to those refusing to conform to this requirement.
- .8 Provide safeguard and protection against accident, injury or damage to any person on the site, adjacent work areas and adjacent property.

1.7 Confined Space

- .1 Confined Space: Where applicable, provide the Consultant and all Regulatory Authorities with a copy of the Contractors' Confined Space Entry Procedure. In the event that defined procedures are not available, abide by the applicable requirements of the Occupational Health and Safety Act and all regulations made thereunder.
- .2 Persons intended to work in confined spaces, as defined by the Owner, must have formal training in performing work in confined spaces.
- .3 Provide proof of valid certificates of such training for all workers prior to entry of such workers into confined spaces.
- .4 Provide all necessary safety equipment for entry into confined spaces.
- .5 Where workers are required to enter a confined space, as defined by the OHSA, O. Reg. 632/05 Section 221.2, ensure that workers of the Contractor and all Subcontractors follow the requirements of the above legislation, including but not limited to:
 - .1 Having a method for recognizing each confined space to which the program applies
 - .2 Having a method for assessing the hazards to which workers may be exposed
 - .3 Having a method for the development of confined space entry plans (which include on-site rescue procedures)
 - .4 Having a method for training workers
 - .5 Having an entry-permit system.
 - .6 Supply the necessary tools and equipment to perform the confined space entry. These items include, but are not limited to, required documentation, gas detectors, breathing equipment, fall protection and rescue equipment.

1.8 Safety Meetings

- .1 Site toolbox safety meetings will be held weekly for all Contractor employees and all sub trade contractors.

- .2 Where a Joint Health and Safety Committee is required on a project, workers and supervisors, selected, as members of the committee must attend.

1.9 Workplace Hazardous Materials Information System (WHMIS)

- .1 Be familiar with WHMIS regulations and be responsible for compliance.
- .2 Provide to the Consultant a list of Designated Substances that will be brought to the site prior to commencing work. Safety Data Sheets (SDS) and the hazardous material inventory for each substance listed must be kept on the Project.
- .3 Be responsible for all other requirements of regulations as applicable to Employers.
- .4 All controlled products to be properly labelled and stored.
- .5 Immediately inform Owner and Consultant if any unforeseen or peculiar safety-related factor, hazard, or condition becomes evident during performance of Work.

1.10 Fire Protection

- .1 Provide and maintain safeguard and protection against fire in accordance with current fire codes and regulations.
- .2 Provide temporary fire protection throughout the course of construction. Particular attention shall be paid to the elimination of fire hazards.
- .3 Comply with the requirements of FCC No. 301 Standards for Construction Operations issued by the Fire Commissioner of Canada and the National Building Code.
- .4 Provide and maintain portable fire extinguishers during construction, in accordance with Part 6 of the National Fire Code of Canada 2015 and NFPA 241.
- .5 Maintain unobstructed access for firefighting at all areas in accordance with the National Building Code of Canada.

1.11 First Aid

- .1 Provide such equipment and medical facility as required by WSI Act to supply first aid services to anyone who may be injured at the place of Work. Report all accidents or injuries to the proper authorities and to the Owner and Consultant.

1.12 Accident Reporting

- .1 Investigate and report incidents and accidents as required by Occupational Safety and Health Act, and the Regulations made pursuant to the Act.

1.13 Records on Site

- .1 Maintain on site a copy of the safety documentation as specified in this section and any other safety related reports and documents issued to or received from the authorities having jurisdiction.
- .2 Upon request, make copies available to the Consultant.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Field Engineering survey services.
- .2 Survey services to establish and confirm inverts for Work.
- .3 Recording of subsurface conditions found.

1.2 References

- .1 Owner's identification of existing survey control points and property limits.

1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit name and address of Surveyor to Consultant.
- .3 On request of Consultant, submit documentation to verify accuracy of field engineering work.
- .4 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform to Contract Documents.

1.4 Examination of Work and Site

- .1 Examine the site and existing building to be fully informed of their particulars as related to the Work.
- .2 Verify dimensions of completed Work in place before fabrication of Work to be incorporated with it. Ensure that all necessary job dimensions are taken for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions.
- .3 No claims for extra payment will be paid for extra work made necessary or for difficulties encountered due to conditions of the site which were visible or reasonably inferable from an examination of the site at the time prior to tender closing date and furthermore, failure of the Contractor to visit and examine the site shall be deemed a waiver of all claims for extra payment due to any condition of the site existing prior to tender closing date.
- .4 As-found damage: Record by photography and submit evidence to Consultant before commencing work, any found damaged surfaces or materials adjacent to new work, and not included under scope of this new work. Remedial work to any damage, not so recorded, shall be the responsibility of the Contractor.

1.5 Qualifications of Surveyor

- .1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to Consultant.

1.6 Survey Reference Points

- .1 Existing control points are designated on drawings.
- .2 Locate, confirm and protect control points 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 reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.
- .5 Require surveyor to replace control points in accordance with original survey control.

1.7 Survey Requirements

- .1 Establish two permanent benchmarks on site, referenced to established bench marks by survey

control points. Record locations, with horizontal and vertical data in Project Record Documents.

- .2 Establish lines and levels, locate and lay out, by instrumentation.
- .3 Stake for grading, fill and topsoil placement and landscaping features.
- .4 Establish pipe invert elevations.
- .5 Stake batter boards for foundations.
- .6 Establish foundation and floor elevations.
- .7 Establish lines and levels for mechanical and electrical work.

1.8 Existing Services

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings. The Contractor is responsible for coordination of all utility locates.
- .2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut off points as directed by Consultant.
- .3 Where Work involves breaking into or connecting to existing services, carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to building occupants, pedestrian and vehicular traffic.
- .4 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
- .5 Install temporary drain plugs to prevent construction debris from blocking pipes downstream of the work.
- .6 All existing concrete floor slabs shall be scanned prior to any cutting or breaking of concrete. Employ a qualified concrete scanning company or inspection and testing agency to scan and map floor slabs for reinforcing, plastic and metal conduit, piping, grounding cables, embedment and the like. Map all slabs and provide copies to the Owner and Consultant.

1.9 Location of Services, Equipment and Fixtures

- .1 Location of services, equipment, fixtures and outlets indicated on drawings or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance. Include existing equipment which affects or will be affected by the work.
- .3 Inform Consultant of impending installation and obtain approval for actual location.
- .4 Location of site services where required, is approximate and is based on information provided by the Owner. Undertake all locates to determine exact locations of existing services and lay out new services to avoid any conflicts with new building elements, including site improvements, building foundations and other new or existing services.
- .5 Submit field drawings and interference drawings to indicate relative position of various services and equipment. Refer to requirements for interference drawings specified elsewhere.
- .6 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the spaces provided.
- .7 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus and connections are coordinated.
- .8 Ensure that clearances required by jurisdictional authorities and clearances for proper

maintenance and access are indicated and maintained.

.9 Submit interference drawings to Owner and Consultant in accordance with Section 01 33 00.

.10 Unless specifically indicated by the Consultant, interference drawings will be received for information only and will not be reviewed.

1.10 Records

.1 Maintain a complete, accurate log of control and survey work as it progresses.

.2 Record locations of maintained, re-routed and abandoned service lines.

1.11 Subsurface Conditions

.1 Promptly notify Consultant in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Requirements and limitations for cutting and patching the Work.

1.2 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit written request and obtain Consultant's approval in advance of cutting or alteration which affects:
 - .1 Structural integrity of any element of Project.
 - .2 Integrity of weather exposed or moisture resistant elements.
 - .3 Efficiency, maintenance, or safety of any operational element.
 - .4 Visual qualities of sight exposed elements
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 .Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Date and time work will be executed.

1.3 Materials

- .1 As specified and required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 25 00 - Substitution Procedures.
- .3 Requests for change in materials shall include documentation indicating conformance to project requirements and intent.

1.4 Definitions

- .1 Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- .2 Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

PART 2 PRODUCTS

2.1 Materials

- .1 General: Comply with requirements specified in other Sections.
- .2 In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
- .3 If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Consultant for the visual and functional performance of in-place materials.

PART 3 EXECUTION

3.1 Preparation

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

3.2 General

- .1 Carry out all cutting, fitting and patching required for the work of the Contract.
- .2 Repair all wall and floor surfaces where items have been removed.
- .3 Make good all finishes as required.
- .4 Repaint damaged wall surfaces.
- .5 Fit several parts together, to integrate with other Work.
- .6 Uncover Work to install ill-timed Work.
- .7 Remove and replace defective and non-conforming Work.
- .8 Provide cutting and patching of all openings in non-structural elements of Work as necessary to complete installation of mechanical and electrical Work. Include complete removal and replacement of such elements as necessary to provide construction access.
- .9 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .10 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .11 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools are not allowed on masonry work without prior approval.
- .12 Restore work with new products in accordance with requirements of Contract Documents.
- .13 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .14 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with "ULC approved firestopping material, full thickness of the construction element. Include any openings in existing building elements created by removal of existing services or equipment.
- .15 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

3.3 Cutting and Patching

- .1 General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
- .2 Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- .3 Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged

during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

- .4 Temporary Support: Provide temporary support of work to be cut.
- .5 Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- .6 Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 - Summary of Work.
- .7 Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- .8 Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - .1 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - .2 Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - .3 Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - .4 Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - .5 Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - .6 Proceed with patching after construction operations requiring cutting are complete.
- .9 Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - .1 Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - .2 Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - .1 Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - .2 Restore damaged pipe covering to its original condition.
 - .3 Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, colour, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform colour and appearance.

- .1 Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - .4 Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 - .5 Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
 - .10 Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.
- 3.4 Subfloor Levelling
- .1 Where existing flooring is to be removed from floor slabs to remain, including ceramic tile flooring, carefully remove all flooring, grout, adhesives, waterproofing membranes and the like down to the base slab. Clean, patch and repair slab where damaged with concrete or acceptable leveling compound in accordance with new flooring manufacturer's instructions and ASTM F710-21. Refer to original building drawings and remove and replace existing concrete floor toppings as necessary and where required.
 - .2 Where new flooring is to be installed on new concrete slab or on framed floors, subfloor shall be levelled in accordance with flooring manufacturer's specifications and tolerances and with ASTM F710-21 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- 3.5 Fire Barrier Seals
- .1 Ensure fire separations are maintained as indicated on the drawings. patch and firestop all penetrations and perimeters of fire rated assemblies, accordingly.

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Progressive Cleaning
- .2 Final Cleaning

1.2 Project Cleanliness

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Owner. Do not burn waste materials on site.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use clearly marked separate bins for recycling.
- .7 Clean interior areas prior to start of finishing work and maintain areas free of dust and other contaminants during finishing operations.
- .8 Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

PART 2 PRODUCTS

2.1 Products

- .1 All cleaning materials and products shall be low VOC type. Submit list of cleaning products including SDS for approval prior to commencement of cleaning operations.
- .2 Use only cleaning materials recommended by manufacturer of surface to be cleaned and recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.1 Final Cleaning

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .5 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors and ceilings.

- .6 Clean lighting reflectors, lenses, and other lighting surfaces. Clean and/or replace lamps, light fixtures, grilles and lenses.
- .7 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .8 Thoroughly vacuum clean interior of electrical equipment.
- .9 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .10 Clean and seal concrete floor surfaces with non-skid matte sealer.
- .11 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .12 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.
- .13 Broom clean and wash exterior paved areas, walks, steps and surfaces; rake clean other surfaces of grounds.
- .14 Remove dirt and other disfiguration from exterior surfaces.
- .15 Clean and sweep roofs. Clear all drains, scuppers, gutters and downspouts.
- .16 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .17 Remove snow and ice from access to building.
- .18 Under direction of Consultant, aim adjustable luminaires.

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 References.
- .2 Submittals.
- .3 Definitions.
- .4 Waste Management Goals for the Project.
- .5 Documents.
- .6 Waste Management Plan.
- .7 Waste Audit.
- .8 Waste Reduction Work Plan.
- .9 Materials Source Separation Program.
- .10 Disposal of Wastes.
- .11 Scheduling.
- .12 Storage, Handling and Protection.
- .13 Application.
- .14 Diversion of Materials.

1.2 References

- .1 O. Reg. 102/94 Waste Audits and Waste Reduction Work Plans.
- .2 O. Reg. 278/05 Occupational Health and Safety Act

1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit a completed Waste Management Plan (WMP) including Waste Reduction Workplan (WRW) and Materials Source Separation Program description prior to project start-up.

1.4 Definitions

- .1 Waste Management Plan (WMP): Contractor's approved overall strategy for waste management including waste audit, waste reduction workplan and materials source separation program.
- .2 Waste Audit (WA): Relates to projected waste generation. Involves measuring and estimating quantity and composition of waste, reasons for waste generation, and operational factors which contribute to waste.
- .3 Waste Reduction Work Plan (WRW): Written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.
- .4 Materials Source Separation Program (MSSP): Consists of a series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .5 Waste Management Coordinator (WMC): Designate individual who is in attendance on-site, full-time. Designate, or have designated, individuals from each Subcontractor to be responsible for waste management related to their trade and for coordinating activities with WMC.
- .6 Separate Condition: Refers to waste sorted into individual types.

1.5 Waste Management Goals for the Project

- .1 The Owner has established that this Project shall generate the least amount of waste possible and that processes shall be employed that ensure the generation of as little waste as possible including prevention of damage due to mishandling, improper storage, contamination, inadequate protection or other factors as well as minimizing over packaging and poor quantity estimating.
- .2 Of the waste that is generated, the waste materials designated in this specification shall be salvaged for reuse and or recycling. Waste disposal in landfills or incinerators shall be minimized.

1.6 Documents

- .1 Maintain at job site, one copy of following documents:
 - .1 Waste Audit
 - .2 Waste Reduction Workplan
 - .3 Material Source Separation Plan

1.7 Waste Management Plan

- .1 Waste Management Plan: Submit a Waste Management Plan within 10 calendar days after receipt of Notice of Award of Contract, or prior to any waste removal, whichever occurs sooner. The Plan shall contain the following:
 - .1 Analysis of the proposed job site waste to be generated, including the types of recyclable and waste materials generated (by volume or weight). In the case of demolition, a list of each item proposed to be salvaged during the course of the project should also be prepared
 - .2 Alternatives to Land Filling: Contractor shall designate responsibility for preparing a list of each material proposed to be salvaged, reused, or recycled during the course of the Project.
- .2 Post WMP or summary where workers at site are able to review its content.

1.8 Waste Audit

- .1 Prepare Waste Audit prior to project start-up.
- .2 Record, on Waste Audit , extent to which materials or products used consist of recycled or reused materials or products

1.9 Waste Reduction Work Plan

- .1 Prepare WRW prior to project start-up.
- .2 Reduce construction and demolition waste in compliance with O. Reg. 102/94.
- .3 Reduction will involve action to minimize quantity of waste at source. Reuse products which would become waste where practical. Recycling will involve collection and source separation at the site, of materials for use as feedstock in manufacturing of new products.
- .4 Conform to local Municipal and Regional Landfill Solid waste management requirements. Consider reduction, reuse and recycling of waste generated during construction such as dimensional lumber, clean drywall, concrete, brick, scrap metal and corrugated cardboard.

1.10 Materials Source Separation Program

- .1 The Waste Management Plan shall include a Source Separation Program for recyclable waste and shall be in accordance with the established policies currently in place at the local Municipality, and the requirements of O. Reg. 102/94.
- .2 Prepare MSSP and have ready for use prior to project start-up.
- .3 Implement MSSP for waste generated on project in compliance with approved methods and as approved by Consultant.
- .4 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and/or recyclable materials.
- .5 Provide containers to deposit reusable and/or recyclable materials.
- .6 Locate containers to facilitate deposit of materials without hindering daily operations.
- .7 Locate separated materials in areas which minimize material damage.
- .8 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.

1.11 Disposal of Wastes

- .1 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .2 Provide appropriate on-site containers for collection of waste materials and debris. Containers for volatile wastes shall be closed containers and shall be removed from site daily.
- .3 Provide and use clearly marked separate bins for recycling.
- .4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site.
- .5 Remove waste material and debris from site and deposit in waste container at end of each working day.
- .6 Do not permit waste to accumulate onsite.
- .7 Burying of rubbish and waste materials is prohibited.
- .8 Disposal of waste into waterways, storm, or sanitary sewers is prohibited.

1.12 Scheduling

- .1 Coordinate work with other activities at site to ensure timely and orderly progress of the Work.

1.13 Storage, Handling and Protection

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Owner.

- .2 Materials from building demolition to be salvaged or re-used are to be removed and salvaged.
- .3 Unless specified otherwise, materials for removal become Contractor's property.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Application

- .1 Do work in compliance with Waste Management Plan.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.
- .3 Source separate materials to be reused/recycled into specified sort areas.

3.2 Designated Substances

- .1 All designated substances abatement, removal and disposal shall be completed in accordance with O. Reg 278/05 and all other applicable legislation.

3.3 Diversion of Materials

- .1 Separate materials from general waste stream and stockpile in separate piles or containers, to approval of Owner, and consistent with applicable fire regulations. Mark containers or stockpile areas. Provide instruction on disposal practices.
- .2 On-site sale of materials is not permitted.

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Administrative procedures preceding preliminary and final inspections of Work.

1.2 References

- .1 Canadian Construction Documents Committee CCDC 2-2020, Stipulated Price Contract including Supplementary Conditions.
- .2 OAA/OGCA Document 100 - Recommended Procedures Regarding Substantial Performance of Construction Contracts and Completion Takeover of Projects.
- .3 The Construction Act.

1.3 Inspection and Declaration

- .1 Contractor's Inspection: The Contractor shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents. Submit duplicate copies of the deficiency list to the Owner and Consultant.
 - .1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .2 Request Consultant's review.
- .2 Consultant's Review: Consultant and Contractor will perform review of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .3 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
 - .4 Certificates required by Boiler Inspection Branch, Fire Commissioner, Utility companies, TSSA, ESA and other regulatory agencies have been submitted.
 - .5 Operation of systems have been demonstrated to Owner's personnel.
 - .6 Work is complete and ready for Final Review by the Consultant.
- .4 Final Inspection: when items noted above are completed, request final review of Work by Consultant, and Contractor. If Work is deemed incomplete by the Consultant, complete outstanding items and request re-review.
- .5 Declaration of Substantial Performance: when Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance. Refer to CCDC 2, General Conditions Article GC 5.4 - Substantial Performance of Work and Payment of Holdback for specifics to application.
- .6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7 Final Payment: When Consultant considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to CCDC 2, General Conditions Article GC 5.5 – Final Payment for specifics to application.

- .8 Payment of Holdback: After issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with CCDC 2, General Conditions Article 5.4 - Substantial Performance of Work and Payment of Holdback.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 As built, samples, and specifications.
- .2 Equipment and systems.
- .3 Product data, materials and finishes, and related information.
- .4 Operation and maintenance data.
- .5 Spare parts, special tools and maintenance materials.
- .6 Warranties and bonds.

1.2 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

1.3 Submission

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .2 At least 2 weeks prior to commencement of scheduled commissioning activities, submit 2 copies of the draft Operating and Maintenance Manuals, for Consultants review and use during the commissioning activities. After the completion of the commissioning activities, the Consultant will return to the Contractor 1 draft copy, with review comments, for revision. Submit 1 copy of the revised Operating and Maintenance for approval prior to the production of final copies. Prior to the Issuance of the Final Certificate of Completion, and within 10 working days after Substantial Performance, submit 2 copies of the final Operating and Maintenance Manuals.
- .3 Building will not be deemed ready for use unless the draft copies of the Operating and Maintenance Manuals and the "As-built" Record Documents have been submitted and reviewed by the Consultant.
- .4 Building will not be deemed ready for use unless the completed and submitted Operating and Maintenance Manuals and "As-built" Record Documents have been accepted by the Consultant.
- .5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
- .6 If requested, furnish evidence as to type, source and quality of products provided.
- .7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

1.4 Format

- .1 Organize data in the form as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in .dwg format. Provide duplicate copies on memory stick
- 1.5 Contents Each Volume
 - .1 Table of Contents:
 - .1 Title of project.
 - .2 Date of submission; names.
 - .3 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .4 Schedule of products and systems, indexed to content of volume.
 - .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
 - .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
 - .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
 - .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- 1.6 Occupant Manual
 - .1 Submit Occupant Manual to Consultant's requirements.
 - .2 Occupant Manual to include:
 - .1 General building information.
 - .2 Building management.
 - .3 Building operations.
 - .4 Safety.
 - .5 Security.
 - .6 Environmental considerations.
 - .7 Communications.
 - .8 Contact List.
 - .9 Other/Miscellaneous.
- 1.7 As-Builts and Samples
 - .1 In addition to requirements in General Conditions, maintain at the site for Consultant one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.

- .3 Addenda.
- .4 Change Orders and other modifications to Contract.
- .5 Reviewed shop drawings, product data, and samples.
- .6 Field test records.
- .7 Inspection certificates.
- .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Consultant.
- 1.8 Recording Actual Site Conditions
 - .1 Record information on set of drawings, provided by Consultant.
 - .2 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
 - .3 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
 - .4 Submit following drawings:
 - .1 Record changes in red. Mark on one set of prints and at completion of project prior to final inspection, produce electronic "as-built" records on disk using latest version of AutoCad. Annotate "AS-BUILT RECORD" in each drawing title block.
 - .2 All changes shall be shown on a separate drawing layer named "as-built".
 - .3 At least 2 weeks prior to commencement of scheduled commissioning activities, submit one copy of the draft "As-built" Project Record Documents for Consultants review and use during the commissioning activities. After the completion of the commissioning activities, the Consultant will return to the Contractor the draft copy, with review comments, for revision. Prior to the Issuance of the Final Certificate of Completion, and within 10 working days after Substantial Performance, submit 2 copies of the final "As-built" Project Record Documents and disk of "as-built" record drawings.
 - .5 Specifications: legibly mark each item to record actual construction, including:

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- .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
 - .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections
- 1.9 Equipment and Systems
- .1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with Engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
 - .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
 - .3 Include installed colour coded wiring diagrams.
 - .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
 - .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
 - .6 Provide servicing and lubrication schedule, and list of lubricants required.
 - .7 Include manufacturer's printed operation and maintenance instructions.
 - .8 Include sequence of operation by controls manufacturer.
 - .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
 - .10 Provide installed control diagrams by controls manufacturer.
 - .11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.
 - .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
 - .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
 - .14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control
 - .15 Additional requirements: as specified in individual specification sections.
- 1.10 Materials and Finishes
- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
 - .3 Moisture-Protection and Weather-Exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
 - .4 Additional Requirements: as specified in individual specifications sections.

1.11 Spare Parts

- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Spare parts as identified in individual sections are to be delivered to the Owner prior to the Contractor's application for Substantial Performance.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.12 Maintenance Materials

- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Maintenance materials are to be delivered to the Owner prior to the Contractor's application for Substantial Performance.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.13 Special Tools

- .1 Provide special tools, in quantities specified in individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Special tools are to be delivered to the Owner prior to the application for Substantial Performance.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

1.14 Storage, Handling and Protection

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.15 Warranties and Guarantees

- .1 Separate each warranty or guarantee with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and guarantees, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.
- .4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
- .5 Verify that documents are in proper form, contain full information, and are notarized.

- .6 Co-execute submittals when required.
- .7 Retain warranties and guarantees until time specified for submittal.

1.16 Independent Specialty Engineers Sign-Off

- .1 Prior to Substantial Performance, provide copies of signed and stamped engineers review and sign-off letters stating that the work has been built in accordance with their drawings and designs. Conditional or vague letters of sign-off will not be accepted. All specialty design engineers for all sub-contractors and suppliers will be required to review the work in progress at appropriate intervals to ensure compliance with their designs and drawings and shall provide final sign-off letters. Provide copies of all field reports issued by specialty engineers. Carry all costs associated with full compliance with this requirement.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 References

- .1 The National Building Code of Canada, Part 8-Safety Measures on Construction and Demolition Sites.
- .2 CSA Group (CSA)
 - .1 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures
- .3 ASTM International (ASTM)
 - .1 ASTM F710-21 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
- .4 Ontario Regulation 102/94 Waste Audits and Waste Reduction Work Plans.
- .5 Ontario Regulation 103/94 Environmental Protection Act.
- .6 Ontario Regulation 213/07 The Fire Code.
- .7 Ontario Regulation 232/98 Landfilling Sites.
- .8 Ontario Regulation 278/05 Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations.
- .9 Ontario Regulation 347 Environmental Protection Act, General — Waste Management.
- .10 Ontario Regulation 332/12 The Building Code.
- .11 The Workplace Health and Safety Act, and Regulations for Construction Projects.
- .12 The Contractors Health and Safety Policy.
- .13 Laws, rules and regulations of other authorities having jurisdiction.

1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit detailed written schedule, methodology and proposed procedures for demolition, including a Safe Work Plan for review prior to commencement of demolition.
- .3 Where required by authorities having jurisdiction, submit for approval drawings, diagrams or details clearly showing sequence of disassembly work or supporting structures and underpinning.
- .4 Drawings for structural elements of the demolition process including shoring, underpinning and installation of new lintels or beams in existing load bearing walls, shall bear signature and stamp of qualified professional engineer registered in the Province of Ontario.
- .5 Submit proposed dust-control measures.
- .6 Submit proposed noise-control measures.
- .7 Submit schedule of demolition activities indicating the following:
 - .1 Detailed sequence of demolition and removal work, including start and end dates for each activity.
 - .2 Dates for shutoff, capping, and continuation of utility services.

- .8 If hazardous materials are encountered and disposed of, landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
- .9 At Project Closeout: Submit record drawings in accordance with Section 01 78 00. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions

1.4 Permits

- .1 Obtain and pay for all permits and comply with all laws, rules, ordinances, and regulations relating to Demolition of Building and preservation of Public Health and Safety.
- .2 The Consultant will complete General Review during demolition in accordance with the Ontario Building Code. All other engineering required for shoring design and for other structural elements of the demolition work will be completed by the Contractor's own engineer and paid for by the Contractor.

1.5 Waste Management Plan

- .1 All work of this section shall be completed in accordance with the contractors approved Waste Management Plan specified in Section 01 74 19.

1.6 Definitions

- .1 Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals and inorganic wastes.
- .2 Demolition Waste: Building materials and solid waste resulting from construction, remodeling, repair, cleanup, or demolition operations that are not hazardous. This term includes, but is not limited to, asphalt concrete, Portland cement concrete, brick, lumber, gypsum wallboard, cardboard and other associated packaging, roofing material, ceramic tile, carpeting, plastic pipe, and steel. The materials may include rock, soil, tree stumps, and other vegetative matter resulting from land clearing and landscaping for construction or land development projects.
- .3 Environmental Pollution and Damage: The presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human or animal life; affect other species of importance to humanity; or degrade the utility of the environment for aesthetic, cultural or historical purposes.
- .4 Inert Fill: A permitted facility that accepts inert waste such as asphalt and concrete exclusively for the purpose of disposal.
- .5 Inert Solids/Inert Waste: Non-liquid solid waste including, but not limited to, soil and concrete that does not contain hazardous substances or soluble pollutants at concentrations in excess of water-quality standards established by a regional water board and does not contain significant quantities of decomposable solid waste.
- .6 Landfill: A landfill that accepts non-hazardous materials such as household, commercial, and industrial waste, resulting from construction, remodeling, repair, and demolition operations. A landfill must have a solid waste facilities permit from the Ministry of the Environment and be in conformance to O. Reg 232/98.
- .7 Recycling: The process of sorting, cleansing, treating and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.
- .8 Remove: Remove and legally dispose of items, except those identified for use in recycling, re-use, and salvage programs.

- .9 Reuse: The use, in the same or similar form as it was produced, of a material which might otherwise be discarded.
- .10 Solid Waste: All putrescible and non-putrescible solid, semisolid, and liquid wastes, including garbage, trash, refuse, paper, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, dewatered, treated, or chemically fixed sewage sludge which is not hazardous waste, manure, vegetable or animal solid and semisolid wastes, and other discarded solid and semisolid wastes. "Solid waste" does not include hazardous waste, radioactive waste, or medical waste as defined or regulated by law.

1.7 Quality Assurance

- .1 Demolition Firm Qualifications: Demolition contractor shall be an experienced firm that has successfully completed demolition Work similar to that indicated for this Project.
- .2 Regulatory Requirements: Comply with governing regulations before starting demolition. Comply with hauling and disposal regulations of authorities having jurisdiction. Obtain and pay for all permits required.
- .3 Pre-demolition Conference: Conduct a conference at Project site.
 - .1 Review the environmental goals of this Project and make a proactive effort to increase awareness of these goals among all labor forces on site.
 - .2 Review schedule and scheduling procedures.
 - .3 Review health and safety procedures.
 - .4 Review of Project conditions including review of record photographs.

1.8 Project Conditions

- .1 Construct safety barriers, barricades, fencing and hoarding to separate public from work areas as described in Section 01 56 00.
- .2 The Owner assumes no responsibility for the actual condition of the structures to be demolished.
- .3 Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner insofar as practicable. Variations within the structures may occur by the Owner's salvage operations prior to start of demolition.

1.9 Designated Substances

- .1 Refer to Designated Substances Survey - 12 Queen Street, Lakefield, Ontario dated June 6, 2022 and prepared by Cambium Inc. (Cambium Reference number 15392-001).
- .2 Should any other material not identified in the above referenced reports resembling asbestos or other hazardous substances be encountered in course of demolition work, immediately stop work and notify the Owner's Representative. Refer to Section 01 41 00.
- .3 All designated substances abatement, removal and disposal shall be completed in accordance with O. Reg 278/05 and all other applicable legislation.

PART 2 PRODUCTS

2.1 Materials

- .1 Provide all materials necessary for temporary shoring. On completion, remove temporary materials from site.
- .2 All building materials removed from the building shall become the property of the Contractor unless specified otherwise and shall be reused in new construction or removed from the Site.

- .3 All concrete, masonry, asphalt and similar materials shall be crushed prior to disposal.

2.2 Salvage

- .1 All items of salvageable value must be salvaged.
- .2 Provide a schedule of items to be salvaged and clearly indicate which items are to be retained by Owner. Clearly identify and tag each salvageable item.
- .3 Transport salvaged items from the site as they are removed.
- .4 Items of salvageable value to the Contractor may be removed from the structure as the work progresses, if such items are not claimed by the Owner.

2.3 Reuse

- .1 Salvage and reuse materials as indicated on the drawings.

2.4 Recycle

- .1 All materials from demolition and land clearing which can be recycled through local municipal programs and which is not scheduled for salvage shall be sorted and separated in accordance with Regional, Provincial and Municipal standards and regulations.
- .2 Provide recycling receptacles for the duration of construction activities at the building site.

PART 3 EXECUTION

3.1 Examination

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of demolition, salvage and recycling required.
- .2 Verify that utilities have been disconnected and capped.
- .3 Survey condition of the building to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition.
- .4 Retain a licensed and qualified civil or structural engineer to provide analysis, including calculations, necessary to ensure the safe execution of the demolition work.
- .5 Perform surveys and tests as the Work progresses to detect hazards resulting from demolition activities.
- .6 Preliminary Survey:
 - .1 The Demolition Plans indicate the general extent of existing conditions based upon drawings provided by the Owner and existing site conditions. Review all areas of work to determine full extent of areas to be demolished, altered or renovated and become familiar with actual conditions and extent of work required.
 - .2 Before commencing demolition operations, examine Site and provide engineering survey to determine type of construction, condition of structure, and Site conditions. Assess strength and stability of damaged or deteriorated structures.
 - .3 Assess potential effect of removal of any part or parts on the remainder of structure before such part(s) are removed.
 - .4 Assess effects of demolition at adjacent structures and consider need for underpinning, shoring and/or bracing.
 - .5 Investigate for following conditions:

- .1 load bearing walls and floors
- .2 structure suspended from another
- .3 effects of soils, water, lateral pressures on retaining or foundations walls
- .4 presence of tanks and other piping systems
- .5 presence of designated substances and hazardous materials.
- .7 After determining demolition methods, determine area of possible vibration. Carefully inspect beyond those adjacent areas. List potential damage areas and photograph each for record purposes before starting work.

3.2 Preparation

- .1 Erect and maintain dustproof and weatherproof partitions as required to prevent spread of dust, fumes and smoke to other parts of building. Maintain fire exits. On completion, remove partitions and make good surfaces to match adjacent surfaces of building.
- .2 Provide all shoring and bracing required for the execution of the work.
- .3 Ensure all sedimentation controls as required are in place prior to commencement of demolition activities.
- .4 Before commencing demolition, verify that existing water, gas, electrical and other services in areas being demolished are cut off, capped diverted or removed as required. Post warning signs on electrical lines and equipment which must remain energized to serve adjacent areas during period of demolition.
- .5 Conduct demolition operations and remove materials from demolition to ensure minimum interference with roads, streets, walks, and other adjacent occupied and utilized facilities.
- .6 Do not close or obstruct streets, walks, or other adjacent occupied or utilized facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

3.3 Utilities

- .1 Contact authorities or utility companies for assistance in locating and marking services passing under, through, overhead or adjacent to structure to be demolished. Such services include:
 - .1 Electrical power lines
 - .2 Gas mains
 - .3 Communication cables
 - .4 Fibre optic cables
 - .5 Water lines.
 - .6 Drainage piping (storm and sanitary).
- .2 Before disconnecting, removing, plugging or abandoning any existing utilities serving the building:
 - .1 Notify the Owner, applicable utility companies, and local authorities having jurisdiction.
 - .2 Cut off and cap utilities at the mains on the property or in the street as required by the Owner and responsible utility company. Maintain fire protection to the existing buildings at all times.
 - .3 Remove, cut off and plug, or cap all utilities within the existing building areas to be demolished, except those designated to remain

3.4 Protection

- .1 Erect and maintain temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction. Maintain such areas free of snow, ice, water and debris. Lighting levels shall be equal to that prior to erection.
- .2 Provide safe access and egress from working areas using entrances, hallways, stairways or ladder runs, protected to safeguard personnel using them from falling debris.
- .3 Do not interfere with use and activities of adjacent buildings and site. Maintain free and safe passage to and from buildings.
- .4 Where demolition operations prevent normal access to adjacent properties, provide and maintain suitable alternative access.
- .5 Provide flagmen where necessary or appropriate, to provide effective and safe access to site to vehicular traffic and protection to Owner's personnel. Refer to Division 1 for safety requirements.
- .6 Protect existing site improvements, appurtenances, and landscaping that are designated to remain in place.
- .7 Ensure that all necessary controls are in place at the beginning of each work period which will prevent the spread of contaminated material beyond the work area limits. Stop work immediately if there exists any possibility of the spread of contaminated materials.
- .8 Keep dust from entering existing facilities and areas of building not affected by the Work. Comply with Ministry of Health requirements regarding debris control.
- .9 Ensure scaffolds, ladders, equipment and other such equipment are not accessible to public. Protect with adequate fencing or remove and dismantle at end of each day or when no longer required.
- .10 Take precautions to guard against movement, settlement or collapse of adjacent structures, services or driveways. Be liable for such movement, settlement or collapse caused by failure to take necessary precautions. Repair promptly such damage when ordered.
- .11 If Owner considers additional bracing and shoring necessary to safeguard and prevent such movement or settlement, install bracing or shoring upon Owner's orders.
- .12 Particular attention shall be paid to prevention of fire and elimination of fire hazards which would endanger new work or existing premises.
- .13 Protect existing adjacent work against damages which might occur from falling debris or other causes due to work of this Section.
- .14 At all times protect the structure from overloading.
- .15 Provide protection around floor and/or roof openings.
- .16 Protect from weather, parts of adjoining structures not previously exposed.
- .17 Protect interiors of building parts not to be demolished from exterior elements at all times.
- .18 At end of each day's work, leave work in safe condition so that no part is in danger of toppling or falling.

3.5 Temporary Ventilation

- .1 Provide all required temporary ventilation for demolition work.

3.6 Environmental Controls

- .1 Comply with provincial and municipal regulations pertaining to water, air, solid waste, recycling, chemical waste, sanitary waste, sediment and noise pollution.
- .2 Protection of Natural Resources:
 - .1 Preserve the natural resources.
 - .2 Confine demolition activities to areas defined by public roads, easements, and work area limits indicated on the drawings.
 - .3 Water Resources: Comply with applicable regulations concerning the direct or indirect discharge of pollutants to underground and natural surface waters. Provide sedimentation control where necessary.
 - .4 Store and service construction equipment at areas designated for collection of oil wastes.
 - .5 Oily Substances: Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water in such quantities as to affect normal use, aesthetics, or produce a measurable ecological impact on the area.
- .3 Dust Control, Air Pollution, and Odour Control: Prevent creation of dust, air pollution and odors.
 - .1 Use temporary enclosures and other appropriate methods to limit dust and dirt rising and scattering in air to lowest practical level.
 - .2 Store volatile liquids, including fuels and solvents, in closed containers.
 - .3 Properly maintain equipment to reduce gaseous pollutant emissions.
- .4 Noise Control: Perform demolition operations to minimize noise.
 - .1 Provide equipment, sound deadening devices, and take noise abatement measures that are necessary to comply with municipal regulations.
- .5 Salvage, Re-Use, and Recycling Procedures:
 - .1 Identify re-use, salvage, and recycling facilities.
 - .2 Develop and implement procedures to re-use, salvage, and recycle demolition materials.
 - .3 Identify materials that are feasible for salvage, determine requirements for site storage, and transportation of materials to a salvage facility.
 - .4 Source-separate clean and uncontaminated demolition materials including, but not limited to the following types:
 - .1 Concrete, Concrete Block, Concrete Masonry Units (CMU), Brick.
 - .2 Metal (ferrous and non-ferrous).
 - .3 Wood.
 - .4 Glass.
 - .5 Plastics and Insulation.
 - .6 Gypsum Board.
 - .7 Porcelain Plumbing Fixtures.
 - .8 Fluorescent Light Tubes.
 - .9 Paper: Bond, Newsprint, Cardboard, Paper, Packaging Materials.
 - .10 Other materials as appropriate.

3.7 Performance

- .1 Ensure demolition work is supervised by competent foreman at all times.
- .2 Demolition shall proceed safely in systematic manner. Work on each floor level shall be complete before commencing work on supporting structure and safety of its supports are impaired. Parts of building which would otherwise collapse prematurely shall be securely shored. Walls and piers shall not be undermined.
- .3 Until acceptance, maintain and preserve active utilities traversing premises.
- .4 Provide enclosed chutes for disposal of debris from heights more than 1 storey in accordance with CSA S350.
- .5 Maintain safety of site by shoring below-grade-structures and excavations resulting from demolition against collapse.

3.8 Demolition

- .1 Review demolition procedures to ensure no personnel or equipment are located or working without additional safe working platforms or working surface adequate to support the operations.
- .2 Any damage caused to the adjacent buildings or properties by the neglect of the Contractor or any of his forces shall be made good at the expense of the Contractor including all costs and charges which may be claimed by the Owner for damages suffered.
- .3 Demolish in a manner to minimize dusting. Keep dusty materials wetted at all times.
- .4 Demolition: Use methods required to complete Work within limitations of governing regulations and as follows:
 - .1 Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - .2 Demolish concrete and masonry in sizes that will be suitable for acceptance at recycling or disposal facilities.
 - .3 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - .4 Break up and remove concrete slabs on grade in small sizes, suitable for acceptance at recycling or disposal facilities, unless otherwise shown to remain.
 - .5 Remove all disconnected, abandoned utilities.
 - .6 Remove all finishes, fixtures, fittings and services as indicated
 - .7 Damages: Promptly repair damages to adjacent facilities caused by demolition operations.
 - .8 Prevent access to excavations by means of fences or hoardings.

3.9 Selective Demolition

- .1 Carefully dismantle and remove all items in as shown and as necessary to complete the work.
- .2 Salvage items scheduled for reuse or to be handed over to the Owner.
- .3 Particular attention shall be paid to prevention of fire and elimination of fire hazards which would endanger the existing buildings.
- .4 Where existing flooring is to be removed from floor slabs to remain, carefully remove flooring, grout, adhesives, waterproofing membranes and the like down to the base slab. Patch and repair slab where damaged with concrete or acceptable leveling compound in accordance with new

flooring manufacturer's instructions and ASTM F710. Refer to original building drawings and remove and replace existing concrete floor toppings as necessary and where required.

- .5 Return areas to condition existing prior to the start of the work unless indicated otherwise.
- .6 At exterior and interior bearing walls to be removed, include breaking out and removal of existing concrete foundations to a minimum of 200 mm below new finished floor level.

3.10 Handling of Demolished Materials

- .1 Conform to the approved Waste Management Plan.
- .2 Do not allow demolished materials to accumulate or be stored on-site for more than 5 days.
- .3 Do not burn, bury or otherwise dispose of rubbish and waste materials on project site.
- .4 Pallet and shrink-wrap materials scheduled for re-use and stockpile where directed on site.
- .5 Disposal: Transport demolished materials off Owner's property and legally reuse, salvage, recycle, or dispose of materials. Legally transport and dispose of materials that cannot be delivered to a source separated or mixed recycling facility to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal.
- .6 Deliver to facilities that can legally accept new construction, excavation and demolition materials for purpose of re-use, recycling, composting, or disposal.

3.11 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work.
- .3 Upon completion of demolition work, remove debris, trim surfaces and leave work site clean.
- .4 Video storm and sanitary sewers and jet clean where debris may have accumulated

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 20 00 Concrete Reinforcing
- .2 Section 03 30 00 Cast-in-Place Concrete
- .3 Section 31 23 10 Excavating, Trenching and Backfilling

1.3 References

- .1 American Concrete Institute (ACI)
 - .1 ACI 117-10 Standard Specifications for Tolerances for Concrete Construction and Materials.
 - .2 ACI 347R-14 Guide to Formwork for Concrete
 - .3 ACI SP-4-14 Formwork for Concrete
- .2 CSA Group (CSA)
 - .1 CSA-A23.1-14/ CSA-A23.2-14 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete.
 - .2 CSA O86-14 Engineering Design in Wood
 - .3 CSA S269.1-16 Falsework and Formwork.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit shop drawings showing type, extent and locations of items to be built into concrete.
 - .2 Sleeving Drawings: Submit drawings showing sleeves required through floors, roof and other structural members.
 - .3 Submit drawings showing size and spacing of conduits and piping, if requested by Consultant.
 - .4 Coordinate with other Divisions prior to submittal.
 - .5 Prior to submission to Consultant, review all submitted drawings. By this review, Contractor represents to have determined and verified field measurements, site conditions, materials, catalogue number and similar data and to have checked and coordinated each drawing with the requirements of Work and of Contract Documents. Contractor's review of each drawing shall be indicated by stamp, date and signature of a responsible person.
 - .6 At time of submission, notify Consultant in writing of any deviations in drawings from the requirements of the Contract Documents.
 - .7 Consultant will review and return submitted drawings in accordance with an agreed schedule. Consultant's review will be for conformity to design concept and for general arrangement and shall not relieve Contractor of responsibility for errors or omissions in submitted drawings or of responsibility for meeting requirements of Contract Documents.
 - .8 Make any changes in submitted drawings which Consultant may require, consistent with Contract Documents and resubmit unless otherwise directed by Consultant. When

- resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.
- .9 Do not commence placing sleeves, conduits, or piping before drawings have been reviewed and Consultant's comments incorporated on drawings issued to site.
 - .10 Assume responsibility for accuracy of Work. Review of submitted shop drawings does not relieve Contractor from compliance with requirements of Contract Documents.
- .3 Submit shop drawings as follows:
- .1 4 copies for review before any Work commences.
 - .2 1 additional copy for distribution as directed by Consultant.
 - .3 1 copy to Inspection and Testing Company.
- .4 Required by Regulatory Agencies: Submit shop drawings bearing signature and seal of Professional Engineer responsible for formwork design, as may be required by regulatory Agencies. Proceed with construction of formwork only with their approval.
- 1.5 Requirements of Regulatory Agencies
- .1 Conform to local and provincial regulations, including construction safety regulations.
- 1.6 Quality Assurance
- .1 Obtain a copy of CSA A23.1-14/A23.2 and maintain on site
 - .2 Design of Formwork: Assume full responsibility for complete structural design and construction of formwork in accordance with CAN/CSA S269.1 and CAN/CSA O86, as applicable.
 - .1 The design and engineering of the formwork, as well as its' construction, shall be the responsibility of the Contractor.
 - .3 Formwork shall be designed for the loads and lateral pressures outlined in the ACI publication "SP-4 Formwork for Concrete" and wind pressures and allowable stresses as set down in the National Building Code and in accordance with CSA A23.1 and A23.2. Formwork shall be of sufficient strength and rigidity to support all concrete and construction loads, taking into account proposed rate and method of pouring concrete so that the resultant finished concrete shall conform to the shapes, lines and dimensions of the members shown on the drawings.
- 1.7 Shipping, Handling and Storage
- .1 Refer to Section 01 61 00 – Common Product Requirements.
 - .2 Protect formwork to prevent functional damage and damage to faces affecting appearance of concrete surfaces exposed to view.
- 1.8 Waste Management and Disposal
- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.
- PART 2 PRODUCTS**
- 2.1 Materials
- .1 All materials shall be new, in accordance with referenced standards.
 - .2 Plywood: Douglas Fir, conforming to CSA O121. Sound undamaged sheets finished one side, fabricated especially for use as concrete form panels, with sealed edges. Minimum 17mm thickness.
 - .3 Lumber: Conforming to CSA O141, with grade stamp clearly visible.

- .4 Chamfers: Cut from 19mm x 19mm wood, smooth with no open defects.
- .5 Form Ties: snap ties, with spreader washer and 25mm break back.
- .6 Void Form: Honeycomb cellular core structure manufactured from kraft fibre. Top and sides protected with wax coated corrugated board, and bottom unprotected.
- .7 Joint Tape: non-staining, water impermeable, self-release.
- .8 Nails, Spikes and Staples: Galvanized, conforming to CSA B111.
- .9 Form Release Agent: Colourless mineral oil which will not stain concrete.
- .10 For concrete surfaces exposed to view, provide panels smooth and free of defects which would be reproduced as concrete blemishes.

PART 3 EXECUTION

3.1 Examination

- .1 Before starting this work, examine work done by others which affects this work.
- .2 Notify the Consultant of any conditions which would prevent proper completion of this work.
- .3 Commencement of work implies acceptance of existing conditions.

3.2 Erection

- .1 Verify lines, levels and centres before proceeding with formwork. Ensure dimensions agree with drawings.
- .2 Align joints and make watertight, to prevent leakage of cement paste and disfiguration of concrete.
- .3 Construct formwork to produce concrete with dimensions, lines and levels within tolerances specified in ACI 347R-14.
- .4 Provide formed openings where required for pipes, conduits, sleeves and other work to be embedded in and passing through concrete members.
- .5 Install chamfers at all external corners exposed to view.
- .6 Voidform: Install voidform and place 7.5 mm thick plywood over voidform, to provide firm surface for supporting reinforcement.
- .7 Adequately brace and shore formwork to sustain loads (both concrete and working loads) applied during construction.
- .8 Be responsible for safety of the structure both before and after the removal of forms, until the concrete has reached its specified 28 day strength.

3.3 Built-In Work

- .1 Form openings and build in anchors, inserts, sub-frames, key-ways, sleeves, miscellaneous metal items, reglets and similar items furnished under Work of other Sections, which are indicated on Drawings and on shop drawings of other trades, and as required for proper completion of Work.
- .2 Do not embed wood in concrete.
- .3 Anchor Bolts: Tie anchor bolts securely in position to prevent movement during concrete placing. Use template to locate bolts. Verify that bolts have specified projection above concrete.
- .4 Openings or Sleeves Not Shown on Structural Drawings:
 - .1 Obtain Consultant's written approval before forming openings of sleeves through columns and beams, or through slabs within 1800 mm of their supports.

- .2 Obtain Consultant's written approval before forming openings or sleeves larger than 200 mm square in any location.
- .5 Embedded Pipe or Conduit Not Shown or Detailed on Structural Drawings:
 - .1 Obtain Consultant's written approval before placing conduit or pipe which would be embedded in finished structure.
- .6 Confirm that built-in items that penetrate surface waterproofing are installed to meet requirements of waterproofing trade.
- 3.4 Construction Joints
 - .1 Form construction and expansion joints with bulkheads to ensure straight lines. Immediately before subsequent pour at construction joint, remove bulkhead and tighten forms so that concrete surfaces will be on same plane with no overlapping of concrete.
 - .2 Review with Consultant proposed location and details of construction joints in walls, columns, beams and slabs.
 - .1 Construction joints shall present appearance of normal form panel joint.
 - .2 Install continuous shear key in construction joints in walls and framed floors which are 152mm or more thick.
 - .3 Provide vertical construction joints in walls at not more than 20 metres centre to centre.
 - .4 Provide waterstops in accordance with manufacturer's instructions at construction joints in walls which retain earth. Waterstops shall be continuous.
- 3.5 Treatment of Formwork Surfaces
 - .1 Form Release Agent:
 - .1 Coat formwork with form release agent before reinforcement, anchors, accessories, and other built in items are installed.
 - .2 Do not coat plywood forms pre-treated with release agent.
 - .3 On surfaces to receive finish materials, adhesives, sealers, paint or other coatings or materials, use a compatible release agent.
- 3.6 Stripping of Formwork
 - .1 Strip formwork on vertical surfaces when concrete has hardened sufficiently that no damage will result from stripping operations.
 - .2 Do not remove plywood formwork by jerking loose or by metal pinch bars. Use wood wedges and gradually force panels loose. Leave plywood forms in place as long as possible to permit maximum shrinkage away from concrete.
 - .3 Take particular care not to damage external corners when stripping formwork.
 - .4 When forms are stripped during curing period, cure and protect exposed concrete in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- 3.7 Defective Work
 - .1 Movement and displacement of formwork during construction, variations in excess of specified tolerances, marked and disfigured surfaces, and failure of materials or workmanship to meet requirements of this specification, and which cannot be repaired by approved methods, will be considered defective work.
 - .2 Replace defective work, as directed by Consultant.

- .3 Pay for additional inspection and testing, redesign, corrective measures, and related expenses, if work has proven to be deficient.
- .4 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost.

3.8 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 10 00 Concrete Forming and Accessories
- .2 Section 03 30 00 Cast-in-Place Concrete
- .3 Section 04 05 19 Masonry Anchorage and Reinforcing
- .4 Section 04 22 00 Concrete Unit Masonry
- .5 Section 05 50 00 Metal Fabrications

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A143/A143M-07(2014) Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
 - .2 ASTM A497 - 99 Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete
 - .3 ASTM A1064/A1064M-17 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- .2 American Concrete Institute (ACI)
 - .1 ACI SP-66 (04) ACI Detailing Manual.
- .3 CSA Group (CSA)
 - .1 CSA-A23.1-14/ CSA-A23.2-14 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete.
 - .2 CSA A23.3-14 Design of Concrete Structures.
 - .3 CSA G30.18-09 (R2014) Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA G40.20-13/G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CSA W186-M1990 (R2012) Welding of Reinforcing Bars in Reinforced Concrete Construction
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC Reinforcing Steel Manual of Standard Practice.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit shop drawings, including placing drawings and bar lists.
 - .2 Prepare placing drawings and bar lists in accordance with the American Concrete Institute (ACI) Detailing Manual, and the Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice, the typical details included with Contract Documents.
 - .3 Prepare placing drawings to minimum scale of 1:50.

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- .4 Submit placing drawings and bar lists sufficiently detailed and dimensioned to permit correct placement of reinforcement and accessories without reference to architectural or structural Drawings.
 - .5 Show reinforcement, including dowels, in elevation on placing drawings for wall reinforcement.
 - .6 Show concrete cover to reinforcement.
 - .7 Show location of construction joints.
 - .3 Inspection Reports: Inspection and Testing Company shall submit reports of inspections and tests.
 - .1 Distribute inspection reports as follows:
 - .1 Consultant.
 - .2 Contractor.
 - .4 Quality Assurance Submittals:
 - .1 Mill Test Report: upon request, provide Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
 - .2 Upon request submit in writing to Consultant proposed source of reinforcement material to be supplied.
 - 1.5 Quality Assurance
 - .1 Obtain a copy of CSA A23.1-09, and maintain on site.
 - .2 Qualifications: Welding: Undertake welding of reinforcement only by a fabricator or Subcontractor approved by Canadian Welding Bureau to requirements of CSA W186.
 - .3 Source Quality Control: Source Quality Control may be performed by an Inspection and Testing Company appointed by Consultant.
 - .4 Review provided by Inspection and Testing Company does not relieve Contractor of his sole responsibility for quality control over Work. Performance or non-performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.
 - .5 Identify and correlate reinforcing steel from Canadian mills with test reports for compliance with requirements specified.
 - .6 Test unidentified reinforcing steel at expense of Contractor. Perform testing for each 1 tonne or part thereof supplied for incorporation in Work.
 - 1.6 Shipping, Handling and Storage
 - .1 Refer to Section 01 61 00 – Common Product Requirements.
 - .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
 - 1.7 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.
- PART 2 PRODUCTS**
- 2.1 Materials
 - .1 In accordance with reference standards.
 - .2 Substitute different size bars only if permitted in writing by Consultant.

.3 Bar Reinforcing Steel:

- .1 Bars which are to be welded by arc-welding process: to CSA G30.18, Grade 400W.
- .2 Other bars: to CSA G30.18, Grade 400R.
- .4 Plain round bars: to CSA G40.20-04/G40.21.
- .5 Welded Wire Fabric: to ASTM A1064/A1064M and in flat sheets, not rolls.
- .6 Cold-drawn annealed steel wire ties: to ASTM A497.
- .7 Chairs, bolsters, bar supports, spacers: to CSA A23.1.
- .8 Mechanical splices: subject to approval of Consultant.

2.2 Fabrication

- .1 Fabricate reinforcing steel only in permanent fabricating shop.
- .2 Fabricate reinforcing steel in accordance with shop drawings.
- .3 Tag reinforcing bars to indicate placement as designated on shop drawings.
- .4 Splices:
 - .1 Provide splices only where specifically indicated on Drawings.
 - .2 Stagger alternate mechanical splices 750 mm apart.
 - .3 Stagger alternate end bearing splices 750 mm apart.
 - .4 Install on threaded splices, plastic internal coupler thread protector and plastic bar end thread protector.

PART 3 EXECUTION

3.1 Examination

- .1 Before starting this work, examine work done by others which affects this work.
- .2 Examine formwork to verify that it has been completed, and adequately braced in place.
- .3 Notify the Consultant of any conditions which would prejudice proper completion of this work.
- .4 Commencement of work implies acceptance of existing conditions.

3.2 Installation

- .1 Place reinforcing steel in accordance with reviewed placing drawings, typical details, and CSA A23.3.
- .2 Adequately support reinforcing and secure against displacement within tolerances permitted.
- .3 Place reinforcing steel to provide minimum spacing and proper concrete cover as noted on drawings.
- .4 Do not cut reinforcement to incorporate other Work.
- .5 Relocate or rebend bars only on written instructions of Consultant.
- .6 Tie reinforcement in place. Do not weld.

3.3 Adjusting

- .1 Adjust and secure reinforcement in correct position immediately before concrete is placed.
- .2 Remove contaminants which lessen bond between concrete and reinforcement.

3.4 Field Quality Control

- .1 Provide competent supervisor, with at least three years of experience in reinforcement placement, to direct placement of reinforcement.
- .2 Inspect placement of reinforcement for conformance with Drawings and Specifications, before each concrete placement, and correct as necessary.
- .3 Consultant's periodic review of selected areas of reinforcement are for verification of conformity to design concept and general arrangement only and shall not relieve Contractor of responsibility for quality control, errors, or omissions, or conformance with requirements of Contract Documents.

3.5 Defective Work

- .1 Incorrectly fabricated, misplaced or omitted reinforcement will be considered defective Work.
- .2 Replace or adjust defective reinforcement before concrete is placed as directed by Consultant.
- .3 Replace or strengthen concrete work which is deficient as a result of incorrectly fabricated, misplaced, or omitted reinforcement, which was not corrected before concrete was placed.
- .4 Pay for additional inspection and testing, redesign, corrective measures, and related expenses, if Work has proven to be deficient.

3.6 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 10 00 Concrete Forming and Accessories
- .2 Section 03 20 00 Concrete Reinforcing
- .3 Section 04 05 19 Masonry Anchorage and Reinforcing
- .4 Section 05 50 00 Metal Fabrications
- .5 Section 07 92 00 Joint Sealants
- .6 Section 10 80 00 Miscellaneous Specialties
- .7 Section 32 16 23 Sidewalks

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C260/C260M-10a (2016) Standard Specification for Air Entraining Admixtures for Concrete
 - .2 ASTM C309-11 Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete
 - .3 ASTM C330/C330M-14 Standard Specification for Lightweight Aggregates for Structural Concrete
 - .4 ASTM C494/C494M-15a Standard Specification for Chemical Admixtures for Concrete
 - .5 ASTM C881/C881M-14 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
 - .6 ASTM C1017/C1017M-13e1 Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
 - .7 ASTM C1107/C1107M-14a Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
 - .8 ASTM D412-16 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
 - .9 ASTM D624-00(2012) Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
 - .10 ASTM D1751-18 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
 - .11 ASTM D2240-15e1 Standard Test Method for Rubber Property—Durometer Hardness
- .2 American Concrete Institute (ACI)
 - .1 ACI 117-10, Standard Specifications for Tolerances for Concrete Construction and Materials.
 - .2 ACI 232.1R-12, Use of Raw or Processed Natural Pozzolans in Concrete
- .3 CSA Group (CSA)

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- .1 CSA-A23.1-14/ CSA-A23.2-14 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete.
 - .2 CSA A283-06 (R2011) Qualification Code for Concrete Testing Laboratories.
 - .3 CSA A3000-18 Cementitious Materials Compendium
 - .4 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 1010, Material Specification for Aggregates - Granular A, B, M and Select Subgrade Material.
 - .2 OPSS 1212, Material Specification for Hot-Poured Rubberized Asphalt Joint Sealing Compound.
- 1.4 Submittals
- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Samples: Submit for inspection, material samples of specified mix designs.
 - .3 Concrete Mix Designs:
 - .1 Submit concrete mix designs for review. Specify intended use for each mix design.
 - .2 Review of mix design does not relieve Contractor from responsibility for compliance with Contract Documents.
 - .3 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA A23.1. Mix design shall be adjusted to prevent alkali aggregate reactivity problems.
 - .4 Provide certification that plant, equipment, and all materials to be used in concrete comply with the requirements of CSA A23.1.
 - .5 Submit written requests for use of admixtures not specified, for site mixing of concrete, and for use of bonding agents.
 - .6 Submit in writing, proposed method of in-situ strength testing.
 - .4 Inspection Reports: Inspection and Testing Company shall:
 - .1 Submit written reports of inspection and tests.
 - .2 Distribute reports as follows:
 - .1 Consultant;
 - .2 Contractor.
 - .3 On concrete cylinder test reports, include:
 - .1 Specific location of concrete represented by sample
 - .2 Design strength.
 - .3 Unit weight of sample
 - .4 Class of exposure
 - .5 Aggregate size and mixtures incorporated
 - .6 Date, hour and temperature at time sample taken
 - .7 Percentage air content
 - .8 Test strength of cylinder

.9 Type of failure if test fails to meet specification.

1.5 Quality Assurance

- .1 Obtain a copy of CSA A23.1-14/A23.2 and maintain on site.
- .2 Pre-Construction Conference:
 - .1 At least 35 days prior to the start of concrete construction schedule, conduct a meeting to review proposed mix designs and to discuss detailed requirements of the proposed concrete operations. Review requirements for submittals, coordination, and availability of materials. Establish work progress and sequencing schedules and procedures for material testing, inspection and certifications.
- .3 Source Quality Control:
 - .1 Both source quality control, and field quality control specified in Article 1.5.4, may be performed by an Inspection and Testing Company appointed by Consultant.
 - .2 Review provided by Inspection and Testing Company does not relieve the Contractor of his sole responsibility for quality control over Work. Performance or non- performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.
 - .3 Inspection and Testing Company shall be certified under CSA A283, Qualification Code for Concrete Testing Laboratories, for Category 1 Certification.
 - .4 Payment for specified Work performed by Inspection and Testing Company will be made from Cash Allowance.
 - .5 Payment for additional tests (including testing of structure and its performance and load testing) required by changes of materials or mix design requested by Contractor, and failure of completed Work to meet specified requirements, shall be made at Contractor's expense.
 - .6 Perform Work of source quality control in accordance with CSA A23.2 and to include:
 - .1 Verification that ready-mix supplier is qualified to supply concrete in accordance with Specification.
 - .2 Review of proposed concrete mix designs.
 - .3 Sampling, inspection, and testing of materials as may be required.
- .4 Field Quality Control:
 - .1 Inspection and Testing Company, when appointed as specified for Source Quality Control, shall perform sampling, inspection and testing of concrete work at site.
 - .2 Perform sampling, inspection and testing in accordance with CSA A23.2, and to include:
 - .1 Making of standard slump tests.
 - .2 Obtaining of three standard specimens for strength tests from each 100 m of concrete, or fraction thereof, of each mix design of concrete placed in any one day. In addition, for slabs-on-grade, obtain beam specimens for determination of modulus of rupture.
 - .3 Verification that test specimens are stored within an enclosure, maintained at specified temperatures.
 - .4 Making compression tests of each set of three specimens, one at 7 days and two at 28 days; modulus of rupture tests at 90 days.

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- .5 Verification of air content of air-entrained concrete.
 - .1 For Class of exposure F-1, and C-2, test at frequency in accordance with CSA A23.1.
 - .2 Make first test before placing any concrete.
 - .3 After stable air content has been established, frequency of tests will be determined by Consultant.
 - .4 For other Classes of exposure, test at time of obtaining strength test specimens.
 - .3 Inspection for Tolerances:
 - .1 Confirm that concrete work meets specified tolerance requirements.
 - .2 Use the elevation survey records of elevations of finished concrete surfaces specified in Section 03 10 00 and this section as basis for judging compliance.
 - .3 Use approved aluminum straightedge to judge compliance with specified slab tolerances, except use dipstick equipment where F-number tolerance is specified.
 - .4 Slabs-on-Grade:
 - .1 Observe application of curing compound to sample slab, recording rate of application.
 - .2 Monitor on a random basis acceptable to the Consultant, that slab is being saw cut before slab temperature starts to fall.
 - .3 Qualifications: Floor finishing shall be undertaken only by contractors with at least 10 years of experience.
- 1.6 Tolerances
- .1 In accordance with ACI 117-10 and CSA A23.1.
 - .2 Difference between elevation of high point and low point in specified area not to exceed:
 - .1 In any bay up to 100 m²: 12 mm.
 - .2 In any bay up to 400 m²: 25 mm.
 - .3 Straightedge method: Finish floor slabs to meet following tolerances when measured at 72 +/- 12 hours after completion of floor finishing, before shores are removed from formed slabs, by placing a freestanding unlevelled straight edge anywhere on slab and allowing it to rest on two high points. Gap between straightedge placed on two high points and slab not to exceed:
 - .1 3 metre straightedge: 8 mm (Class A).
 - .2 2 metre straightedge: 4 mm.
- 1.7 Shipping, Handling and Storage
- .1 Refer to Section 01 61 00 – Common Product Requirements.
- 1.8 Job Conditions
- .1 Protect floor slabs, and concrete surfaces exposed to view or on which finishes are to be applied, from grease, oil, and other soil which will affect the appearance of the concrete, or impair the bond of finish material.
 - .2 Environmental Conditions: In addition to Cold Weather and Hot Weather Requirements of CSA A23.1, the following shall apply to Work of this Section:

- .1 Provide protection or heat, or both, so that temperature of concrete at surfaces is maintained at not less than 21 ° C for three days after placing, not less than 10 ° C for the next two days and above freezing for the next two days.
- .2 Do not permit alternate freezing and thawing for fourteen days after placing.
- .3 Vent exhaust gases from combustion type heaters to atmosphere outside protection enclosures.
- .4 Provide protection to maintain concrete continuously moist during curing period.
- .5 For field cured cylinders representing strength development of in-situ concrete, provide same specified hot and cold weather protection for storage of each concrete compression specimen as for concrete from which it was taken, until it is sent to testing laboratory.
- .6 Do not place concrete during rain. Should rain commence during placing, cover freshly placed concrete.
- .7 Do not place bonded toppings on rough slabs that are less than 15 °C.
- .8 Do not grout at ambient air temperatures or concrete surface temperatures less than 5 ° C, or when temperature is forecast to fall to less than 5 ° C within 24 hours of grouting.
- .9 Do not apply sealants at ambient air temperatures or concrete surface temperatures less than 5 ° C.

1.9 Project Records

- .1 Maintain record of all concrete pour related to time, date, delivery slip serial number and location of each concrete pour and identify related test cylinders. Keep records on site until project is completed.
- .2 Delivery Records: File duplicate copies of concrete delivery slips on which shall be recorded: supplier, serial number of slip, date, truck number, contractor, Project, Class of exposure, cementing materials content, air content, volume in load, and time of first mixing of aggregate, cementing materials and water.
- .3 Record Drawings:
 - .1 Record on a set of Drawings:
 - .1 founding elevations of all footings
 - .2 variations of foundation Work from that indicated on Drawings.
 - .2 Make record drawings available for Consultant's inspection at all times.

1.10 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 To meet specified requirements of referenced Standards.
- .2 Cement:
 - .1 Portland Cement: to CSA A3000.
 - .2 Cementitious Hydraulic Slag: to ACI 232.1R

- .3 Fine Aggregate: For slabs-on-grade, fineness modulus of fine aggregate to be between 2.7 and 3.1.
- .4 Coarse Aggregates:
 - .1 20 mm to 5 mm (No. 4 sieve) except as specified below.
 - .2 For slabs-on-grade 125 mm and thicker: 40 mm to 5 mm (No. 4 sieve); combine at least two of the single sizes specified in Table 5 Group II of CSA A23.1, one of which is to be 40 mm, to obtain maximum bulk density (unit weight) and optimum grading, in accordance with an approved procedure.
 - .3 For slabs-on-grade: Abrasion loss not to exceed 35%. Petrographic number of aggregate not to exceed 125 when tested in accordance with ASTM C295/C295M Standard Guide for Petrographic Examination of Aggregates for Concrete.
- .5 Admixtures:
 - .1 Conform to Reference Standards for chemical and air-entraining admixtures.
 - .2 Provide only admixtures that are free of chlorides.
 - .3 When requested, provide evidence acceptable to Consultant that superplasticizer does not increase shrinkage of concrete.
- .6 Premoulded Expansion Joint Filler:
 - .1 Bituminous impregnated fibre board conforming to ASTM D1751.
- .7 Bonding Agent: To ASTM C881/C881M, 100% reactive, 2 component, low viscosity, high modulus bonding adhesive.
- .8 Saw Cut Filler: Semi-rigid flexible epoxy joint filler shall be a two-component, pourable, moisture insensitive formulation and possess the following characteristics:
 - .1 Compliance to ACI 302.1R for joint fillers used in control and construction joints.
 - .2 Solids, % by weight, ASTM D1259: 100%.
 - .3 Tensile adhesion to concrete 24 ° C, ASTM D5329: 290 psi.
 - .4 Shore D Hardness (7 days), ASTM D2240: 60.
 - .5 Shore A Hardness (7 days), ASTM D2240: 95.
 - .6 Tensile Strength, ASTM D638.
 - .1 24 ° C, (3 days): 4550 kPa.
 - .2 24 ° C, (7 days): 5310 kPa.
 - .7 Elongation, ASTM D638-10.
 - .1 24 ° C, (3 days): 72%.
 - .2 24 ° C, (7 days): 53%
 - .8 Water Absorption 24 ° C (24 hrs.), ASTM D570: 0.56% by weight.
- .9 Sealant: Refer to Section 07 92 00 – Joint Sealants
- .10 Mechanical Anchors: 'Kwik' Bolts, 'Cinch' Anchors or Parabolts.

2.2 Concrete Mixes

- .1 Ready Mix, with 28 day compressive strength as indicated on Drawings.

- .2 Design concrete mix in conformance with CSA A23.1, Tables 1, 2, 5 (Alternative 1) and 17, and as follows. Provide concrete meeting water/cementing materials ratio and air content of Table 14 in accordance with Class of exposure specified in following sub-paragraphs, and minimum strength specified on Drawings. Note that concrete designed in accordance with water/cementing materials ratio of Table 14 may yield strength exceeding minimum strength specified on Drawings.
 - .1 Class of exposure C-2 with 25 percent Portland cement replaced with cementitious hydraulic slag: for pavements, sidewalks, curbs and gutters.
 - .2 Class of exposure F-2 with 25 percent Portland cement replaced with cementitious hydraulic slag: for grade beams, and for exposed exterior beams, columns, walls and slabs.
 - .3 Slabs-on-Grade:
 - .1 Use type 20 Portland cement, or replace 35 percent type Portland cement with cementitious hydraulic slag.
 - .2 When mean daily temperature exceeds 25 ° C at time of placement, replace 25 percent of type 20 cement, or 50 percent of type 10 cement, with cementitious hydraulic slag.
 - .3 Use water/cementing materials ratio 0.45 maximum.
 - .4 Use aggregates specified in paragraphs 2.1.3.
 - .5 Cementing materials content 325 kg/m.
 - .6 Modulus of rupture 3.5 MPa average, 3.0 MPa minimum.
 - .7 Slump at delivery, before addition of superplasticizer, 50 mm; add superplasticizer, not water, to bring slump to level acceptable to floor finisher for placement.
 - .4 Interior Concrete, other than specified above, and not exposed to freezing and thawing or the application of deicing chemicals: select water/cementing materials ratio and cementing materials content on basis of strength, workability, and finishing requirements.
- .3 Submit evidence, and material samples, if requested, acceptable to the Inspection and Testing Company, to verify that the proposed concrete mix design will produce specified quality of concrete.
- .4 List all proposed admixtures in mix design submission. Do not change or add admixtures to approved design mixes without Consultants approval.
- .5 Concrete Weight: Air dry unit weight: minimum 2,300 kg/m; adjusted proportionally for maximum air content listed in CSA A23.1, Clause 15, Table 10.

2.3 Admixtures

- .1 Chemical Admixture: Incorporate water-reducing admixture, type WN, in all concrete.
- .2 Air Entraining Agent: Incorporate air-entraining agent in addition to chemical admixture in concrete of relevant Class of exposure, in accordance with CSA A23.1, Clause 15, Table 10.
- .3 Chloride: Do not use calcium chloride or admixtures containing chloride in concrete.

2.4 Premixed Grout

- .1 Non-Shrink Metallic: Non-catalyzed metallic grout to ASTM C1107, Compressive strength at 28 days: 48 MPa.
- .2 Non-Shrink, Non Stain, Non-Metallic: to ASTM C1107. Compressive strength at 28 days: 59 MPa.
- .3 Flowable Grout: High-tolerance Non-shrink, Non-metallic shrinkage compensating grout to ASTM C1107. Compressive strength at 28 days: 59 MPa.

PART 3 EXECUTION

3.1 Examination

- .1 Before starting this work, examine work done by others which effects this work.
- .2 Notify Consultant of any condition which would prejudice proper completion of this work.
- .3 Commencement of work implies acceptance of existing conditions.
- .4 Confirm that surfaces on which concrete is to be placed are free of frost and water before placing.
- .5 Confirm that reinforcement, dowels, control joints, inserts and all other built in work are in place and secured.

3.2 Treatment of Formed Surfaces

- .1 Conform to the requirements of CSA A23.1, and as additionally specified herein.
- .2 Treat concrete surfaces which will be exposed or painted in the completed building to provide a "Smooth Rubbed Finish" in accordance with CSA A23.1, uniform in colour and texture.
- .3 Plugs at Recessed Ties:
 - .1 Clean tie holes to remove all foreign matter.
 - .2 Coat plugs by dipping in adhesive and insert in hole.
 - .3 Remove excess adhesive immediately with thinner which will not stain concrete, as recommended by manufacturer.
- .4 Obtain Consultant's approval of finished exposed concrete and grind or otherwise correct to the satisfaction of the Consultant.

3.3 Placing Concrete

- .1 Place concrete in accordance with requirements CSA A23.1.
- .2 Notify Consultant and inspection and testing firm at least 24 hours prior to commencement of concrete placing operation and 24 hours before wall forms are closed in.
- .3 Do not place concrete in water or open frozen surfaces.
- .4 Remove contaminants which lessen concrete bond to reinforcement before concrete is placed.
- .5 Maintain accurate records of cast in place concrete items. Record date, location of pour, quantity, air temperature and test samples taken.
- .6 Ensure that reinforcement, inserts, embedded items, formed expansion joints and the like, are not disturbed during concrete placement.
- .7 Provide construction joint as indicated on the drawings. Ensure dowels are adequately anchored and placed at right angles to the joint before placing concrete.
- .8 Place floor slabs to depth indicated on the drawings with 25 MPa minimum concrete unless otherwise noted on drawings but consistent with minimum cement content specified for exposed floors in this specification.
- .9 Sloping Surfaces and Slabs: commence concrete placement at bottom of sloping surfaces.
- .10 Obtain Geotechnical Engineer's confirmation that thickness, elevation and compaction of sub-grade meets specifications before placing concrete.

3.4 Finishing Concrete

- .1 Perform finishing operations on plastic concrete surfaces in accordance with CSA A23.1, and as specified herein.
- .2 Refer to the drawings for floor finishes and coverings.
- .3 Screed the top of rough floor slabs to an even level or sloping surface at the proper elevation to receive the finish or topping specified on the drawings and in finish schedule.
- .4 Provide a smooth steel trowel finish on all areas scheduled to receive a covering, or painted finish.
- .5 Exposed Floor Surfaces: Provide hard, smooth, dense, steel troweled surface, free from blemishes, and of uniform appearance.
- .6 Non-slip Surfaces: Provide swirl trowel or broom finish of texture acceptable to Consultant.
- .7 Curb Edging: Finish external corners of curbs rounded and smooth.

3.5 Curing

- .1 Cure concrete in accordance with CSA A23.1

3.6 Grouting

- .1 Mix prepackaged grout with water in accordance with manufacturer's printed instructions.
- .2 Dampen concrete surfaces immediately before installing grout.
- .3 Use non-shrink and shrinkage-compensating grouts only when grout will be contained against expansion and self-disintegration.
- .4 Slope grout beyond edge of plate at 45 degrees.
- .5 Provide same environmental protection and curing as specified for concrete.

3.7 Joint Sealant

- .1 Apply sealant to thoroughly dry surfaces only, at ambient air temperatures above 5 ° C.
- .2 Provide sealant on top of joint filler with a polyethylene bond breaker between joint filler and joint sealant applied in accordance with manufacturer's direction.
- .3 Confirm that preformed joint filler and backer rod are compatible with sealant.
- .4 Caulk joints in accordance with the following:
 - .1 Do not commence joint preparation until concrete is at least 28 days old.
 - .2 Thoroughly clean sides of joints with mason's router, or power saw, equipped with double blade where necessary to suit joint width.
 - .3 Blow clean with compressed air with oil trap on line, or vacuum clean.
 - .4 Install backer rod of diameter 25 percent greater than joint width, and type recommended by sealant manufacturer to be compatible with sealant. Locate backer rod to provide for sealant depth of one-half joint width, but not less than 12 mm.
 - .5 Prime joint if required, as recommended by sealant manufacturer.

3.8 Defective Work

- .1 Variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by approved methods will be considered defective work.
- .2 Replace or modify concrete that is out of place or does not conform to lines, detail or grade as directed by the Consultant.

- .3 Replace or repair defectively placed or finished concrete as directed by the Consultant.
 - .4 Testing and Replacement of Deficient Concrete in Place:
 - .1 Pay for additional testing and related expenses if concrete has proven to be deficient.
 - .2 Replace or strengthen deficient concrete work as directed by the Consultant, and pay for all testing and related expenses for replaced work until approved by the Consultant.
- 3.9 Cleaning
- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
 - .2 Clear away from the building site excess and waste materials and debris resulting from Work of this Section.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 04 22 00 Concrete Unit Masonry

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A153/A153M-16a Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- .2 CSA Group (CSA)
 - .1 CSA A23.1-14/A23.2-14 Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
 - .2 CSA S304-14 Design of Masonry Structures.
 - .3 CAN/CSA A371-14 Masonry Construction for Buildings.
 - .4 CSA G30.3-M1983 (R1998) Cold-Drawn Steel Wire for Concrete Reinforcement.
 - .5 CSA G30.18-09 (R2014) Carbon Steel Bars for Concrete Reinforcement
 - .6 CSA W186-M1990 (R2016) Welding of Reinforcing Bars in Reinforced Concrete Construction
- .3 American Concrete Institute (ACI)
 - .1 Detailing Manual
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 Reinforcing Steel Manual of Standard Practice

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.
- .3 Shop Drawings:
 - .1 Submit shop drawings for all masonry reinforcing. Include placing drawings, bar lists and details. Indicate clearly reinforcing bar sizes, spacing, bending details, lap details, dowels to adjacent construction location and quantities of reinforcement.
 - .2 Prepare placing drawings and bar lists in accordance with the American Concrete Institute (ACI) Detailing Manual, and the Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice, the typical details included with Contract Documents.
 - .3 Prepare placing drawings to minimum scale of 1:50.
 - .4 Submit placing drawings and bar lists sufficiently detailed and dimensioned to permit correct placement of reinforcement and accessories without reference to architectural or structural Drawings.
 - .5 Show reinforcement, including dowels, in elevation on placing drawings for wall reinforcement.

- .6 Show cover to reinforcement
- .7 Show location of construction joints.

1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.6 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 All metal components: hot dipped zinc galvanized to CSA S304 unless otherwise indicated.
- .2 Bar Reinforcement: To CSA A371 and CSA G30.18, grade 400R, deformed billet steel bars.
- .3 Wire Reinforcement: To CSA A371 and CSA G30.3.
 - .1 Interior walls: hot dipped galvanized to CSA S304
 - .1 4.76 mm wire diameter hot dipped galvanized to CSA S304 for interior bearing walls.
 - .2 3.66 mm wire diameter bright wire finish, standard duty for interior non-bearing walls and partitions
 - .3 Truss Type: Blok-Trus BL-30 by Blok-Lok Ltd. for non-vertically reinforced walls
 - .4 Ladder Type: Blok-Trus BL-10 by Blok-Lok Ltd. for vertically reinforced walls

2.2 Fabrication

- .1 Fabricate reinforcing in accordance with CSA A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Ontario.
- .2 Obtain Consultant's approval for locations of reinforcement splices other than shown on placing drawings.
- .3 Upon approval of Consultant, weld reinforcement in accordance with CSA W186.
- .4 Ship reinforcement clearly identified in accordance with drawings.

PART 3 EXECUTION

3.1 Installation

- .1 Install masonry reinforcement and anchors in accordance with CSA A370, CSA A371, CSA A23.1 and CSA S304 unless indicated otherwise.

3.2 Reinforcement

- .1 Unless otherwise noted, all masonry walls shall be reinforced with joint reinforcement.
- .2 Reinforcement shall be installed in the first and second bed joints, 200 mm apart immediately above lintels and below sill at openings, and in bed joints at 400 mm vertical intervals elsewhere. Reinforcement in the second bed joint above or below openings shall extend 600 mm beyond the jambs. All other reinforcement shall be continuous except that it shall not pass through vertical masonry control joints. Side rods shall be lapped at least 150 mm at splices.

- .3 Use prefabricated corner and tee sections for continuous reinforcement at corners and intersecting walls.
 - .4 Vertical reinforcement shall have a minimum clearance of 13 mm from the masonry and not less than one bar diameter between bars.
 - .5 All block cores containing vertical reinforcing and/or anchor bolts shall be solidly filled with non-shrink grout.
 - .6 Place reinforcement and ties in grout spaces prior to grouting.
 - .7 Cleanouts: Provide cleanouts in the bottom course of masonry for each grout pour when the grout pour height exceeds 1.5 m.
 - .8 Construct cleanouts so that the space to be grouted can be cleaned and inspected. In solid grouted masonry, space cleanouts horizontally a maximum of 800 mm on center.
 - .9 Construct cleanouts with an opening of sufficient size to permit removal of debris. The minimum opening dimension shall be 76 mm.
 - .10 After cleaning, close cleanouts with closures braced to resist grout pressure.
- 3.3 Reinforced Lintels and Bond Beams
- .1 Reinforce masonry lintels and bond beams as indicated.
 - .2 Place and grout reinforcement in accordance with CSA S304.
- 3.4 Metal Anchors
- .1 Do metal anchors as indicated.
- 3.5 Lateral Support and Anchorage
- .1 Do lateral support and anchorage in accordance with CSA S304 and as indicated.
- 3.6 Control Joints
- .1 Terminate reinforcement 25 mm short of each side of control joints unless otherwise indicated.
 - .2 Control joints shall be stepped to avoid cutting lintel beams. Under no circumstance shall the control joints be placed to compromise the bearing for the lintel.
- 3.7 Field Bending
- .1 Do not field bend reinforcement except where indicated or authorized by Consultant.
 - .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
 - .3 Replace bars which develop cracks or splits.
- 3.8 Field Touch Up
- .1 Touch up damaged and cut ends of galvanized reinforcement steel with compatible finish to provide continuous coating.
- 3.9 Cleaning
- .1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 10 00 Concrete Forming and Accessories
- .2 Section 03 20 00 Concrete Reinforcing
- .3 Section 03 30 00 Cast-in-Place Concrete
- .4 Section 04 05 19 Masonry Anchorage and Reinforcing
- .5 Section 05 50 00 Metal Fabrications
- .6 Section 06 10 00 Rough Carpentry
- .7 Section 07 84 00 Firestopping
- .8 Section 07 92 00 Joint Sealants
- .9 Section 08 11 00 Metal Doors and Frames

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C90-16a Standard Specification for Loadbearing Concrete Masonry Units
 - .2 ASTM C129-17 Standard Specification for Nonloadbearing Concrete Masonry Units
 - .3 ASTM C150/C150M-19a Standard Specification for Portland Cement
 - .4 ASTM C207-18 Standard Specification for Hydrated Lime for Masonry Purposes.
 - .5 ASTM D2240-15e1 Standard Test Method for Rubber Property—Durometer Hardness.
 - .6 ASTM D5249-10 (2016) Standard Specification for Backer Material for Use with Cold and Hot Applied Joint Sealants in Portland Cement Concrete and Asphalt Joints.
- .2 CSA Group (CSA)
 - .1 CSA A23.1-14/A23.2-14 Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
 - .2 CSA A165 Series-14 (R2019) CSA Standards on Concrete Masonry Units.
 - .3 CSA A179-14 (R2019) Mortar and Grout for Unit Masonry
 - .4 CSA A370-14 (R2018) Connectors for Masonry.
 - .5 CSA A371-14 (R2019) Masonry Construction for Buildings.
 - .6 CSA S304-14 (R2019) Design of Masonry Structures.
- .3 Canadian Concrete Masonry Producers Association (CCMPA) Quality Assurance Program.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Data: Submit manufacturer's printed product literature, specifications and data sheets

- .3 Submit shop drawings for all masonry reinforcing. Include placing drawings, bar lists and details. Indicate clearly reinforcing bar sizes, spacing, bending details, lap details, dowels to adjacent construction location and quantities of reinforcement and connectors.
- .4 Submit engineered temporary bracing design drawings for temporary support of masonry walls. Drawings shall be prepared by, and bear the seal of a Professional Engineer, licensed in the Province of Ontario.
- .5 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 Quality Assurance

- .1 The masonry sub-contractor shall have a minimum of five years of continuous documented Canadian experience in work of the type and quality shown and specified. Proof of experience shall be submitted when requested by the Consultant and shall be subject to the approval of the Consultant.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Materials shall be kept clean and dry.
- .4 Deliver cement, lime and mortar ingredients with manufacturer's seal and labels intact.
- .5 Cementitious material and aggregates shall be stored in accordance with the requirements of CSA A23.1.
- .6 Exposed units which become stained or chipped, surface marked or scratched, and materials which are affected by inadequate protection shall be replaced, at no additional expense to the Owner.

1.7 Project Conditions

- .1 Provide heat enclosures and heat as required.
- .2 Work to be undertaken shall be carried out according to CAN3-A371, Clause 5.15.2.
- .3 Maintain temperature of mortar between 5 ° C and 50 ° C until batch is used.
- .4 Keep masonry dry using secure waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven snow, rain and dirt, until masonry work is completed and protected by flashings or other permanent construction.
- .5 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.

1.8 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Masonry Units: Concrete Block: Modular, conforming to CCMPA requirements and CSA A165.1.
 - .1 H/20/A/M concrete masonry units to be used at all load bearing masonry walls.
 - .2 H/15/A/M concrete, masonry units, at all other locations unless noted otherwise.

- .3 Refer to drawings for Fire Resistance Ratings. Type of concrete and block to conform to Table 5.0, Fire Resistance Rating of Concrete Block in Hours, of the Canadian Concrete Masonry Producers Association Handbook.
- .4 Special shapes: provide special shapes indicated or required including bullnose and corner blocks, base blocks, fillers, and the like as may be required. Provide purpose made shapes for lintels and bond beams.
- .5 Exposed block shall all be made by one manufacturer and shall be uniform in colour, shade and texture.
- .2 Bar Reinforcement, wire reinforcement, and ties: as specified in Section 04 05 19 - Masonry Anchorage and Reinforcing.
- .3 Control Joint Filler: to ASTM D5249-10, Type 1, Round, flexible, continuous-length, nonabsorbent, nongassing, nonstaining, and nonshrinking. Extruded from a cross-linked polyethylene. Flexible foam, heat-Resistant Backer Rod. 9.5 mm thick by width of wall.
- .4 Mortar: Conforming to CSA A179.
 - .1 Use same brand of material and source of aggregate for entire project.
 - .2 Aggregate: CSA A179, fine grain aggregates.
 - .3 Cement: normal Portland to ASTM C150, Type 10.
 - .4 Water shall be clean, potable and free of deleterious amounts of acid, alkalies, or organic materials.
 - .5 Hydrated Lime: Type 'S' to ASTM C207.
 - .6 Type 'S' mortar shall be used for all concrete block masonry work.
 - .7 Proprietary Mortar Mixes: conform to mix requirements specified
 - .8 Mortar colour for concrete unit masonry work shall be grey.
 - .9 Admixtures of any kind are not allowed.
- .5 Grout: to CSA A179, Table 3: Premixed, non-shrink non-metallic grout.
- .6 Other materials not specifically described but required for a complete and proper installation of masonry, shall be as selected by the Contractor subject to approval by the Consultant

2.2 Mixes

- .1 Mixing: Prepare and mix mortar materials under strict supervision, and in small batches only for immediate use.
- .2 Mix proprietary mortars in strict accordance with manufacturer's instructions to produce the specified mortar types in accordance with CSA A179. Do not use re-tempered mortars.
- .3 Take representative samples for testing consistency of strength and colour according to CSA A179.

2.3 Accessories

- .1 Mechanical Fasteners: As recommended by manufacturer of material to be fastened, and in accordance with the reference standards, corrosion resistant.

PART 3 EXECUTION

3.1 Examination

- .1 Examine work of other trades for defects or discrepancies and report same in writing to Consultant.
- .2 Installation of any part of this work shall constitute acceptance of such surfaces as being satisfactory.

3.2 General

- .1 Do masonry work in accordance with CSA A371 except where specified otherwise.
- .2 A competent masonry foreman shall supervise and direct the work and only skilled masons shall execute the work of this Section.
- .3 Coordinate work of this Section with others such as, field welding of anchors to steel work, insulation application, and the like. Prepare all items for built-in as the work proceeds, either supplied and installed by other trades or installed under this Section.
- .4 Unless otherwise indicated on the drawings, all interior masonry partitions shall extend from floor level to the underside of floor or roof structures above.

3.3 Installation

- .1 Build masonry plumb, level, and true to line, with vertical joints in alignment.
- .2 Lay out coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.
- .3 Lay block with webs to align plumb over each other with thick ends of webs up. The top course of all partitions which do not pass through a ceiling or up to the underside of a roof deck shall have the open cells filled solid.
- .4 Cut exposed block with power driven abrasive cutting disc or diamond cutting wheel for flush mounted electrical outlets, grilles, pipes, conduits, leaving 3 mm maximum clearance.
- .5 Fill all vertical and bed joints, including plain end faces, through the entire wall thickness solidly with mortar.
- .6 Do not break bond of exposed walls where partitions intersect and if bond would show through on exposed face of walls. Bond these partitions to walls they intersect with prefabricated intersection masonry reinforcement in each course.
- .7 Bond intersecting block walls in alternate courses.
- .8 Terminate non load bearing walls within 20 mm of structure above unless indicated otherwise.
- .9 Where walls are pierced by structural members, ducts, pipes, fill voids with mortar to within 20 mm of such members.
- .10 Buttering corners of units, throwing mortar droppings into joints, deep or excessive furrowing of bed joints, is not permitted. Do not shift or tap units after mortar has taken initial set. Where adjustment must be made after mortar has started to set, remove mortar and replace with fresh supply.
- .11 Do not wet concrete masonry before or during laying in wall.
- .12 Bed and vertical joints shall be evenly and solidly filled with mortar.
- .13 Provide reinforced bond beams where indicated on structural drawings.
- .14 Provide vertical reinforcement as indicated on structural drawings. Fill all reinforced cores solid with grout as indicated. Provide cleanout port at bottom of each grouted core when required by Consultant.

3.4 Exposed Masonry

- .1 Do not use chipped, cracked or stained, and otherwise damaged units or unsatisfactory material in exposed and load bearing masonry walls.
- .2 Lay all joints 10 mm thick (uniform). All joints shall be full of mortar except where specifically designated to be left open.
- .3 All joints shall be slightly concave. Use sufficient force to press mortar tight against masonry units on both sides of joints. Remove excess material or burrs left after jointing by means of a trowel or rubbing with burlap bag.
- .4 Provide bullnose block at all exposed masonry corners.

3.5 Tolerances

- .1 Tolerances in notes to Clause 5.3 of CSA A371 apply.

3.6 Reinforcement and Connectors

- .1 Refer to Section 04 05 19 - Masonry Anchorage and Reinforcing.

3.7 Concrete Masonry Lintels

- .1 Refer to Section 04 05 19 - Masonry Anchorage and Reinforcing.
- .2 Lintels in non-load-bearing walls shall be constructed with special bond or lintel block units unless shown otherwise on plans. Lintels shall bear 200 mm minimum and bearing shall be isolated with two layers of heavy asphalt coated paper.
- .3 Reinforcing steel in lintels shall be 2 x 20 M bars minimum specified under Section 04 05 19 - Masonry Anchorage and Reinforcing, or as noted on drawings.
- .4 Concrete fill for lintels shall be 25 MPa or as noted on the drawings. Concrete shall be as specified in Section 03 30 00.

3.8 Loose Steel Lintels

- .1 Install loose steel lintels. Centre over opening width.
- .2 Lintels supplied under Section 05 50 00 – Metal Fabrications.

3.9 Control Joints

- .1 Provide continuous joints as indicated and at spacing not to exceed 6000 mm c/c unless noted otherwise on drawings.
- .2 Break vertical mortar bond with extruded neoprene gasket or building paper.
- .3 Prime control joint to prevent drying out of caulking material.

3.10 Support of Loads

- .1 Use 25 MPa concrete unless specified otherwise on the Drawings, where concrete fill is used in lieu of solid units.
- .2 Use grout to CSA A179 where grout is used in lieu of solid units.
- .3 Install building paper below voids to be filled with grout. Keep paper 25 mm back from face of units.

3.11 Lateral Support and Anchorage

- .1 Do lateral support and anchorage of masonry in accordance with CSA S304.1 and as indicated.

3.12 Grouting

- .1 Grout masonry in accordance with CSA S304.1 and as indicated.

3.13 Temporary Wall Bracing

- .1 Design and provide all required temporary engineered wall bracing.
- .2 Brace masonry walls to resist wind pressure and other lateral loads during construction period.
- .3 Provide temporary bracing of masonry work during and after erection until mortar has cured and permanent lateral support is in place

3.14 Built-ins

- .1 Build in items required to be built into masonry and provided by other Sections, including bearing plates, door frames, anchor bolts, sleeves and inserts. Build in items to present a neat, rigid, true and plumb installation. Leave wall openings required for ducts, grilles, pipes and other items.
- .2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
- .3 Brace door jambs to maintain plumb. Fill voids between masonry and metal frames with masonry mortar or insulation, as indicated on drawings or as required to provide a neat, finished appearance.
- .4 Set wall plates on masonry in non-shrink grout in accordance with manufacturer's instructions.
- .5 Do all cutting, fitting, drilling, patching and making good for other trades in masonry work.

3.15 Protection

- .1 Protect masonry units from damage resulting from subsequent construction operations.
- .2 Use protection materials and methods which will not stain or damage masonry units.
- .3 Remove protection materials upon Substantial Performance, or when risk of damage is no longer present.

3.16 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Allow mortar droppings on unglazed concrete masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block and finally by brushing.
- .3 Remove mortar from concrete floor slabs and leave entire area vacuum clean.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 04 05 19 Masonry Anchorage and Reinforcing
- .3 Section 04 22 00 Concrete Unit Masonry
- .4 Section 06 10 00 Rough Carpentry
- .5 Section 06 20 00 Finish Carpentry
- .6 Section 09 91 13 Exterior Painting
- .7 Section 09 21 23 Interior Painting

1.3 References

- .1 The Ontario Building Code.
 - .1 MMAH Supplementary Standard SB-8, September 14, 2012. Design, Construction and Installation of Anchorage Systems for Fixed Access Ladders.
- .2 ASTM International (ASTM)
 - .1 ASTM A53/A53M-20 Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.
 - .2 ASTM A123/A123M-17 Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A153/A153M-16a Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - .4 ASTM A240/A240M-20 Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
 - .5 ASTM A264-12(2019) Standard Specification for Stainless Chromium-Nickel Steel-Clad Plate
 - .6 ASTM A269/A269M-15a (2019) Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
 - .7 ASTM A276/A276M-20 Standard Specification for Stainless Steel Bars and Shapes
 - .8 ASTM A307-14e1 Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - .9 ASTM A312/A312M-19 Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
 - .10 ASTM A380/A380M-17 Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems
 - .11 ASTM A385/A385M-20 Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
 - .12 ASTM A511/A511M-20 Standard Specification for Seamless Stainless Steel Mechanical Tubing and Hollow Bar
 - .13 ASTM A1008/A1008M-20 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High Strength Low Alloy, High Strength Low Alloy with Improved Formability,

Solution Hardened, and Bake Hardenable

- .14 ASTM A1011/A1011M-18a Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
- .15 ASTM C1107/C1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
- .16 ASTM D1187/D1187M-97(2018) Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal
- .17 ASTM D6386-16a Standard Practice for Preparation of Zinc (Hot Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting
- .18 ASTM F593-17 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- .19 ASTM F594-09(2020) Standard Specification for Stainless Steel Nuts
- .20 ASTM F3125/F3125M-19e2 Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions
- .3 CSA Group (CSA)
 - .1 CSA G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA-S16.1-M Limit States Design of Steel Structures.
 - .4 CSA S136-12 Cold Formed Steel Structural Members.
 - .5 CSA W47.1-09 (R2014) Certification of Companies for Fusion Welding of Steel Structures.
 - .6 CSA W59-18 Welded Steel Construction
 - .7 CSA W178.1-18 Certification of Welding Inspection Organizations
 - .8 CSA W178.2-18 Certification of Welding Inspectors
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.40-97 Anticorrosive Structural Steel Alkyd Primer
 - .2 CAN/CGSB 1.181-99 Ready Mixed, Organic Zinc Rich Coating.
- .5 Canadian Sheet Steel Building Institute (CSSBI)
- .6 Steel Structures Painting Council, Systems and Specifications Manual.
 - .1 CISC/CPMA 1-73a-1975 A Quick drying One-coat Paint for Use on Structural Steel.
 - .2 CISC/CPMA 2-75-1975 A Quick Drying Primer for Use on Structural Steel.
- .7 American Welding Society AWS D1.6, Structural Welding Code - Stainless Steel.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit Shop and Erection Drawings for review.
 - .2 Verify site dimensions before proceeding with shop fabrication and to suit field conditions and field openings.

- .3 Show and describe in detail all the work of this Section including large scale detail of members and materials, of connection and jointing details, and of anchorage devices, dimensions, thicknesses, description of materials, metal finishing, as well as all other pertinent data and information, including type, size and description of all fasteners and anchors.
- .4 Indicate connections to building structure.
- .5 Shop drawings for all metal fabrications shall be stamped and signed by a Professional Engineer registered in the Province of Ontario. Each submission of the shop drawings shall bear the seal of the Engineer.

1.5 Qualifications

- .1 Work of this Section shall be executed by a firm thoroughly conversant with laws and regulations which govern and capable of workmanship of best grade of modern shop and field practice known to recognized manufacturers specializing in this work and having a minimum ten (10) years proven experience in the fabrication of high quality metal fabrications. Use workmen skilled in work of this Section.
- .2 Welding shall be performed by trades persons certified by The Canadian Welding Bureau under CSA Standard W47.1.

1.6 Design Requirements

- .1 Design metal stair, handrail, guardrail and ladder construction and connections to OBC vertical and horizontal live load requirements.
- .2 Handrails and guards shall conform to Article 3.4.6.5 and 3.4.6.6 of the Ontario Building Code.
- .3 Stairs shall be designed and constructed to safely sustain a live load of 4.8 kPa evenly distributed over treads and landings with a maximum deflection of L/360. Furnish all supporting members required to connect to the building.
- .4 Design service access ladders to Ministry of Labour requirements.
- .5 Access ladders shall be designed to the minimum requirements noted on the drawings and MMAH Supplementary Standard SB-8, whichever is more stringent. This shall include through-bolting anchors at masonry walls.
- .6 Except where specified otherwise, and where required by applicable codes, detail and fabricate stairs to NAAMM Metal Stairs Manual.

1.7 Examination

- .1 All dimensions shall be taken from the drawings and checked against the building. Be responsible for the correctness of such measurements and report to the Consultant in writing all discrepancies between measurements at building and those shown on drawings prior to commencing work. Verify location of anchor bolts and embedded steel and ensure that work prepared by other trades is at a proper elevation, on line, level and true.

1.8 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Label, tag or otherwise mark work supplied for installation by other Sections to indicate its function, location and shop drawing description.
- .3 Protect work from damage and deliver to a location at the site in order to meet the scheduling requirements.

1.9 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Structural Steel Sections and Steel Plate: CSA G40.20-13/G40.21-13, Grade 350W.
- .2 Architectural and Miscellaneous Mild Steel: CSA G40.20-13/G40.21-13, Grade 300W.
- .3 High Strength Bolts and Nuts: ASTM F3125. Dimensions, sizes, thread, strength, quality and type of items shall be designed for the work intended. Exposed fasteners and anchors shall be same material, colour and finish as the metal to which they are applied.
- .4 Sheet Steel: (Commercial Quality) ASTM A1008 stretcher leveled or temper rolled.
- .5 Steel Pipe: ASTM A53 Schedule 40, Grade B.
- .6 Welding Materials: CSA W59.
- .7 Welding Electrodes: CSA W48 Series.
- .8 Grout: non-shrink, non-metallic, non-stain, flowable, to ASTM C1107, 15 MPa at 24 hours.
- .9 Isolation Coating: Alkali resistant bituminous paint to ASTM D1187.
- .10 Adhesive Anchors: HILTI or Rawl Epoxy Adhesive Anchors sized to suit loading conditions, suitable for substrate. Adhesive to be low VOC type (maximum 250 g/l) to SCAQMD Rule 1168-03, Adhesives and Sealants Applications.

2.2 Finishes

- .1 Primers: All primers for metal fabrications are to be factory applied under the requirements of this Section. Refer to Finish Schedules in Section 09 91 23 for types of primers required for each application. Colour to be grey.
- .2 Pre Paint Finish: For galvanized surfaces to be exposed and finish painted, to ASTM D6386.
- .3 Galvanizing: hot dipped with zinc coating to CSA G164, ASTM A123 or ASTM A385.
 - .1 Bolts, nuts, washers, iron, and steel hardware components shall be galvanized in accordance with CSA G164 or ASTM A153.
 - .2 Galvanized coatings on products fabricated from rolled, pressed and forged steel shapes, plates, bars and strips: Galvanized after all welding and grinding complete. No welding or grinding of galvanized products allowed.
- .4 Zinc Rich Primer: zinc rich, organic, ready mix to CAN/CGSB 1.181. Low VOC type.

PART 3 EXECUTION

3.1 Fabrication

- .1 Fabricate to reviewed shop drawings and in general to details, sizes and materials indicated on drawings and specified herein.
- .2 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .3 Fabricate work complete with all components required for anchoring; bolting or welding to structural frame; standing free or resting in frames or sockets; in a safe and sure manner.
- .4 Where possible fit and shop assemble various sections of the work and deliver to site in largest practicable sections. Where shop fabricating is not possible, make trial assembly in shop.
- .5 Ensure exposed welds are continuous for length of each joint.
- .6 Grind and fill all welds after inspection and acceptance and leave ready for prime painting.

- .7 Fill all open joints, depressions, seams with metallic paste filler or by continuous brazing or welding and grind smooth to true sharp arises and profiles.
- .8 Fit joints and intersecting members accurately. Make work in true planes with adequate fastenings.
- .9 Supply all fastenings, anchors, accessories required for fabrication and erection of work of this Section. Make thread dimensions such that nuts and bolts will fit without re-threading or chasing threads.
- .10 Welding shall be done by the shielded metal-arc method in accordance with the requirements CSA W59 and AWS D1.6 for stainless steel. The welding operators shall be currently certified under CSA W47.1 for the work they are performing.
- .11 Make exposed metal fastenings and accessories of same material, texture, colour and finish as base metal on which they occur unless otherwise shown or specified. Keep exposed fastenings to an absolute minimum evenly spaced and neatly laid out. Make fastenings of permanent type unless otherwise indicated.
- .12 Surfaces to be welded shall be free from loose scale, rust, paint, or other foreign matter. Where weld material is deposited in two or more layers, each layer shall be cleaned before the next layer is deposited. Care shall be taken to minimize stresses due to heat expansion, contraction and distortion by using proper sequence in welding and by approved methods.
- .13 Appearance, quality of welds made, methods of correcting defective work shall be in accordance with CSA W59.

3.2 Shop Painting

- .1 Cleaning Steel:
 - .1 Clean steel, whether it is to be painted or not, to the degree required by CISC/CPMA 1-73a, except as specified below.
 - .2 Prepare galvanized items scheduled to be painted in accordance with the requirements of Section 09 91 23, and ASTM D6386.
 - .3 Steel to receive a shop or field paint finish shall be cleaned in accordance with Sections 09 91 23 or SSPC SP6, whichever produces a surface which has less rust and mill scale.
 - .4 Clean steel which is specified to be painted to CISC/CPMA 2-75 in accordance with that Standard.
 - .5 Clean steel which is specified to receive an organic zinc-filled epoxy primer, or zinc-rich paint, or inorganic zinc primer, in accordance with SSPC-SP 6, Commercial Blast Cleaning.
 - .6 Clean welds by wire brushing and wash down with clean water, to remove the chemical residues left by the electrodes, prior to painting.
- .2 The following surfaces shall not be painted:
 - .1 Surfaces and edges to be field welded. If painted, remove paint for field welding for a distance of at least 50 mm on all sides of the joint, to ensure proper fusion of the metal.
 - .2 The contact surfaces of friction type connections assembled by high strength bolts.
 - .3 Portions of steel members which are to be encased in or in contact with concrete or masonry.
 - .4 Galvanized items not specifically indicated to be painted.
- .3 Preparation and priming of all metal work which will be exposed to view and which is scheduled to be finish painted, shall be in accordance with the requirements of Section 09 91 23.
- .4 All other concealed or unpainted ferrous metal work shall be given one prime paint coat type CGSB

1.40 and in accordance with CISC/CPMA 2-75. Work paint into all corners and all joints. Metal parts in contact shall be primed before shop assembly. Priming damaged during erection or through lack of protection shall be cleaned and touched up.

- .5 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 ° C.
- .6 Metals in contact with other dissimilar metals, concrete or masonry materials shall be insulated or separated from one another to prevent corrosion, staining or electrolysis by use of bituminous paint.

3.3 Galvanizing

- .1 Steel members, fabrications, and assemblies shall be galvanized after fabrication by the hot dip process in accordance with CSA G164 or ASTM A123.
- .2 Galvanizing of architecturally exposed steel shall be completed by a company recognized in the application of High Quality galvanized finishes and in accordance with ASTM A385.
- .3 Prepare metals to be galvanized and painted in accordance with requirements of ASTM D6386.
- .4 Bolts, nuts, washers, iron, and steel hardware components shall be galvanized in accordance with CSA G164 or ASTM A153.
- .5 Coating Requirements:
 - .1 Weight: the weight of the galvanized coating shall conform to Table 1 of CSA G164, ASTM A123 or ASTM A153 (as appropriate).
 - .2 Surface Finish: The galvanized coating shall be continuous, adherent, as smooth and evenly distributed as possible and free from any defect that is detrimental to the stated end use of the coated article. The integrity of the coating shall be determined by visual inspection and coating thickness measurements.
 - .3 Adhesion: the galvanized coating shall be sufficiently adherent to withstand normal handling.

3.4 Miscellaneous Framing and Supports

- .1 General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- .2 Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - .1 Fabricate units from slotted channel framing where indicated.
 - .2 Furnish inserts for units installed after concrete is placed.
- .3 Galvanize miscellaneous framing and supports where indicated.
- .4 Prime miscellaneous framing and supports with primer specified in Section 09 91 13 - Exterior Painting or Section 09 91 23 -Interior Painting.

3.5 Angle Lintels

- .1 Provide all loose steel angle lintels required to support openings and recesses in masonry walls, whether indicated on the drawings or not. Refer to Architectural, Structural and Mechanical drawings for locations of openings. Lintels shall be as scheduled on the Structural drawings.
- .2 Steel angles: CSA G40.21, Grade 300W, sizes indicated for openings. Provide 150 mm minimum bearing at ends unless otherwise indicated.
- .3 Weld or bolt back-to-back angles to profiles as indicated.

- .4 Supply for installation by Sections 04 22 00 and 04 27 00.
- .5 Lintels shall be prime painted unless otherwise indicated.

3.6 Steel Pan Stairs

- .1 Form treads and risers from 3.3 mm steel plate. Secure treads and risers to L 35 x 35 x 5 horizontal and vertical welded to stringers. Sub-treads and risers for concrete filled metal pan stairs shall be 3.3 mm sheet steel formed as detailed. Treads to be concrete filled, with welded wire mesh reinforcing. Risers to be exposed metal, with a formed 19 mm dust cove.
- .2 Form stringers from C250 x 23 unless indicated otherwise or required to meet design requirements. Stringers shall be continuous. Apply continuous welds to cranked joints. All edges shall be ground smooth.
- .3 Form stringers as described above, with 6 mm thick plate fascia welded on.
- .4 Extend stringers around mid-landings to form steel base. Cope and crank stringers as necessary to line with structural steel framing at floor openings.
- .5 Fascia and supporting members throughout shall be of size and weight as shown on drawings.
- .6 Provide all necessary angles, channels, clips, plates and anchors as required to support all stair treads and landings and as shown on the drawings.
- .7 Fabricate stair landings as detailed on the drawings with 38 mm galvanized composite metal floor deck specified in Section 05 31 00 and welded wire mesh. Spot weld deck to framing with 19 mm diameter puddle welds at 150 mm c/c along entire length of all framing members. Place reinforcing mesh.
- .8 Provide clip angles for fastening of furring channels, where applied finish is indicated for underside of stairs and landings.
- .9 Close ends of stringers where exposed.
- .10 Make provisions for support of metal furring around perimeter of areas where gypsum board soffits are to be installed.

3.7 Railings

- .1 Definition: the term railing shall be taken to mean balustrades, guards, rails and handrails.
- .2 Design and fabricate railings to conform to all applicable Ontario Building Code requirements.
- .3 Unless otherwise indicated, fabricate railings as follows:
 - .1 Fabricate handrails and guardrails as detailed.
 - .2 Pipe rails shall have an outside diameter as indicated on drawings. Close open ends of tubular members with welded steel plugs.
 - .3 Extend handrails horizontally at top and bottom of each flight of stairs as shown on the drawings but not less than 305 mm beyond stair nosing at top of stair and 610 mm at bottom of stair.
 - .4 Support railings at each end, and at maximum 1070 mm centres unless indicated otherwise or required to meet loading requirements of the Ontario Building Code.
 - .5 Minimum wall thicknesses of tubular railings: 2.5 mm.
 - .6 At corners, angles and intersections, cope or mitre railings, weld and grind smooth.
- .4 Pickets shall be minimum 13 mm diameter solid steel bars at 100 mm centres.
- .5 Interior railings: prime painted.

- .6 Exterior railings as detailed, galvanized. Connect new railings to existing where required.

3.8 Ladders

- .1 Conform to Ministry of Labour and Ontario Building Code requirements where applicable.
- .2 Unless otherwise detailed, construct ladders as follows:
 - .1 Stringers shall be minimum 19 x 38 mm steel bar.
 - .2 Rungs shall be 19 mm solid steel bars, 400 mm long, spaced at 300 mm o.c. vertically and welded to stringers.
 - .3 Attach stringers to walls with 10 mm x 38 mm steel bar yokes, U-shaped, spaced at maximum 1220 mm o.c. vertically. Locate centre line of rungs not less than 150 mm from face of walls.
 - .4 Interior ladders shall be prime painted. Rungs shall have knurled or non-slip finish.

3.9 Steel Weld Plates and Angles

- .1 Provide steel weld plates and angles not specified in other Sections, for items supported from concrete or masonry construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete or masonry.

3.10 Installation

- .1 Supervise the setting of bases, anchor bolts, and other steel to concrete connections. Cutting of base plates to accommodate anchor bolts is cause for rejection of base plates.
- .2 Provide all bracing and shoring required to support the work of this Section during installation.
- .3 Work shall be fabricated and erected square, plumb and true, straight, level and accurately fitted to size detailed on reviewed Shop Drawings. All joints shall be welded unless otherwise indicated. Exposed welds shall be ground smooth and/or flush. Exposed work shall be finished smooth and even, close joints and neat connections. Exposed welds continuous for full length of joints.
- .4 Where anchors or fastenings, sleeves, have to be built in by other trades, supply all necessary templates, instructions and supervision to ensure satisfactory installation.
- .5 Do all drilling, cutting and fitting necessary to attach this work to adjoining work and make it complete.
- .6 Provide all components required for anchoring. Make anchoring in concealed manner where possible. Exposed anchors shall be approved by the Consultant, shall be neat, and of the same material, colour, texture and finish of base metal on which they occur. Exposed fastenings shall be evenly spaced.
- .7 Grind all field welds smooth.
- .8 Touch up shop coat of prime paint where damaged by field erection.
- .9 Touch up galvanized finishes with zinc rich paint.

3.11 Fasteners and Anchors

- .1 Use methods for fastening or anchoring metal fabrications to building construction as shown or specified.
- .2 Securely anchor components in place. Unless otherwise indicated, anchor components as follows:
 - .1 To concrete and solid masonry with expansion or epoxy adhesive type anchors.
 - .2 To hollow construction with toggle bolts.
 - .3 To thin metal with screws or bolts.

- .4 To thick metal with bolts or by welding.
- .5 Fill space between railing members and sleeves with non-shrink grout.
- .3 Where fasteners and anchors are not shown, design the type, size, location and spacing to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and suit the sequence of installation.
- .4 Use material and finish of the fasteners compatible with the kinds of materials which are fastened together and their location in the finished work.
- .5 Fasteners for securing metal fabrications to new construction only, may be by use of threaded or wedge type inserts or by anchors for welding to the metal fabrication for installation before the concrete is placed or as masonry is laid.
- .6 Fasteners for securing metal fabrication to existing construction or new construction may be expansion bolts, toggle bolts, power actuated drive pins, welding, self-drilling and tapping screws or bolts.

3.12 Schedule

- .1 General:
 - .1 Supply and install all metal fabrications indicated on Drawings, and not included in the work of other Sections.
 - .2 Coordinate and sequence the work to ensure timely delivery to the site, of all items to be built in.
 - .3 Where items are required to be built into masonry, concrete or other work supply such items to respective Sections with all anchors and accessories for building in.
 - .4 All items shall be of sizes and as detailed on drawings.
 - .5 Coordinate with Section 09 91 13 and 09 91 23 for preparation of exposed metal items required to have finish coatings applied in the field.
 - .6 Review all coordination drawings prior to installation of materials, to ensure that no interferences with the work of other Sections will occur.

3.13 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Clean exposed prefinished and plated items and items fabricated from stainless steel as recommended by the metal manufacturer and protect from damage until Substantial Performance of the project.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 10 00 Concrete Forming and Accessories
- .2 Section 03 30 00 Cast-In-Place Concrete
- .3 Section 04 22 00 Concrete Unit Masonry
- .4 Section 05 50 00 Metal Fabrications
- .5 Section 06 20 00 Finish Carpentry
- .6 Section 07 51 00 Ethylene-Propylene-Diene Monomer Roofing
- .7 Section 07 71 00 Roof Specialties and accessories
- .8 Section 08 11 00 Metal Doors and Frames

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A123/A123M-13 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A653/A653M-15 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
 - .3 ASTM F1667 - 17 Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
- .2 CSA Group (CSA)
 - .1 CAN/CSA A247- M86 (R1996) Insulating Fiberboard.
 - .2 CSA B111-1974(R2003) Wire Nails, Spikes and Staples.
 - .3 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .4 CSA O80 SERIES-15 Wood Preservation
 - .5 CSA O86-14 Engineering Design in Wood
 - .6 CSA O121-17 Douglas Fir Plywood.
 - .7 CSA O141-05 (R2014) Softwood Lumber
 - .8 CSA O151-17 Canadian Softwood Plywood
 - .9 CSA O437 Series-93 (R2011) Standards on OSB and Waferboard
 - .10 CSA Z809-08 Sustainable Forest Management
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 71.26-M88 Adhesive for Field Glueing Plywood to Lumber Framing for Floor Systems.
- .4 Underwriters Laboratories Canada (ULC)
 - .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

- .5 National Lumber Grading Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber, Latest Edition.
- .6 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-2004 FSC Principle and Criteria for Forest Stewardship.
 - .2 FSC-STD-20-002-2004 Structure and Content of Forest Stewardship Standards V2-1
 - .3 FSC Accredited Certified Bodies.
- 1.4 Submittals
 - .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 When required by authorities having jurisdiction, submit sequential erection drawings indicating all necessary false work, temporary construction bracing and hoisting.
 - .3 Submit shop drawings for laminated veneer lumber stamped and signed by a Professional Engineer registered in the Province of Ontario. Include statement that laminated wood members are designed in accordance with the referenced standards.
- 1.5 Quality Assurance
 - .1 Sawn lumber shall be identified by the grade stamp of an association or independent grading agency certified by the Canadian Lumber Standards Accreditation Board.
 - .2 Design of wood structural system including laminated veneer lumber shall be in accordance with the Ontario Building Code and CSA 086. Design loads shall be as required by the Ontario Building Code, the National Building Code Supplement and as indicated on the drawings.
- 1.1 Shipping, Handling and Storage
 - .1 Protect materials, under cover, both in transit and on the site.
 - .2 Store materials to prevent deterioration or the loss or impairment of their structural and other essential properties. Do not store materials in areas subject to high humidity and areas where masonry and concrete work are not completely dried out.
 - .3 Store sheathing materials level and flat, in a dry location. Protect panel edges from moisture at all times.
- PART 2 PRODUCTS
- 2.1 Materials
 - .1 Timber Material shall be 'Grade Stamped'.
 - .2 Construction Lumber: To CAN/CSA O141 Softwood Lumber graded to NLGA Standard Grading Rules for Canadian Lumber, published by the National Lumber Grades Authority. All lumber shall bear grade stamps. Moisture content of softwood lumber not to exceed 19% at time of installation.
 - .1 Framing lumber, plates, furring, blocking, No. 1 SPF.
 - .2 Nailing strips, furring and strapping: No. 4 S-P-F.
 - .3 Fitment framing: No. 1 S-P-F.
 - .3 Canadian Softwood Plywood: to CSA O151-M, standard construction, good one or both sides as required, thickness as shown or specified.
 - .1 Douglas Fir Plywood: To CSA O121-M, standard construction, good one side, thickness as shown on the drawings.

- .2 Plywood used for exposed interior work shall have select grade veneer, one or both faces where exposed, with fire retardant finish. Fire retardant shall be in accordance with CAN/CSA-080.1, and all treated materials shall bear a ULC approval stamp.
 - .3 Poplar Plywood: to CSA 0153, standard construction.
 - .4 Underlayment: 6 mm thick spruce plywood, sanded one side, 6 mm thick, 1200 mm
 - .5 LVL: Laminated veneer lumber comprised of Ultrasonically graded veneer lumber and coated with waterproof adhesives. Microllam LVL. as manufactured by Weyerhaeuser, size as indicated on the drawings.
 - .6 Nails, Spikes and Staples: To ASTM F1667.
 - .7 Bolts: 12.5 mm diameter, galvanized, complete with nuts and washers.
 - .8 Proprietary Fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.
 - .9 Wood Preservative to CAN/CSA O80 SERIES.
 - .10 Adhesive: Contractors gun grade cartridge loaded wood adhesive, general purpose, to CSA 0112 Series and CAN/CGSB-71.26.
 - .11 Building Paper: to CAN2-51.32-M, 15# asphalt impregnated paper.
 - .12 Connectors: Simpson Strong Tie galvanized steel connectors, brackets, gussets and the like as indicated and as required.
 - .13 Galvanizing: to CAN/CSA-G164. Use galvanized fasteners, and hardware for exterior work, preservative treated lumber, and materials in contact with concrete or masonry.
- 3.1 Installation
- .1 Workmanship:
 - .1 Execute work using skilled mechanics according to best practice, as specified here.
 - .2 Lay out work carefully and to accommodate work of other trades. Accurately cut and fit; erect in proper position true to dimensions; align, level, square, plumb, adequately brace, and secure permanently in place. Join work only over solid backing.
 - .2 Rough Hardware: Include rough hardware such as nails, bolts, nuts, washers, screws, clips, hangers, connectors, strap iron, and operating hardware for temporary enclosures.
 - .3 Erection of Framing Members:
 - .1 Install members true to line, levels and elevations. Space framing members and frame all openings as detailed on the drawings.
 - .2 Construct continuous members from pieces of longest practical length.
 - .3 Install spanning members with crown edge up.
 - .4 Provide treated wood nailers, blocking, cants, grounds, furring and similar members where shown and where required for screeding or attachment of other work and surface applied items. Attach to substrate as required to support applied loading.
 - .5 Electrical Equipment Backboard: provide backboards for mounting electrical equipment as indicated. Use 19 mm thick fir face veneer fire retardant softwood plywood on 19 mm x 38 mm furring around perimeter and at maximum of 305 mm intermediate spacing.
 - .1 Install plywood backboards with countersunk screws.

.6 Blocking: Provide solid wood backing to support equipment and fixtures as required.

.7 Underlayment

.1 Store underlayment panels in the room where they will be installed for at least 72 hours to acclimate the panels to minimize expansion/contraction issues after installation.

.2 Ensure subfloor is thoroughly cleaned.

.3 Install underlayment over subfloor just prior to laying of flooring and protect from water and physical damage. Stagger end joints of underlayment with respect to each other and stagger all joints with respect to paralleling panel joints in subfloor. Space panels 2 mm apart at ends and 3 mm apart at edges and at least 12 mm from concrete or masonry walls. Install with adhesive and nail panels 150 mm o.c. along edges and 150 mm o.c. each way throughout panel, but not closer than 10 mm 3/8 inch to panel edges. Nails must be annular ring or screw type and must be countersunk 2 mm. Lightly sand all joints to receive flooring.

.1 Roof Blocking, Curbs and Copings:

.1 Provide and install framing, blocking, curbs and copings as indicated on the drawings. Anchor blocking securely in permanent manner.

.2 Provide minimum 10 mm Douglas Fir plywood copings on all built-up wood copings and curbs as detailed.

.3 Provide shims and blocking necessary for levelling.

3.2 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 05 50 00 Metal Fabrications
- .2 Section 06 10 00 Rough Carpentry
- .3 Section 06 40 00 Architectural Woodwork
- .4 Section 06 61 16 Solid Surfacing
- .5 Section 07 92 00 Joint Sealants
- .6 Section 08 11 00 Metal Doors and Frames
- .7 Section 08 14 16 Flush Wood Doors
- .8 Section 08 71 10 Door Hardware
- .9 Section 09 21 16 Gypsum Board
- .10 Section 09 91 23 Interior Painting
- .11 Section 10 28 10 Toilet and Bath Accessories

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM E1333-14 Standard Test Method for Determining Formaldehyde Concentrations in Air and Emissions Rates from Wood Products Using a Large Chamber.
 - .2 ASTM F1667-18a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
- .2 American National Standards Institute (ANSI)
 - .1 ANSI A208.1-2009 Particleboard.
 - .2 ANSI A208.2-2016 Medium Density Fibreboard (MDF) for Interior Applications.
 - .3 ANSI/HPVA HP-1-2016 Standard for Hardwood and Decorative Plywood.
 - .4 ANSI/NEMA LD 3-2005 High Pressure Decorative Laminates
- .3 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
 - .1 Architectural Woodwork Quality Standards Illustrated.
- .4 Canadian Plywood Association (CanPly)
 - .1 The Plywood Handbook 2005.
- .5 CSA Group (CSA)
 - .1 CSA B111-1974 (R2003) Wire Nails, Spikes and Staples.
 - .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA O112 SERIES-M1977 (R2006) Standards for Wood Adhesives
 - .4 CSA O121-17 Douglas Fir Plywood.
 - .5 CSA O141-05 (R2014) Softwood Lumber

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- .6 CSA O151-17 Canadian Softwood Plywood
 - .7 CSA O153-13 (R2017) Poplar Plywood.
 - .8 CSA Z760-94 (R2001) Life Cycle Assessment
 - .6 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-V4-0 FSC Principle and Criteria for Forest Stewardship.
 - .2 FSC-STD-20-002-2004, Structure and Content of Forest Stewardship Standards V2-1
 - .3 FSC Accredited Certified Bodies.
 - .7 National Hardwood Lumber Association (NHLA)
 - .1 Rules for the Measurement and Inspection of Hardwood and Cypress 1998.
 - .8 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2005.
 - .9 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
 - .1 SCAQMD Rule 1168-03 Adhesives and Sealants Applications
 - 1.4 Submittals
 - .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Submit shop drawings.
 - .1 Indicate details of construction, profiles, jointing, fastening and other related details.
 - .2 Indicate materials, thicknesses, finishes and hardware.
 - .3 Submit duplicate 300 mm long samples of each type of solid wood or 300 x 300 mm square type of plywood to receive stain or natural finish.
 - .4 Submit samples of plastic laminate materials.
 - 1.5 Quality Assurance
 - .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
 - .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.
 - .3 Wood materials certified by Forestry Stewardship Council.
 - 1.6 Shipping, Handling and Storage
 - .1 Refer to Section 01 61 00 – Common Product Requirements.
 - .2 Protect materials against dampness during and after delivery.
 - .3 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.
 - 1.7 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.
- PART 2 PRODUCTS**
- 2.1 Lumber Materials

- .1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:

- .1 CSA O141.
- .2 NLGA Standard Grading Rules for Canadian Lumber.
- .3 AWMAC custom premium grade, moisture content as specified.
- .4 Machine stress-rated lumber is acceptable.

2.2 Panel Materials

- .1 Douglas Fir Plywood (DFP): to CSA O121, standard construction.
 - .1 Forestry Stewardship Council (FSC) certified.
 - .2 Urea-formaldehyde free.
- .2 Canadian Softwood Plywood (CSP): to CSA O151, standard construction.
 - .1 Forestry Stewardship Council (FSC) certified.
 - .2 Urea-formaldehyde free.

2.3 Accessories

- .1 Rough Hardware: Bolts, lag screws, anchors, nails and expansion shields required to secure this portion of work. Rough hardware hot dip galvanized conforming to latest edition of CSA G164. All fasteners used in damp or wet areas to be suitable for use in corrosive environment. Use hot dipped galvanized or other material approved by the Consultant.
- .2 Nails and staples: to ASTM F1667 galvanized.
- .3 Wood screws: to CSA B35.4 plain type and size to suit application.
- .4 Splines: wood or metal to suit application.
- .5 Adhesive: recommended by manufacturer, waterproof type, maximum VOC limit 30 g/L SCAQMD Rule 1168 - Adhesives and Sealants Applications.

PART 3 EXECUTION

3.1 Construction

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

3.2 Fabrication

- .1 General:
 - .1 Field measure all dimensions.

- .2 Fabricate all finish carpentry items to AWMAC premium grade, and in accordance with the reviewed shop drawings.
- .3 Set nails and screws, apply stained plain wood filler to indentations, sand smooth and leave ready to receive finish.
- .4 Provide 10 mm thick solid matching wood strip on plywood and particle board edges 13 mm or thicker, exposed in final assembly.
- .5 Ease edges of solid lumber components to 1.6 mm radius.
- .6 Baseboard, Casing and Trim:
 - .1 Match existing wood baseboard, casing and trim profiles where required.
 - .2 Reuse existing reclaimed material for greatest extent possible
 - .3 Mill new material to match profiles of existing. Use AWMAC custom premium grade lumber.

3.3 Installation

- .1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- .2 All fastenings shall be concealed.
- .3 Provide heavy duty grounds as necessary for secure installation of finish carpentry work.
- .4 All wood surfaces shall be sanded smooth, ready to receive finish.
- .5 Scribe and cut as required, fit to abutting walls and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.
- .6 Form joints to conceal shrinkage.
- .7 Set and secure materials and components in place, rigid plumb and square.
- .8 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
- .9 Set finishing nails to receive filler. Where screws are used to secure members, countersink screws in round, cleanly cut hole and plug with wood plug to match material being secured.
- .10 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

3.4 Door Installation

- .1 Install doors in accordance with instructions in Section 08 11 00 and Section 08 14 16 and manufacturer's printed instructions.

3.5 Finish Hardware Installation

- .1 Finish hardware will be supplied for installation under this Section.
- .2 Prepare doors and frames in accordance with manufacturer's instructions and templates. Install finish hardware complete in all respects, hang doors and make adjustments necessary.
- .3 Doors shall swing freely. Where thresholds are to be used, door bottom shall be finished to suit thresholds as required.
- .4 Where indicated on door schedules or drawings, under-cut doors.

3.6 Miscellaneous

- .1 Install Toilet and Bath Accessories as specified in Section 10 28 10, including accessories supplied by Owner.

3.7 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 06 20 00 Finish Carpentry
- .3 Section 06 61 16 Solid Surfacing
- .4 Section 07 92 00 Joint Sealants

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM F1667 – 18a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
- .2 Architectural Woodwork Manufacturer's Association of Canada (AWMAC)
 - .1 Architectural Woodwork Standards Manual
- .3 American National Standards Institute (ANSI)
 - .1 ANSI A208.1-2009 Particleboard
 - .2 ANSI/NPA A208.2-2009 Medium Density Fibreboard (MDF)
 - .3 ANSI/NEMA LD 3-2005 High-Pressure Decorative Laminates (HPDL)
 - .4 ANSI/HPVA HP-1-2009 Standard for Hardwood and Decorative Plywood
- .4 CSA Group (CSA)
 - .1 CSA O112 SERIES-M1977 (R2006) Wood Adhesives
 - .2 CSA O121-08 (R2013) Douglas Fir Plywood
 - .3 CSA O151-17 Canadian Softwood Plywood
 - .4 CSA O153-13 Poplar Plywood
 - .5 CSA Z809-08 Sustainable Forest Management
- .5 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-2004 FSC Principle and Criteria for Forest Stewardship.
 - .2 FSC-STD-20-002-2004 Structure and Content of Forest Stewardship Standards V2-1
 - .3 FSC Accredited Certified Bodies.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit shop drawings conforming to AWMAC's STANDARDS (NAAWS).
 - .1 Show proposed assembly, connections, anchorage, materials, dimensions, thickness, and finishes.
 - .2 On casework and countertop elevations show location of backing required for attachment within walls.
- .3 Samples:
 - .1 Submit duplicate, 300 mm long samples of each type of solid wood and 300 x 300 mm samples of each type of plywood used in exposed work and scheduled to receive stained or natural finish, complete with specified finish, prior to fabrication of cabinetwork.
 - .2 Veneer samples minimum 304 mm x 304 mm. Each sample set of three to represent range of colour and grain expected.
 - .3 Submit full range of manufacturer's standard plastic laminates for selection by the Consultant.
 - .4 Submit sample of each type of cabinet hardware component used.

1.5 Quality Assurance

- .1 Unless otherwise specified, carry out finish carpentry work in accordance with the requirements of "Millwork Standards" (latest issue) of Architectural Woodwork Manufacturers' Association of Canada (AWMAC), Custom Grade.
- .2 Woodwork Manufacturer Qualifications:
 - .1 Minimum 5 years of production experience similar to this project, whose qualifications indicate ability to comply with requirements of this Section.
- .3 Preinstallation Conference:
 - .1 Before framing completed hold a meeting with the contractor, casework manufacturer, casework installer, and framing sub-contractor.
 - .2 Review locations of backing required for casework installation as shown on casework shop drawings.
 - .3 Review method of attachment for backing to wall system as shown on architectural drawings.
- .4 Mock-up: Prepare mock-ups in accordance with Section 01 45 00 – Quality Control.
 - .1 Provide mockups of one base cabinet, one wall hung cabinet, and one countertop. Base cabinet to have minimum one drawer. Mockup of material and finish to be provided. Approved mockup may be incorporated in the project.

1.6 Definition

- .1 "Exposed" when referred to in this Section, shall mean all parts which can be viewed and shall include interiors of cabinets, backs of doors, shelving and gables.

1.7 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Protect against damage, including damage by excessive changes in moisture content, during delivery and storage. Maintain minimum storage temperature of 16 ° C, and relative humidity of 25% to 55%.
- .4 Cover plastic laminate faces at shop with heavy Kraft paper.
- .5 Do not deliver finish carpentry components to site before all wet trades are completed, the building is closed in and humidity conditions on site are acceptable. Do not deliver during rain or damp weather
- .6 Store materials on site in such a way as to prevent deterioration or loss or impairment of essential properties. Prevent excessive moisture gain of materials.

1.8 Protection

- .1 Provide coverings as necessary to protect finish carpentry components from damage of any kind during storage and after installation.

1.9 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.10 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

- .1 All materials CSA Z809 or FSC Certified.
- .2 Solid Wood:
 - .1 Unless otherwise indicated, provide AWMAC Custom Grade.
 - .2 All wood materials shall be new, straight and clean, free of sap, knots, pitch, and other defects, except as permitted by applicable grading rules.
 - .3 All wood shall be kiln dried to a maximum moisture content of 7%.
 - .4 Softwood: to CSA O141, dressed all sides used in concealed locations.
- .3 Veneers: As required by AWMAC's STANDARDS (NAAWS) for its use and Grade specified. Flat sliced maple veneers from architectural grade flitches to provide uniform grain pattern and colour throughout, free of dark streaks and blemishes. Sharp variation of grain patterns and colour between adjacent jointed pieces is not acceptable.
- .4 Plywood: to CSA O151-M Standard Grade, solid two sides. Use in concealed locations only, except as indicated.
- .5 Particleboard: Meeting requirements of AWMAC's STANDARDS (NAAWS). To ANSI A208.1 , minimum density of 720kg/m3 Grade "R".
- .6 MDF: Medium Density Fiberboard meeting requirements of AWMAC's STANDARDS (NAAWS).
- .7 Edgeband
 - .1 For wood veneer casework: Veneer of same species and cut as exposed surfaces.
 - .2 For Plastic Laminate Casework: High Pressure Decorative Laminate (HPDL).
- .8 Plastic laminate facing sheet: ANSI/NEMA LD 3 High-Pressure Decorative Laminates (HPDL) PF-S and GP-S;
 - .1 Backing sheet: BK Grade by manufacturer of facing sheet.
 - .2 Core: CAN3-0188.1M, Grade R.
 - .3 Laminating adhesive: CAN3-O112 Series M.
 - .4 Core sealer: clear water resistant synthetic resin sealer.
 - .5 Colours, pattern, gloss and texture will be selected by Consultant from full range of products by one of the following:
 - .1 Formica,
 - .2 Arborite,
 - .3 Pionite,
 - .4 Nevamar
 - .5 Wilsonart.
- .9 Melamine Overlaid Panels:

- .1 Melamine overlay, heat and pressure laminated with phenolic resin to 12.7 mm thick particle board.
- .2 Overlay bonded to both faces where exposed two sides, and when panel material require surface on one side only, reverse side to be overlaid with a plain balancing sheet.
- .3 Furniture finish: solid colour as selected by the Consultant.
- .4 Edge Finishing: matching melamine and polyester overlay edge strip with self-adhesive.
- .10 Fasteners and Adhesive:
 - .1 Nails and staples: ASTM F1667, galvanized, spiral head nails.
 - .2 Screws: Zinc, cadmium or chrome plated steel.
 - .3 Splines: wood or metal, to suit application.
 - .4 Adhesive: Type 1 waterproof. To CSA O112-M, type as appropriate for the intended application. Complying with ANSI/WDMA I.S-1 series. Contact bond not acceptable.
 - .5 Avoid the use of adhesives, preservatives, synthesizing agents and finish coatings that contain formaldehyde and high V.O.C. content.
- .11 Cabinet Hardware: Products listed are a standard of acceptance. Products by other manufacturers, of equal quality and similar appearance may also be accepted subject to review and approval by Consultant.
 - .1 Shelf Standards: Knappe & Vogt KV80, Anochrome finish.
 - .2 Brackets: Knappe & Vogt KV180, Anochrome finish.
 - .3 Hinges: Blum concealed hinges, 125° clip and 125° opening with self-closing spring. Full or half overlay. Nickel plated steel.
 - .4 Cabinet Pulls: Richelieu D-Pull No: 30134-170, 96 mm c.c. brushed stainless steel.
 - .5 Catches: Type optional with manufacturer.
 - .6 Drawer Slides: Knappe & Vogt 8450FM Soft-Close Full-Extension Drawer Slide
 - .7 Door and Drawer Bumpers: "Quietex" bumpers.
 - .8 Provide other hardware and hardware accessories as detailed or required.
 - .9 All exposed hardware to have Platinum (Mica) finish by Teknion or equivalent unless noted otherwise.

2.2 Fabrication

- .1 Materials and methods of construction to meet requirements of AWMAC's STANDARDS (NAAWS) for grade or grades specified. If there is conflict between plans and/or specifications and AWMAC's STANDARDS (NAAWS), plans and specifications shall govern.
- .2 Wood Casework: AWMAC Standard Custom Grade.
- .3 Construction Type: Frameless
- .4 Cabinet and door interface: Flush overlay.
- .5 Exposed joints and edges:
 - .1 Uniformly space exposed joints unless otherwise indicated.
 - .2 No edge grain shall be visible; mitre external corners, house internal fasteners. Glue mitred corners.
 - .3 All exposed edges of plywood and particle board shall have solid wood edging, pressure glued. AWMAC No. 3 edge.
 - .4 Ease edges of solid lumber components to 1.6 mm radius.
- .6 Mechanical Fasteners:
 - .1 Inconspicuously locate mechanical fasteners. Wherever possible, conceal fastenings.

- .2 Countersink nail heads.
- .3 Where exposed to view, countersink screw and bolt heads and fill holes with matching wood plugs.
- .4 Cutting and fitting: make cut-outs in work of this Section as required to accommodate work of other Sections.
- .5 Make provisions in cabinetwork to accept built-in appliances, provided by others.

2.3 Plastic Laminate Casework

- .1 Construct cabinetwork components of plastic laminate faced particle board as indicated and in accordance with AWMAC Custom grade.
- .2 Tenon, dado, dowel, or rabbet interior construction with all parts well glued. Shoulder mitre all exposed corners. Open ends or skeleton frames against walls are not permitted. Unless otherwise permitted by Consultant, use unitized construction system for all components.
- .3 Exposed Surfaces: High Pressure Decorative Laminate (HPDL), meeting requirements of AWMAC's Standards (NAAWS) for Grade specified.
- .4 Construct door and drawer fronts of 19 mm plastic laminate faced MDF.
- .5 Exposed interior surfaces: LPDL of a colour and pattern compatible with exposed surfaces
- .6 Semi-exposed surfaces: LPDL
- .7 Apply self-edged minimum 1.0 mm thick plastic laminate to exposed ends of countertops.
- .8 Rout gables for pilaster strips where adjustable shelving is required.
- .9 Construct shelving with edge moulding to match. Shelving to cabinetwork to be adjustable unless otherwise noted.
- .10 Apply moisture repellent sealer to concealed backs of cabinetwork.
- .11 Install cabinet hardware in accord with hardware manufacturer's directions. Unless otherwise indicated, provide each door with pull and with minimum two hinges. Provide locks where indicated.

2.4 Drawers

- .1 Sides: Particle board with melamine surfaces.
- .2 Bottoms: MDF with melamine surfaces
- .3 Joinery: Meeting requirements of AWMAC's STANDARDS (NAAWS) for Grade specified.

2.5 Solid Surface Countertops

- .1 As specified in Section 06 61 16.

2.6 Finishes

- .1 All exposed exterior surfaces: plastic laminate as indicated. Colours selected by the Consultant.
- .2 All exposed interior surfaces: melamine unless indicated otherwise.
- .3 Cabinet and case backs unexposed to view shall be back primed with one coat of moisture repellent sealer.
- .4 Apply finishes in accordance with the AWMAC Manual.

- .5 Stainless Steel: Type 316 stainless steel, brushed finish.

PART 3 EXECUTION

3.1 Examination

- .1 Verify mechanical, electrical, plumbing, HVAC and other building components, affecting work in this Section are in place and ready. Verify HVAC controls and systems are operating properly.
- .2 Verify adequacy of backing and support framing. Advise Contractor of areas and surfaces requiring further modifications for plumb, level, even or square fitting.

3.2 Installation

- .1 Install work in accordance with AWMAC Installation Manual, Custom grade.
- .2 Secure all work in place, square, plumb, and level.
- .3 Accurately scribe and closely fit components to irregularities of adjacent surfaces.
- .4 Accurately fit joints in true plane, locate joints over bearing or supporting surfaces.
- .5 Countersink mechanical fasteners used at exposed and semi-exposed surfaces, excluding installation attachment screws and those securing cabinets end to end.
- .6 Where permitted, nail with small headed finishing nails. Countersink nail heads with nail setter.
- .7 Install plastic laminate components using concealed fastening devices.
- .8 Where components are fastened with screws or bolts, countersink screw and bolt heads and provide wood plugs matching surrounding wood.
- .9 Where cabinetwork abuts other building elements, provide wood trim matching cabinetwork except where otherwise detailed.
- .6 Cut equipment cutouts shown on plans using templates provided.
 - .1 Radius internal corners at least 3 mm and chamfer edges.
 - .2 Where core edge is to remain exposed, cover with plastic laminate edging.
 - .3 Where core edge is to be concealed, seal with sealer.
- .10 Where access is required to valves and other mechanical and electrical components, located behind cabinetwork, provide removable plywood access panels of size required and secure with four brass screws.

3.3 Adjustment

- .1 Adjust all moving and operating parts to function smoothly and correctly.
- .2 Fill and retouch all nicks, chips and scratches. Replace all un-repairable damaged items.
- .3 Replace damaged components which, in the opinion of the Consultant, cannot be satisfactorily repaired.

3.4 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Upon completion of installation, clean installed items of pencil and ink marks and broom clean the area of operation.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 40 00 Architectural Woodwork
- .2 Section 07 92 00 Joint Sealants

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM E84-21a Standard Test Method for Surface Burning Characteristics of Building Materials
- .2 CSA Group (CSA)
 - .1 CSA O151-17 Canadian Softwood Plywood
- .3 Architectural Woodwork Institute (AWI)
 - .1 AWI/AWMAC/WI's Architectural Woodwork Standards
- .4 International Surface Fabricators Association (ISFA)
 - .1 ISFA 2-01 (2013) Classification and Standards for Solid Surfacing Material
- .5 American National Standards Institute (ANSI)
 - .1 ANSI ICPA-SS-1 (2001) Performance Standard for Solid Surface Materials

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Include detailed specification of construction and fabrication, manufacturer's installation instructions, and manufacturer's detailed recommendations for handling, storage, installation, protection, and maintenance.
- .3 Shop Drawings: For countertops. Show materials, finishes, edge profiles, methods of joining, terminations, and cutouts.
 - .1 Show locations and details of joints.
 - .2 Show direction of directional pattern, if any.
- .4 Samples:
 - .1 Submit 76 x 76 mm samples of specified colours.
- .5 Provide maintenance data for solid surface material countertops for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 Quality Assurance

- .1 Source Limitations: Obtain materials and products from single source.
- .2 Fabricator Qualifications: Certified solid surface fabricator/installer.
- .3 Installer Qualifications: Firm experienced in installation or application of systems similar in complexity to those required for this Project, including specific requirements indicated.
 - .1 Acceptable to or licensed by manufacturer.

1.6 Field Conditions

- .1 Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.
- .2 Coordinate locations of utilities that will penetrate countertops.

1.7 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Handle in a manner to prevent breakage. Brace parts if necessary. Transport in the near vertical position with finished face toward finished face. Do not allow finished surfaces to rub during shipping and handling.
- .4 Store in racks in near vertical position. Prevent warpage and breakage. Store Inside away from direct exposure to sunlight.

1.8 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.9 Warranty

- .1 Furnish manufacturer's 10-year material warranty.

PART 2 PRODUCTS

2.1 Solid Surface Material

- .1 Composition Solid-Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1 and ISFA-2.
- .2 Panel thickness: 12.7 mm.
- .3 Panel weight: 21.5 kg/m²
- .4 Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - .1 Flame-Spread Index: 25 or less.
 - .2 Smoke-Developed Index: 50 or less.
 - .3 Flammability: To NFPA 101, Class A.
- .5 Pattern and Finish:
 - .1 Washrooms: Wilsonart Coconut Oil 9100GS
 - .2 Kitchens: Wilsonart Chilled Earth 9228SS

2.1 Accessory Materials

- .1 Adhesive for Bonding to other products: as recommended by solid surface material manufacturer.
- .2 Sealant for Countertops: Comply with applicable requirements in Section 07 92 00.
- .3 Heat Reflecting Tape: Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.
- .4 Insulating Fabric: Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source.

2.2 Fabrication

- .1 Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI Architectural Woodwork Standards.
- .2 Grade: Premium.
- .3 Configuration:
 - .1 Front: Pencil round edge 3.0 mm radius.
- .4 Countertops: 12.7-mm thick, solid surface material with front edge built up with same material.
- .5 Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
- .6 Joints: Fabricate countertops in sections for joining in field, with joints at locations indicated on reviewed shop drawings.
 - .1 Joint Locations: Not within 76 mm of a cutout or cooktop, 25 mm from inside corner for conventional seams, and not where countertop sections less than 900 mm long would result, unless unavoidable.
- .7 Cutouts and Holes:
 - .1 Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
 - .1 Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop.
 - .2 Provide vertical edges, rounded to 10-mm radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom.
 - .2 Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
 - .3 Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

PART 3 EXECUTION

3.1 Examination

- .1 Examine substrates to receive solid surfacing. Identify conditions detrimental to proper or timely installation. Do not commence installation until conditions have been corrected.
- .2 Verify that substrates supporting solid surfacing are plumb, level, and flat to within 3.0 mm/3.0 metres.

3.2 Preparation

- .1 Precondition solid surfacing in accordance with manufacturer's printed instructions.

3.3 Installation

- .1 Install components plumb and level, in accordance with approved shop drawings, Project installation details, and manufacturer's printed instructions.
- .2 Joints between adjacent pieces of surfacing shall be flush, tight fitting, level, and neat. Securely join adjacent pieces with manufacturer's adhesive. Fill joints level to polished surface.
- .3 Install countertops level to a tolerance of 3 mm in 2.4 m, 6 mm maximum. Do not exceed 0.4-mm difference between planes of adjacent units.

- .4 Fasten countertops by adhering with 100-percent silicone material in dab format (not bead format) to base units into underside of countertop at 457 to 610 mm o.c. Shim as needed to align subtops in a level plane.
- .5 Align adjacent surfaces and, using adhesive in colour to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- .6 Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
- .7 Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- .8 Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- .9 Apply mildew resistant silicone sealant to perimeter of all countertops as specified in Section 07 92 00.

3.4 Protection

- .1 Protect surfaces from damage until date of Substantial Performance. Repair or replace damaged components that cannot be repaired to Consultant's satisfaction.

3.5 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 References

- .1 CSA Group (CSA)
 - .1 CSA B149.1-15 Natural Gas and Propane Installation Code
 - .2 CSA B149.2-15 Propane Storage and Handling Code
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 51.34-M86 Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 Underwriters' Laboratories of Canada (ULC)
 - .1 ULC 604-2016 Standard for Factory-Built Type A Chimneys
 - .2 ULC S702-2014 Standard for Mineral Fibre Thermal Insulation for Buildings
 - .3 CAN/ULC-S702.1:2014-AMD1 Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification
 - .4 CAN/ULC-S702.2-15 Standard for Mineral Fibre Thermal Insulation for Buildings, Part 2: Installation
- .4 Canadian Construction Materials Centre (CCMC) Product Evaluation

1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit product data sheets for system materials. Include product characteristics, performance criteria, and limitations.
- .3 Submit proof of manufacturer's CCMC Listing and listing number.
- .4 Manufacturer's Instructions: indicate special handling criteria, installation sequence and cleaning procedures.

1.4 Quality Assurance

- .1 Provide Certification of Coverage and Application Chart in accordance with ULC 702 Appendix A, certified by Applicator's signature that the information is correct.

1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.6 Project Conditions

- .1 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.
- .2 Ventilation:
 - .1 Ventilate area of work by use of approved portable supply and exhaust fans.

- .2 Provide continuous ventilation during and after insulation application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 3 days after completion of insulation installation.
- .3 Protection
 - .1 Provide temporary enclosures to prevent dust from contaminating air beyond application area.
 - .2 Protect adjacent surfaces and equipment from damage by fall-out, and dust.
- 1.7 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

- 2.1 Materials
 - .1 Loose Fill Insulation: to CAN/ULC-S702.1, asbestos-free, formaldehyde -free. CCMC evaluation listing number 12851-L or equivalent
 - .1 Type 5 - blowing wool, suitable for application by means of pneumatic equipment. Non-corrosive, non-combustible.
 - .1 Owens Corning ProPink Fibreglas Blown Insulation.
 - .2 Johns Manville JM Climate Pro
 - .3 Certainteed Insulsafe XC Fibre Glass Blowing Insulation.

PART 3 EXECUTION

- 3.1 Installation
 - .1 Comply with requirements of CAN/ULC S702.2.
 - .2 Pneumatically place loose fill insulation above ceiling between joists to provide minimum thermal resistance value RSI as indicated.
 - .3 Ensure ceiling areas exposed to outside air are insulated.
 - .4 Ensure unobstructed air circulation to eave vents. Install baffles as indicated to prevent insulation from spilling over top of exterior wall and causing blockage of soffit vents, and to prevent displacement of insulation by wind entering vents.
 - .5 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of ULC 604 type A chimneys and CSA B149.1 and CSA B149.2 type B and L vents.
- 3.2 Cleaning
 - .1 Proceed in accordance with Section 01 74 11 – Cleaning.
 - .2 Remove insulation material spilled during installation and leave work area ready for application of wall board.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 71 00 Roof Specialties and Accessories
- .3 Section 07 62 00 Sheet Metal Flashing and Trim
- .4 Section 07 92 00 Joint Sealants

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C1289-22 Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
 - .2 ASTM D448-12(2017) Standard Classification for Sizes of Aggregate for Road and Bridge Construction
 - .3 ASTM D4637/D4637M-15(2021) Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane
- .2 CSA Group (CSA)
 - .1 CSA A123.21:20 Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane-Roofing Systems
- .3 Canadian Roofing Contractors Association (CRCA) Metric Specification Manual
- .4 Underwriters' Laboratories of Canada (ULC)
 - .1 ULC S102 Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 List of Equipment and Materials Volume II Building Construction including supplements to date.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit samples and manufacturer's literature for all materials.
- .3 Submit verification that membrane material meets performance requirements specified in the referenced standards.
- .4 Submit shop drawings of all components and accessories showing layout, details of construction and identification of materials.
- .5 Sample of the manufacturer's Total Systems Warranty covering all components of the roofing system.
- .6 Submit a letter of certification from the manufacturer which certifies the roofing contractor is authorized to install the manufacturer's roofing system and lists foremen who have received training from the manufacturer along with the dates training was received.

- .7 Submit a letter of certification from the manufacturer stating the size and weight of the required ballast are in accordance with ANSI (American National Standards Institute) ANSI/SPRI RP-4 (dated December 3, 2008) Wind Design Standard for Ballasted Single-Ply Roofing Systems.
- .8 Upon completion of the installed work, submit copies of the manufacturer's final inspection report to the specifier prior to the issuance of the manufacturer's warranty.

1.5 Quality Control

- .1 The Owner will appoint and pay for an Independent Inspection Company to provide roofing inspection. Provide full co-operation to the roofing inspector.

1.6 Quality Assurance

- .1 The EPDM membrane roofing system must achieve a UL Class A rating.
- .2 The EPDM membrane roofing system must meet the requirements of CSA A123.21:20
- .3 The roofing system must be installed by an applicator authorized and trained by the manufacturer in compliance with shop drawings as approved by the manufacturer. The roofing applicator shall be thoroughly experienced and upon request be able to provide evidence of having at least five years successful experience installing single-ply EPDM roofing systems and having installed at least one (1) roofing application or several similar systems of equal or greater size within one year.
- .4 The manufacturer must have a minimum of 30 years of experience in the manufacturing of vulcanized thermal set sheeting.
- .5 The membrane must be manufactured by the material supplier. Manufacturer's supplying membrane made by others are not acceptable.
- .6 Provide adequate number of experienced workmen regularly engaged in this type of work who are skilled in the application techniques of the materials specified. Applicators installing roof and related work shall be factory trained and approved by the manufacturer. Provide at least one thoroughly trained and experienced superintendent on the job at all times roofing work is in progress.
- .7 There shall be no deviations made from this specification or the approved shop drawings without the prior written approval of the Consultant. Any deviation from the manufacturer's installation procedures must be supported by a written certification on the manufacturer's letterhead and presented for the Consultant's consideration.
- .8 Unless otherwise noted in this specification, the roofing contractor must strictly comply with the manufacturer's current specifications and details.
- .9 Upon completion of the installation, arrange for an inspection to be made by a non-sales technical representative of the membrane manufacturer in order to identify any needed corrective repairs that will be required for warranty issuance. Notify the Consultant seventy-two (72) hours prior to the manufacturer's final inspection.
- .10 Inspector shall be employed and trained by the manufacturer and have received product-specific training from the manufacturer of the products.

1.7 Pre-installation Conference

- .1 Hold a pre-installation meeting prior to start of roofing works, with the Consultant, the Owner, and the General Contractor. The purpose of this meeting shall be to review particular installation conditions. Prepare and distribute a report for this meeting.

1.8 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
 - .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
 - .3 The roofing contractor shall have adequate facilities or access to facilities to take receipt of and store roofing materials so that the materials are ready to be built in.
 - .4 Deliver and store materials undamaged in original unopened containers with manufacturer's label and seals intact. Containers shall be stored upright and roofing membrane shall be stored on end to prevent flattening. All materials shall be protected from moisture at all times. No material shall be placed in direct contact with the earth.
 - .5 All packed materials shall bear the manufacturer's name brand, weight and applicable specification number and printed instructions for storage, application, etc. Materials not identified shall be removed off the site.
 - .6 All materials, except membrane, must be stored between 5 ° C and 27 ° C. If exposed to lower temperature, restore materials to 5 ° C minimum temperature before using. All materials, except membrane, must be stored in a dry area and protected from water and direct sunlight.
 - .7 Store moisture susceptible materials above ground and protect with waterproof coverings.
 - .8 Store materials containing solvents in dry, well ventilated spaces with proper fire and safety precautions. Keep lids on tight. Use before expiration of their shelf life.
 - .9 Underlayment products must be on pallets, off the ground and tightly covered with waterproof materials. Manufacturer's wrap does not provide sufficient waterproofing.
 - .10 Storage of insulation and roofing materials on the roof is prohibited.
 - .11 Any materials which are found to be damaged shall be removed and replaced at the applicator's expense
 - .12 Provide adequate protection of materials and work of this trade from damage by weather, traffic and other causes. Schedule roofing installations in such a manner that traffic over the completed portions of roofing will be avoided. At the end of each day's work seal exposed edges of roofing membrane. Protect work of other trades from damage resulting from the work of this trade. Make good such damage at no additional expense to the Owner and to the satisfaction of the Consultant.
- 1.9 Waste Management and Disposal
- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.
- 1.10 Environmental Requirements
- .1 Proceed with roofing work only when weather conditions are in compliance with the manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations.
 - .2 Obtain written authorization from the roofing inspector to proceed.
 - .3 Do not work during periods of rain, fog, sleet, snow or cold temperatures (below -15 ° C).
- 1.11 Project Conditions
- .1 Safety Data Sheets (SDS) must be on location at all times during the transportation, storage and application of materials.
 - .2 When positioning membrane sheets, exercise care to locate all field splices away from low spots and out of drain sumps. All field splices should be shingled to prevent bucking of water.

- .3 When loading materials onto the roof, the Carlisle Authorized Roofing Applicator must comply with the requirements of the building owner to prevent overloading and possible disturbance to the building structure.
- .4 Proceed with roofing work only when weather conditions are in compliance with the manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations.
- .5 Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage.
- .6 The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.
- .7 New roofing shall be complete and weathertight at the end of the work day.

1.12 Job Site Protection

- .1 Adequately protect building, paved areas, service drives, lawn, shrubs, trees, etc. from damage while performing the required work. Provide canvas, boards and sheet metal (properly secured) as necessary for protection and remove protection material at completion. Repair or be responsible for costs to repair all property damaged during the roofing application.
- .2 Take precautions to prevent the spread of dust and debris, particularly where such material may sift into the building. Provide labor and materials to construct, maintain and remove necessary temporary enclosures to prevent dust or debris in the construction area(s) from entering the remainder of the building.
- .3 Take precautions to prevent drains from clogging during the roofing application. Remove debris at the completion of each day's work and clean drains, if required. At completion, test drains to ensure the system is free running and drains are watertight. Remove strainers and plug drains in areas where work is in progress. Install flags or other telltales on plugs. Remove plugs each night and screen drain.
- .4 Provide protection, such as 3/4" thick plywood, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.
- .5 Do not overload any portion of the building, either by use of or placement of equipment, storage of debris, or storage of materials.
- .6 Protect against fire and flame spread. Maintain proper and adequate fire extinguishers.
- .7 Remove all traces of piled bulk materials and return the job site to its original condition upon completion of the work.

1.13 Work Sequence

- .1 Schedule and execute work to prevent leaks and excessive traffic on completed roof sections. Care should be exercised to provide protection for the interior of the building and to ensure water does not flow beneath any completed sections of the membrane system.

1.14 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

- .2 Provide manufacturer's 15 year Total System Warranty covering both labor and material with no dollar limitation. The maximum wind speed coverage shall be peak gusts of 72 mph, measured at 10 meters above ground level. Agree to make good promptly any defects which occur or become apparent within the warranty period, such defects to include but not be restricted to leaking, failure to stay in place, undue expansion, lifting, deformation, loosening and splitting of seams, joint deformation, failure to adhere, deterioration, blisters, etc.
- .3 Furnish the Guarantee Warranty in writing, on forms issued and approved by the Canadian Roofing Contractors Association, signed by the roofing Contractor.
- .4 Pro-rated System Warranties shall not be accepted.

PART 2 PRODUCTS

2.1 Manufacturer

- .1 Carlisle Syntec roofing system as described herein, is the minimum acceptable standard. Equivalent roofing systems and components as manufactured by the following are acceptable, subject to the approval of the Consultant and conformance to the requirements of the reference standards:
 - .1 Firestone.
 - .2 Lexcan

2.2 Materials

- .1 Use materials as specified herein only or approved equal.
- .2 Compatibility between roofing system components is essential. Unless otherwise approved by the Consultant and accepted by the membrane manufacturer, all products (including insulation, fasteners, fastening plates and edgings) must be manufactured and supplied by the roofing system manufacturer and covered by the warranty.
- .3 All components of the specified roofing system shall be products of the membrane manufacturer or accepted by the manufacturer as compatible.

2.3 Underlayment

- .1 Carlisle SecurShield HD Cover Board – a rigid insulation panel composed of a high-density, closed-cell polyisocyanurate foam core laminated to coated-glass fiber-mat facer for use as a cover board or recover board meeting ASTM 1289, Type II, Class 2 (109 psi max). 1/2" thick 4' x 8' panel weight 11 lbs with an R-value of 2.5.

2.4 Membrane

- .1 Carlisle Sure-Seal 60 mil E.P.D.M. (Ethylene Propylene Diene Monomer) Sure Seal with "FAT" Elastomer. The membrane shall be manufactured in a single panel with no factory splices. The membrane shall conform to the minimum physical properties of ASTM D4637.

2.5 Fasteners and Plates

- .1 HP Fasteners: threaded, black epoxy electro-deposition coated (E-Coat) fastener.
- .2 HP Term Bar Nail-In: a 32 mm long expansion anchor with drive pin used for fastening Carlisle Sure-Seal Termination Bar or Seam Fastening Plates to concrete, brick or block walls.
- .3 Seam Fastening Plate: 50 mm diameter metal fastening plate used in conjunction with Reinforced Universal Securement Strip or EPDM membrane for additional membrane securement.

- .4 Reinforced Universal Securement Strip: a 150 mm wide, nominal 45-mil thick clean, cured black reinforced EPDM membrane with 76 mm wide Factory-Applied Tape (FAT) laminated along one edge: Carlisle Sure-Seal Pressure-Sensitive RUSS.

2.6 Adhesives, Cleaners and Sealants

- .1 All products shall be furnished by the membrane manufacturer and specifically formulated for the intended purpose.
- .2 Bonding Adhesive: Sure-Seal 90-8-30A.
- .3 Splicing Cement: Sure-Seal EP-95
- .4 Splice Tape and Primer: Sure-Seal SecurTAPE or Factory-Applied Tape (FAT) and Sure-Seal Primer.
- .5 Cleaning Solvent: Weathered Membrane Cleaner.
- .6 Internal Seam Sealant: Sure-Seal In-Seam Sealant.
- .7 External Seam Sealant: Sure-Seal Lap Sealant
- .8 Pocket Sealant: Sure-Seal Pourable Sealer
- .9 Insulation Adhesive: Sure-Seal FAST Adhesive.

2.7 Membrane Terminations

- .1 Termination Bar: 25 mm wide and 2.48 mm thick extruded aluminum bar pre-punched 150 mm on center; incorporating a sealant ledge to support lap sealant or universal sealant and provide increased stability for membrane terminations.

2.8 Ballast

- .1 Rounded Water-Worn Gravel
 - .1 Nominal 1-1/2" rounded water-worn gravel which conforms to gradation #4 when sized in accordance with ASTM D448 method of sizing.
 - .2 Existing stone ballast may be reused. Supply additional stone ballast as necessary to obtain full coverage.

2.9 Accessories

- .1 Stack jacks (vent pipe flashings): Refer to Section 07 71 00.
- .2 Elastic flashings: Field fabricated with E.P.D.M. membrane, 1.6 mm thick.
- .3 Pitch Pockets: Spun Aluminum Mastic Pans.
- .4 Retrofit Roof Drains: Thaler Retrofit Aluminum Roof Drain size to fit existing drain piping and roof configuration and compatible with roofing system.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

- .1 Comply with the manufacturer's published instructions for the installation of the membrane roofing system including proper substrate preparation, job site considerations and weather restrictions.
- .2 Position sheets to accommodate contours of the roof deck and shingle splices to avoid bucking water.

3.2 General

- .1 Position sheets to accommodate contours of the roof deck and shingle splices to avoid bucking water.
- .2 Provide protection, such as 19 mm thick plywood, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.
- .3 When loading materials onto the roof, comply with the requirements of the Consultant to prevent overloading and possible disturbance to the building structure
- .4 Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage.
- .5 The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.
- .6 When positioning membrane sheets, exercise care to locate all field splices away from low spots and out of drain sumps. All field splices should be shingled to prevent bucking of water.

3.3 Examination

- .1 Examine work of other trades and notify in writing to the Consultant and Contractor that the work is acceptable or of any defects or discrepancies. Verify that work of other trades which penetrates roof deck or requires men and equipment to transverse roof deck has been completed or adequate protection is provided.
- .2 Examine surfaces for inadequate anchorage, foreign material, moisture and unevenness which would prevent the execution and quality of application of the roofing system as specified. Do not proceed with application of the roof system until defects are corrected. Installation of any part of the work without the written acceptance of such surfaces shall require immediate removal of such installed work.
- .3 If discrepancies are discovered between the existing conditions and those noted on the drawings, immediately notify the owner's representative by phone and solicit the manufacturer's approval prior to commencing with the work. Necessary steps shall be taken to make the building watertight until the discrepancies are resolved.

3.4 Workmanship

- .1 All work shall be of highest quality and in strict accordance with the manufacturer's published specifications and to the Owner's satisfaction.
- .2 Use only competent mechanics and execute work in accordance with drawings and specifications.
- .3 Regard the manufacturer's printed recommendations and specifications as the minimum requirement for materials, methods and workmanship not otherwise specified.
- .4 Maintain roofing equipment in good working order.
- .5 Unsuitable or damaged materials shall immediately be removed from the site.
- .6 Materials shall not be applied during inclement weather. Do not apply roofing over wet decks, or where frost or snow is present.

3.5 Curbs

- .1 Coordinate installation of wood or pre-fabricated curbs by others.

3.6 Underlayment

- .1 Install membrane underlayment over the substrate with boards butted tightly together with no joints or gaps greater than 1/4 inch. Stagger joints both horizontally and vertically if multiple layers are provided.
- .2 Keep underlayment dry at all times. Underlayment showing evidence of having been dampened since its manufacture or separation of laminations shall not be used. Lay underlayment panels with all joints staggered. Underlayment shall be laid with the longest side parallel to the flutes unless the manufacturer stipulates otherwise. Lay board in tight contact to prevent gaps and resulting loss of thermal insulation value. Cut boards to fit neatly around projections through roof.
- .3 Secure underlayment to the substrate with the required mechanical fasteners in accordance with the manufacturer's specifications.

3.7 Roof Membrane

- .1 Roof membrane shall consist of 1 ply of E.P.D.M. Elastomer sheets, fully adhered to substrate. All seams shall be bonded with adhesive.
- .2 Unroll and position membrane without stretching. Allow the membrane to relax for approximately ½ hour before bonding. Fold the sheet back onto itself so half the underside of the membrane is exposed.
- .3 Apply bonding adhesive in accordance with the manufacturer's published instructions, to both the underside of the membrane and the substrate. Allow the adhesive to dry until it is tacky but will not string or stick to a dry finger touch.
- .4 Roll the coated membrane into the coated substrate while avoiding wrinkles. Brush down the bonded half of the membrane sheet with a soft bristle push broom to achieve maximum contact.
- .5 Fold back the unbonded half of the membrane sheet and repeat the bonding procedure.
- .6 Install adjoining membrane sheets in the same manner, overlapping edges approximately 100 mm.
- .7 EPDM membrane is to be fully bonded with bonding adhesive to a minimum 25 mm wide strip of insulation or substrate extending out from the roof perimeter and any large roof protrusions. Apply adhesive to both mating surfaces according to the adhesive application instructions. Membrane is to be fully bonded to all vertical surfaces including walls, curbs and parapets.
- .8 Do not apply bonding adhesive to the splice area.

3.8 Membrane Splicing

- .1 Tape splices must be a minimum of 65 mm wide using 75 mm wide SecurTAPE extending 3 mm minimum to 13 mm maximum beyond the splice edge. Field splices at roof drains must be located outside the drain sump.
- .2 Position membrane sheet to allow for required splice overlap. Mark the bottom sheets with an indelible marker approximately 6 mm to 13 mm from the top sheet edge. The pre-marked line on the membrane edge can also be used as a guide for positioning splice tape.
- .3 Fold the top sheet back and clean the dry splice area (minimum 75 mm wide) of both membrane sheets by scrubbing with clean natural fiber rags saturated with Sure-Seal Primer.
- .4 Apply splice tape and primer in accordance with the manufacturer's specifications and roll the top sheet onto the mating surface.
- .5 Immediately roll the splice using positive pressure when using a 50 mm wide steel roller. Roll across the splice edge, not parallel to it.

- .6 At all field splice intersections, apply lap sealant along the edge of the membrane splice to cover the exposed splice tape 50 mm in each direction from the splice intersection. Install pressure-sensitive "T" Joint covers or a 150 mm wide section with rounded corners of pressure-sensitive flashing over the field splice intersection.

3.9 Flashing

- .1 Wall and curb flashing shall be cured EPDM membrane. Continue the deck membrane as wall flashing where practicable.
- .2 Flash all corners, vent pipes, drains and curbs in accordance with the manufacturer's standard recommended details. Seal drains with water cut-off mastic or elastic sealer tape as per manufacturer's standard recommended details.

3.10 Metal Flashing

- .1 Complete all metal flashings in accordance with Section 07 62 00.

3.11 Pitch Pockets

- .1 Provide and install prefabricated aluminum pitch pockets (mastic pans) around protrusions through the roofing, including the work of the Mechanical and Electrical Trades. Pockets shall be fabricated, to a size 150 mm greater on each side of the protrusion. Solder all seams and corners.
- .2 Flash in the pitch pockets with prefabricated flashing membrane in accordance with the manufacturer's standard recommended details.
- .3 Completely fill the pockets with plastic cement. Slope top of filled pockets down from the centre to finish flush with the outside edges.

3.12 Roof Drains

- .1 Install membrane. Extend 25 mm beyond inside edge of drain bowl flange.
- .2 Trim flashing as necessary to 25 mm from inside edge of drain bowl flange.
- .3 Install clamping ring and drain strainer.
- .4 Install clamping ring same day that base flashing installed to prevent water back-up under membrane.
- .5 Securely fasten clamping ring to provide continuous compression of drain flashings.
- .6 Install strainer dome.
- .7 At end of project, test drains for watertightness and ensure that drains flow freely.

3.13 Temporary Flashing

- .1 Install temporary roofing and flashings in all areas of modifications as necessary to provide a weathertight roof.

3.14 Daily Seal

- .1 On phased roofing, when the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.
- .2 Complete an acceptable membrane seal in accordance with the manufacturer's requirements.

3.15 Ballasting

- .1 Install ballast in accordance with the manufacturer's installation instructions.

.2 Rounded Water-Worn Gravel or Crushed Stone

- .1 Nominal 1-1/2" rounded gravel: coverage rate shall be no less than 1000 pounds per 100 square feet and gravel must be evenly distributed to maintain an average of 10 pounds per square foot.

.3 Install ballast evenly without bare spots to provide complete coverage over the membrane.

.4 Comply with published (American National Standards Institute) ANSI/SPRI RP-4 guidelines concerning applicable coverage rates zone.

3.16 Inspection and Testing

.1 Provide necessary facilities and co-operate with designated inspection and testing agency.

.2 Upon completion of the roofing system, an authorized manufacturer's representative will make an inspection of the installation for warranty acceptance.

3.17 Cleaning

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

.2 Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.

.3 Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 51 00 Ethylene-Propylene-Diene Monomer Roofing
- .3 Section 07 92 00 Joint Sealants

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A653/A653M-18 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM D523-14 (2018) Standard Test Method for Specular Gloss
- .2 CSA Group (CSA)
 - .1 CSA B111 Wire Nails, Spikes and Staples.
 - .2 CSA 136-16 North American Specification for the Design of Cold-Formed Steel Structural Members
- .3 Canadian General Services Board (CGSB)
 - .1 CAN/CGSB 1.108-M Bituminous Solvent Type Paint.
 - .2 CAN/CGSB-37.5 Cutback Asphalt Plastic Cement.
 - .3 CAN/CGSB-51.32 Sheathing, Membrane, Breather Type.
- .4 Canadian Sheet Steel Building Institute (CSSBI)
 - .1 CSSBI - Standard Practice for Sheet Steel Cladding.
 - .2 CSSBI B16-94 Prefinished Sheet Steel for Building Construction.
- .5 Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit duplicate 300 x 300 mm samples of each type of sheet metal material, colour and finish when requested by the Consultant.

1.5 Design and Performance Requirements

- .1 Appearance: neatly and evenly lay out and install components. Exposed fastening devices not permitted.
- .2 Effects of Wind: resist positive and negative wind pressures without detrimental effects.
- .3 Water Control: prevent passage of water.
- .4 Thermal Movement: accommodate expansion and contraction of component parts without buckling, failure of joints, undue stress on fasteners and other detrimental effects.
- .5 Compatibility: components shall be compatible with dissimilar metals and materials with which they are in contact or fastened to so as to prevent corrosion, staining and other detrimental effects. If

required, treat or separate contact surfaces with inert and non-staining insulation material to achieve compatibility.

1.6 Quality Assurance

- .1 Work of this Section shall be performed by a qualified sheet metal contractor with a minimum of 5 years of experience in the type of work required and specified. Submit proof of experience where requested by the Consultant.

1.7 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Materials shall be handled and stored on the job in such a manner that no damage shall be done to the material or the structures.
- .3 Materials showing evidence of improper handling and storage shall be rejected and removed from the site at no additional expense to the Owner.

1.8 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.9 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.
- .2 Submit manufacturer's warrantee that pre-finished materials will not lose film integrity for 25 years and will not chalk or fade for 20 years following date of Substantial Performance.

PART 2 PRODUCTS

2.1 General

- .1 Ensure compatibility of all materials in contact with roof membrane.

2.2 Materials

- .1 Sheet Metal: 0.48 mm thick galvanized sheet steel, commercial quality to ASTM A653 Grade 'A' with a minimum yield stress of 230 MPA, and a working stress of 144 MPA, to CSA S136. Material shall have Z275 designation zinc coating.
- .2 Prefinished material shall be colour coated with manufacturer's standard finish system equivalent to Valspar WeatherXL coating system, utilizing silicone modified polyester resin, minimum dry film thickness of 1.0 ± 0.1 mils when tested to ASTM D1005.
 - .1 Colour for all sheet metal flashing and trim shall be as selected by the Consultant from full range of manufacturer's standard colours.
- .3 Continuous hook on strips and metal bellows: 0.65 mm galvanized sheet steel, zinc coating designation ZF275.
- .4 Isolation Coating: Alkali resistant exterior bituminous paint to CAN/CGSB 1.108-M.
- .5 Plastic Cement: To CAN/CGSB 37.5.
- .6 Nails, Bolts, Screws and Other Fastenings: same metal finish as sheet metal being used to CSA B111. The size of fastenings shall suit the applicable conditions.
- .7 Underlay: No. 15 perforated asphalt felt to CSA A123.3-M or dry sheathing, breather type, to CAN/CGSB-51.32

- .8 Cleats: Of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

PART 3 EXECUTION

3.1 General

- .1 Install sheet metal work in accordance with CRCA specifications and as detailed.
- .2 Use concealed fastenings except where approved before installation.

3.2 Fabrication

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA specifications and as indicated.
Form pieces in 2440 mm maximum lengths.
- .2 Hem exposed edges on underside 13 mm. Mitre and seal corners with sealant.
- .3 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .4 Apply isolation coating (two coats) to metal surfaces to be in contact with concrete or mortar or dissimilar metals.
- .5 Install underlay under sheet metal in accordance with CRCA "FL" series details. Lap joints 100 mm.
- .6 All seams shall be of the "slip lock type" that permit adequate movement without resulting in deformation or loosening of metal flashings. Lapped joints or exposed raw edges will not be accepted. Exposed edges shall be "double back" at least 13 mm. At eaves and parapets, metal shall be hooked over continuous starter strips minimum 1 gauge thicker than the metal used for flashing. Secure starter strips at 300 mm on centre or closer as required.
- .7 Where metal terminates under fascia boards, secure metal at 610 mm centres using specified fasteners. At curbs to openings or at sleepers, provide locked or standing seams at corners. Solder mitred corners, pop rivet or form standing seams.
- .8 Secure metal flashings in reglets at 610 mm centres and further secure metal to vertical surfaces at locks as required.
- .9 All flashings shall be installed in straight lines. Irregular or badly fitted work will not be accepted. Exposed fastenings will only be permitted where concealed fastening is not possible. Provide neoprene washers for exposed fasteners.
- .10 Imperfections in metal flashing work such as holes, dents, creases, or oil-canning will not be accepted.
- .11 Fabricate and install scuppers as detailed and in accordance with CRCA specifications and standards.

3.3 Caulking of Flashings

- .1 Sealants shall be as specified in Section 07 92 00 - Joint Sealants.
- .2 Caulk all joints in flashing.
- .3 Dissimilar metals in contact, or metals in contact with adjacent surfaces shall be separated from one another to prevent corrosion, staining, or electrolysis by use of approved methods and materials.
- .4 Do caulking between metal flashing and concrete.

- .5 Caulking compound shall be applied in strict accordance with the manufacturer's application instructions. Use proper surface primers where necessary.
- .6 Colour of caulking compound shall be the integral colour of the abutting material.

3.4 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 51 00 Ethylene-Propylene-Diene Monomer Roofing
- .3 Section 07 62 00 Sheet Metal Flashing and Trim

1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit shop drawings and manufacturers literature:
 - .1 Indicate size and description of components and materials, arrangement of hardware, operating mechanism, required clearances, fasteners, anchoring, and finishes.

1.4 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.5 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.6 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

- .1 Mechanical Vent Flashings: As recommended by roof system manufacture and to suit mechanical installations. Prefabricated.

2.2 Roof and Attic Access Hatches

- .1 760 mm wide x 915 mm long, single leaf roof access hatch.
- .2 Acceptable Products:
 - .1 Lexsuco R-100/SS/SB/460 mm Ladder Access Roof Hatch.
 - .2 Bilco Type S-20 Roof Access Hatch.
- .3 Curb and door shall be 1.994 mm primer coated G-90 galvanized steel, neatly welded and ground at corners. Doors shall have 25 mm thick glass fibre insulation with a minimum density of 19 kg/m² and a door liner of 1.311 mm primer coated galvanized steel. Reinforce doors to support a minimum live load of 1.9 kPa. Curb shall be 460 mm high with 25 mm thick high density rigid fibre insulation secured to the curb exterior. Curb shall have 90 mm wide pre-punched flanges.
- .4 Roof hatch shall be completely assembled with heavy duty pintle hinges, torsion bar operated doors, latching mechanisms, interior padlock hasps and neoprene draft seals. Door shall have automatic hold open arm complete with rubber grip handle.

- .5 All hardware shall be stainless steel.
- .6 Hatches shall be factory finished with grey primer.
- .7 Provide roof hatch with 35 mm diameter safety bar coated with 20 mil. PVC colour coated roof safety green. Safety bar shall be mounted so as to not impede operation of door.
- .8 Fabrication:
 - .1 Fabricate components free of twists, bends, or visual distortion and insulated. Weld corners and joints.
 - .2 Ensure continuity of gasket seals.
 - .3 Design and fabricate hatch assemblies to collect and lead off accumulated condensation.
 - .4 Pre-drill flanges for anchoring to deck.
 - .5 Assemble hatch components in accordance with reviewed shop drawings and deliver pre-fabricated units to site complete with anchoring hardware, safety bar and accessories.
 - .6 Locate safety bar on side indicated or approved by the Consultant.

PART 3 EXECUTION

3.1 Roof and Attic Access Hatches

- .1 Install in accordance with manufacturers printed instructions.
- .2 Secure all hatches to deck with bolts to meet the manufacturer's specifications.
- .3 Shim and level all curbs to suit roof slopes.
- .4 Erect hatch level and plumb and in proper alignment.
- .5 Adjust and seal assembly with provision for expansion and contraction of components.
- .6 Install safety bar, securely anchored to curb with tamper proof screws or bolts.

3.2 Mechanical Vent Flashings

- .1 Co-ordinate size, material, and locations with Mechanical Sections. Provide mechanical vent flashings at all mechanical equipment and pipe penetrations through the roof.
- .2 Flashings shall be compatible with roofing assemblies.
- .3 Install vent flashings and other penetration flashings and seal to roof membrane in accordance with manufacturer's recommendations and details.
- .4 Secure all vent flashings and accessories to deck with bolts to meet the manufacturer's specifications.
- .5 Coordinate with other trades for location and size of vent flashings.

3.3 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 04 22 00 Concrete Unit Masonry
- .2 Section 07 92 00 Joint Sealants
- .3 Section 09 01 20 Plaster Restoration
- .4 Section 09 21 16 Gypsum Board

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM E84-18 Standard Test Method for Surface Burning Characteristics of Building Materials
 - .2 ASTM E119-18 Standard Test Methods for Fire Tests of Building Construction and Materials
 - .3 ASTM E136-16a Standard Test Method for Behavior of Material in a Vertical Tube Furnace at 750° C
 - .4 ASTM E814-13a (2017) Standard Test Method for Fire Tests of Penetration Firestop Systems.
 - .5 ASTM E1966-15 Standard Test Method for Fire-Resistive Joint Systems
 - .6 ASTM E2307-15be1 Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus
- .2 Underwriter's Laboratories of Canada (ULC)
 - .1 ULC 101-2014 Standard Methods of Fire Endurance Tests of Building Construction and Materials
 - .2 ULC 102.2-2018 Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies
 - .3 ULC 115-2018 Standard Method of Fire Tests of Firestop Systems
- .3 National Fire Protection Association (NFPA)
 - .1 NFPA 252 Standard Methods of Fire Test and Door Assemblies
- .4 South Coast Air Quality Management District (SCAQMD) California State
 - .1 SCAQMD Rule 1168-03: Adhesives and Sealants.
- .5 Ontario Building Code

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings: Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect

actual job conditions.

- .4 Samples: Submit duplicate 300 x 300 mm samples showing actual fire stop material proposed for project.
- .5 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.
 - .1 Test reports: in accordance with ULC 101 for fire endurance and ULC 102 for surface burning characteristics.
 - .2 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties
 - .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .4 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

1.5 Definitions

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

1.6 Quality Assurance

- .1 One installer shall install all firestopping on the project. Each trade shall not firestop their own service penetrations. Installer shall be certified by fire stopping manufacturer.
- .2 Qualifications:
 - .1 Qualified Installer: specializing in fire stopping installations with 5 years documented experience approved and trained by manufacturer.
- .3 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and Consultant to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
- .4 Site Meetings:
 - .1 As part of Manufacturer's Services described in 3.5- Field Quality Control, schedule site visits, to review Work, at stages listed.
 - .2 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.

- .3 Twice during progress of Work at 25% and 60% complete.
- .4 Upon completion of Work, after cleaning is carried out.
- .5 Single Source Responsibility: Obtain through-penetration fire-stop systems for each kind of penetration and construction condition indicated from a single manufacturer.
- .5 Field-Constructed Mockup: Prior to installing fire-stopping, erect mockups for each different through-penetration fire-stop system indicated to verify selections made and to demonstrate qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final installations.
 - .1 Locate mockups on site in locations indicated or, if not indicated, as directed by Consultant.
 - .2 Notify Consultant one (1) week in advance of the dates and times when mockups will be erected.
 - .3 Obtain Consultant's acceptance of mockups before start of final unit of Work.
 - .4 Retain and maintain mockups during construction in an undisturbed condition as a standard for judging completed unit of Work.
 - .5 Accepted mockups in an undisturbed condition at time of Substantial Performance may become part of completed unit of Work.
- 1.7 Sustainable Requirements
 - .1 Materials shall be Low VOC type conforming to SCAQMD Rule 1168-03. Maximum VOC level of firestopping materials shall be 250 g/l.
- 1.8 Project Conditions
 - .1 Environmental Conditions: Do not install fire-stopping when ambient or substrate temperatures are outside limits permitted by fire-stopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
 - .2 Ventilation: Ventilate fire-stopping per fire-stopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.
- 1.9 Shipping, Handling and Storage
 - .1 Refer to Section 01 61 00 – Common Product Requirements.
 - .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
 - .3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.
 - .4 Storage and Protection:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- 1.10 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 All fire stopping shall consist of ULC listed firestop system.
- .2 Applications: Provide fire-stopping systems composed of materials specified in this Section that

comply with system performance and other requirements.

- .3 All firestopping material shall be:
 - .1 From one manufacturer;
 - .2 Intumescent where an appropriate system exists.
- .4 Fire stopping and smoke seal systems: ULC listed in accordance with ULC 115.
 - .1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of ULC 115 and not to exceed opening sizes for which they are intended.
- .5 Service penetration assemblies: ULC listed systems tested to ULC 115.
- .6 Service penetration fire stop components: ULC listed and certified by test laboratory to ULC 115.
- .7 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.
- .8 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.
- .9 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
- .10 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .11 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .12 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .13 Sealants for vertical joints: non-sagging.
- .14 General: Provide fire-stopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.
- .15 F-Rated Through-Penetration Fire-stop Systems: Provide through-penetration fire-stop systems with F ratings indicated, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.
- .16 T-Rated Through-Penetration Fire-stop Systems: Provide through-penetration fire-stop systems with T ratings, in addition to F ratings, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupy-able floor areas. T-rated assemblies are required where the following conditions exist:
 - .1 Where fire-stop systems protect penetrations located outside of wall cavities.
 - .2 Where fire-stop systems protect penetrations located outside fire-resistive shaft enclosures.
 - .3 Where fire-stop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.
 - .4 Where fire-stop systems protect penetrating items larger than a 100 mm diameter nominal pipe or 10,000 mm² in overall cross-sectional area.
- .17 Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.
- .18 For fire-stopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.

- .1 For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration fire-stop systems.
- .2 For floor penetrations with annular spaces exceeding 100 mm or more in width and exposed to possible loading and traffic, provide fire-stop systems capable of supporting the floor loads involved either by installing floor plates or by other means.
- .3 For penetrations involving insulated piping, provide through-penetration fire-stop systems not requiring removal of insulation.
- .19 For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450.
- .20 Compatibility: Provide fire-stopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by fire-stopping manufacturer based on testing and field experience.
- .21 Accessories: Provide components for each fire-stopping system that are needed to install fill materials and to comply with "System Performance Requirements". Use only components specified by the fire-stopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistance-rated systems. Accessories include but are not limited to the following items:
 - .1 Permanent forming/damming/backing materials including the following:
 - .1 Semi-refractory fibre (mineral wool) insulation.
 - .2 Ceramic fibre.
 - .3 Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
 - .4 Fire-rated formboard.
 - .5 Joint fillers for joint sealants.
 - .2 Temporary forming materials.
 - .3 Substrate primers.
 - .4 Collars.
 - .5 Steel sleeves.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

- .1 Compliance: comply with manufacturer's written recommendations or specifications.

3.2 Preparation

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
- .2 Ensure that substrates and surfaces are clean, dry and frost free.
- .3 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .4 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour retarder.
- .5 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains

on adjacent surfaces.

3.3 Installation

- .1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing and as necessary to maintain fire resistance ratings of floor and wall assemblies.
- .2 Provide fire stopping for all disciplines.
- .3 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .4 Fill spaces between openings, ducts, pipes and unused sleeves passing through fire separations with firestop material and install firestopping systems in accordance with the appropriate ULC system number for the products and type of penetration.
- .5 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .6 Tool or trowel exposed surfaces to neat finish.
- .7 Remove excess compound promptly as work progresses and upon completion.

3.4 Sequences of Operation

- .1 Proceed only when submittals have been reviewed by Consultant.
- .2 Mechanical pipe insulation: certified fire stop system component.
 - .1 Ensure pipe insulation installation precedes fire stopping.

3.5 Field Quality Control

- .1 Inspections: notify Consultant when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.
- .2 Employ a ULC accredited Designated Responsible Individual (DRI) to inspect and label all fire stop applications on site.
- .3 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1.4 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1.6 - QUALITY ASSURANCE.

3.6 Commissioning

- .1 Employ a ULC accredited Designated Responsible Individual (DRI) to inspect and label all fire stop applications on site. Submit DRI's written reports within 3 days of review, verifying compliance of Work.
- .2 Perform a thorough examination of the fire stopping system to determine if the assembly is installed as per its ULC listing.
- .3 Allow for destructive testing of installed firestopping. Repair all tested assemblies.
- .4 The examination shall take place prior to close-up to confirm assembly components and

installation configuration.

- .5 Any and all deviations from the ULC listed system shall be considered grounds for rejection and replacement.

3.7 Schedule

- .1 Fire stop and smoke seal at:

- .1 Penetrations through fire-resistance rated concrete, masonry, and gypsum board partitions and walls.
- .2 Top of fire-resistance rated partitions.
- .3 Intersection of fire-resistance rated partitions.
- .4 Control and sway joints in fire-resistance rated partitions and walls.
- .5 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
- .6 Around mechanical and electrical assemblies penetrating fire separations.
- .7 Rigid ducts: greater than 129 cm²: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.
- .8 All electrical outlet boxes installed in fire rated gypsum board assemblies.
- .9 All locations required by the Ontario Building Code.
- .10 Any other locations indicated.

3.8 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 04 22 00 Concrete Unit Masonry
- .2 Section 06 10 00 Rough Carpentry
- .3 Section 06 20 00 Finish Carpentry
- .4 Section 06 40 00 Architectural Woodwork
- .5 Section 07 53 23 Ethylene-Propylene-Diene-Monomer Roofing
- .6 Section 07 62 00 Sheet Metal Flashing and Trim
- .7 Section 07 84 00 Firestopping
- .8 Section 08 11 00 Metal Doors and Frames
- .9 Section 08 50 00 Aluminum Doors and Screens
- .10 Section 08 80 05 Glazing

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C510-16 Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants
 - .2 ASTM C661-15 Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer
 - .3 ASTM C719-14 Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle) 1, 2
 - .4 ASTM C794-18 Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
 - .5 ASTM C834-17 Standard Specification for Latex Sealants
 - .6 ASTM C920-18 Standard Specification for Elastomeric Joint Sealants
 - .7 ASTM C1087-16 Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems
 - .8 ASTM C1193-16 Standard Guide for Use of Joint Sealants
 - .9 ASTM C1247-14 Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids
 - .10 ASTM C1248-18 Standard Test Method for Staining of Porous Substrate by Joint Sealants
 - .11 ASTM C1311-14 Standard Specification for Solvent Release Sealants
 - .12 ASTM C1330-18 Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.
 - .13 ASTM D412-16 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

- .14 ASTM D624-00(2012) Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
- .15 ASTM D2203-01(2018) Standard Test Method for Staining from Sealants
- .16 ASTM D2240-15e1 Standard Test Method for Rubber Property—Durometer Hardness
- .2 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .3 U. S. Environmental Protection Agency (EPA)
 - .1 EPA 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings.
- .4 South Coast Air Quality Management District (SCAQMD) California State
 - .1 SCAQMD Rule 1168-03: Adhesives and Sealants.
- 1.4 Submittals
 - .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Submit product data for all sealant materials and accessories including:
 - .1 Preparation instructions and recommendations.
 - .2 Standard drawings illustrating manufacturer's recommended sealant joint profiles and dimensions applicable to Project.
 - .3 Joint Sealant Schedule: Indicate joint sealant location, joint sealant type, manufacturer and product name, and colour, for each application. Utilize joint sealant designations included in this Section.
 - .4 Samples:
 - .1 Samples for Colour Selection: For each joint sealant type.
 - .2 Samples for Verification: For each joint sealant product, for each colour selected.
 - .5 Greenguard Certificates: For each sealant and accessory product specified to meet volatile organic emissions standards of the Greenguard Children and Schools Certification.
- 1.5 Quality Assurance
 - .1 Installer Qualifications: Company with minimum of three years of experience specializing in work of this section, employing applicators trained for application of joint sealants required for this project, with record of successful completion of projects of similar scope, and approved by manufacturer.
 - .2 Single Source Responsibility: Provide joint sealants by a single manufacturer responsible for testing of Project substrates to verify compatibility and adhesion of joint sealants.
 - .3 Caulking work shall be carried out in strict accordance with manufacturer's printed directions.
 - .4 Pre-construction manufacturer laboratory testing is not required when sealant manufacturer can furnish data acceptable to Consultant based on previous testing for materials matching those of the Work.
- 1.6 Shipping, Handling and Storage
 - .1 Refer to Section 01 61 00 – Common Product Requirements.
 - .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- 1.7 Project Conditions

- .1 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .2 Ventilate area of work by use of approved portable supply and exhaust fans.
- 1.8 Scheduling
 - .1 Ensure sealants are cured before covering with other materials.
- 1.9 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.
- 1.10 Warranty
 - .1 Warrant the work of this Section against defects of workmanship and material, for a period of five (5) years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

- 2.1 Manufacturer
 - .1 Basis-of-Design Products: Provide joint sealant products manufactured by Tremco, Inc., Commercial Sealants and Waterproofing, 220 Wicksteed Avenue, Toronto, www.tremcosealants.com, or comparable products of other manufacturer approved by Consultant.
- 2.2 Materials, General
 - .1 VOC Content for Interior Applications: Provide sealants and sealant primers complying with the following VOC content limits per 40 CFR 59, Subpart D (EPA Method 24):
 - .1 Architectural Sealants: 250 g/L.
 - .2 Sealant Primers for Nonporous Substrates: 250 g/L.
 - .3 Sealant Primers for Porous Substrates: 775 g/L.
 - .2 Low-Emitting Sealants for Interior Applications: Provide sealants and sealant primers complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 - .3 Compatibility: Provide joint sealants and accessory materials that are compatible with one another, and with adjacent materials, as demonstrated by sealant manufacturer using ASTM C1087 testing and related experience.
 - .4 Joint Sealant Standard: Comply with ASTM C920 and other specified requirements for each joint sealant.
 - .5 Stain Test Characteristics: Where sealants are required to be non-staining, provide sealants tested per ASTM C1248 as non-staining on porous joint substrates specified.
- 2.3 Silicone Joint Sealants
 - .1 SJS#1: Single-Component, Nonsag, Non-Staining, Moisture-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 100/50, Use NT; SWRI validated.
 - .1 Basis of Design Product: Tremco Spectrem 1.
 - .2 Volatile Organic Compound (VOC) Content: 1 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.

- .4 Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
- .5 Colour: As selected by Consultant from manufacturer's standard line.
- .2 SJS#5: Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, Use NT.
 - .1 Basis of Design Product: Tremco Tremsil 200 Sanitary.
 - .2 Volatile Organic Compound (VOC) Content: 1 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Colour: White and Clear.
- 2.4 Urethane Joint Sealants
 - .1 UJS#1: Single-Component, Nonsag, Moisture-Cure, Polyurethane Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, Use NT; Greenguard certified.
 - .1 Basis of Design Product: Tremco Dymonic 100.
 - .2 Volatile Organic Compound (VOC) Content: 40 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Tensile Strength ASTM D412: 350 to 450 psi
 - .5 Percent Elongation ASTM D412: 800 to 900%
 - .6 Modulus at 100% ASTM D412: 75 to 85 psi
 - .7 Tear Strength ASTM D412: 65 to 75 psi
 - .8 Smoke Development ASTM E84: 5
 - .9 Colour: As selected by Consultant from manufacturer's standard line.
 - .2 UJS#2: Single-Component, Nonsag, Moisture-Cure, Polyurethane Hybrid Joint Sealant: ASTM C920, Type S, Grade NS, Class 35, Use NT; Greenguard certified.
 - .1 Basis of Design Product: Tremco Dymonic FC.
 - .2 Extrusion Rate ASTM C1183: 93.1 mL/min
 - .3 Weight Loss ASTM C1246: Pass
 - .4 Tack Free Time ASTM C679: 3 to 4 hours.
 - .5 Volatile Organic Compound (VOC) Content: 10 g/L maximum.
 - .6 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .7 Colour: As selected by Consultant from manufacturer's standard line.
 - .3 UJS#4: Immersible, Single-Component, Pourable, Traffic Grade Polyurethane Joint Sealant: ASTM C920, Type S, Grade P, Class 50, Use T and I.
 - .1 Basis of Design Product: Tremco Vulkem 45 SSL.
 - .2 Volatile Organic Compound (VOC) Content: 110 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.

- .4 Colour: As selected by Consultant from manufacturer's standard line.

2.5 Latex Joint Sealants

- .1 LJS#1: Latex Joint Sealant: Siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
 - .1 Basis of Design Product: Tremco Tremflex 834.
 - .2 Volatile Organic Compound (VOC) Content: 35 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Colour: White, paintable.

2.6 Solvent-Release-Curing Joint Sealants

- .1 BJS#1: Butyl-Rubber-Based Joint Sealant: ASTM C1311.
 - .1 Basis of Design Product: Tremco Tremco Butyl Sealant.
 - .2 Volatile Organic Compound (VOC) Content: 250 g/L maximum.
 - .3 Colour: As selected by Consultant from manufacturer's standard colours.

2.7 Acoustical Sealants

- .1 AJS#1: Acoustical/Curtainwall Sealant: Single-component, non-hardening, non-sag, paintable synthetic rubber-tested to reduce airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing of similar assemblies according to ASTM E90.
 - .1 Basis of Design Product: Tremco Tremco Acoustical/Curtainwall Sealant.
 - .2 Volatile Organic Compound (VOC) Content: 160 g/L maximum.
 - .3 Colour: White, paintable.

2.8 Joint Sealant Accessories

- .1 Cylindrical Sealant Backing: ASTM C1330, Type B non-absorbent, bi-cellular material with surface skin, or Type O open-cell polyurethane, as recommended by sealant manufacturer for application.
- .2 Bond Breaker Tape: Polymer tape compatible with joint sealant and adjacent materials and recommended by sealant manufacturer.
- .3 Joint Substrate Primers: Substrate primer recommended by sealant manufacturer for application.
- .4 Cleaners: Chemical cleaners acceptable to joint sealant manufacturer.
- .5 Masking tape: Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 EXECUTION

3.1 Examination

- .1 Examine joint profiles and surfaces to determine if work is ready to receive joint sealants. Verify joint dimensions are adequate for development of sealant movement capability. Verify joint surfaces are clean, dry, and adequately cured. Proceed with joint sealant work once conditions meet sealant manufacturer's written recommendations.

3.2 Preparation

- .1 Joint Surface Cleaning: Clean joints prior to installing joint sealants using materials and methods recommended by sealant manufacturer. Comply with ASTM C1193.

- .1 Remove curing compounds, laitance, form-release agents, dust, and other contaminants.
- .2 Clean nonporous and porous surfaces utilizing chemical cleaners acceptable to sealant manufacturer.
- .3 Protect elements surrounding the Work of this section from damage or disfiguration. Apply masking tape to adjacent surfaces when required to prevent damage to finishes from sealant installation.

3.3 Application

- .1 Sealant and Primer Installation Standard: Comply with ASTM C1193 and manufacturer's written instructions.
- .2 Joint Backing: Select joint backing materials recommended by sealant manufacturer as compatible with sealant and adjacent materials. Install backing material at depth required to produce profile of joint sealant allowing optimal sealant movement.
 - .1 Install joint backing to maintain the following joint ratios:
 - .1 Joints up to 13 mm wide: 1:1 width to depth ratio.
 - .2 Joints greater than 13 mm wide: 2:1 width to depth ratio; maximum 13 mm joint depth.
 - .2 Install bond breaker tape over substrates when sealant backings are not used.
- .3 Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer.
- .4 Joint Priming: Prime joint substrates when recommended by sealant manufacturer or when indicated by preconstruction testing or experience. Apply recommended primer using sealant manufacturer's recommended application techniques.
- .5 Liquid Sealant Application: Install sealants using methods recommended by sealant manufacturer, in depths recommended for application. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.
 - .1 Tool sealants immediately with appropriately shaped tool to force sealants against joint backing and joint substrates, eliminating voids and ensuring full contact.
 - .2 Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
 - .3 Tool exposed joint surface concave using tooling agents approved by sealant manufacturer for application.
- .6 Cleaning: Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.
 - .1 Remove masking tape immediately after tooling joint without disturbing seal.
 - .2 Remove excess sealant from surfaces while still uncured.
- .7 Installation of Acoustical Sealant: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations on both sides of assemblies with a continuous bead of acoustical sealant. Comply with ASTM C919 and with manufacturer's written recommendations.

3.4 Field Quality Control

- .1 Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and with ASTM C1193, Method A.

- .1 Perform 5 tests for the first 300 m of joint length for each kind of sealant and joint substrate, and one test for each 300 m of joint length thereafter or 1 test per each floor per building elevation, minimum.
- .2 For sealant applied between dissimilar materials, test both sides of joint.
- .2 Remove sealants failing adhesion test, clean substrates, reapply sealants, and re-test. Test adjacent sealants to failed sealants.
- .3 Submit report of field adhesion testing to Consultant indicating tests, locations, dates, results, and remedial actions taken.

3.5 Exterior Joint Sealant Schedule

- .1 Exterior construction joints in cast-in-place concrete.
 - .1 UJS#1: Single-component non-sag urethane sealant.
- .2 Exterior perimeter joints at frames of doors, windows, storefront frames, and louvers.
 - .1 SJS#1: Single-component neutral-curing non-staining silicone sealant.
 - .2 UJS#1: Single-component non-sag urethane sealant.
- .3 Exterior joints within aluminum storefront framing, and window systems:
 - .1 SJS#1, SJS# 2: Single-component neutral-curing non-staining silicone sealant.
- .4 All other exterior non-traffic joints.
 - .1 SJS#1: Single-component neutral-curing non-staining silicone sealant.
 - .2 UJS#1: Single-component non-sag urethane sealant.
- .5 Exterior horizontal traffic and traffic isolation joints:
 - .1 UJS# 4: Single-component pourable urethane sealant.

3.6 Interior Joint Sealant Schedule

- .1 Interior vertical movement joints in interior concrete and unit masonry.
 - .1 UJS#1: Single-component non-sag urethane sealant.
- .2 Interior movement joints in interior unit masonry.
 - .1 UJS#1: Single-component non-sag urethane sealant.
- .3 Interior perimeter joints of exterior aluminum frames.
 - .1 UJS#1: Single-component non-sag urethane sealant.
- .4 Interior perimeter joints of interior frames.
 - .1 UJS#2: Single-component non-sag urethane sealant.
- .5 Interior sanitary joints between plumbing fixtures, food preparation fixtures, and casework and adjacent walls, floors, and counters.
 - .1 SJS#5: Mildew-Resistant, Single-Component, nonsag, acid-curing silicone joint sealant.
- .6 Interior traffic joints in floor and between floor and wall construction.
 - .1 UJS# 4: Single-component pourable urethane sealant.
- .7 Interior non-moving joints between interior painted surfaces and adjacent materials.

- .1 LJS#1: Siliconized acrylic latex
 - .1 Joint-Sealant Colour: Paintable.
 - .8 Interior concealed sealants at thresholds and sills.
 - .1 BJS#1: Butyl-rubber-based joint sealant.
 - .9 Interior exposed and non-exposed acoustical applications:
 - .1 AJS#1: Acoustical joint sealant.
- 3.7 Cleaning
- .1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 04 22 00 Concrete Unit Masonry
- .2 Section 06 10 00 Rough Carpentry
- .3 Section 07 92 00 Joint Sealants
- .4 Section 08 14 16 Flush Wood Doors
- .5 Section 08 71 10 Door Hardware
- .6 Section 08 80 05 Glazing
- .7 Section 09 21 16 Gypsum Board
- .8 Section 09 22 16 Non-Structural Metal Framing
- .9 Section 09 91 23 Interior Painting

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A653/A653M-20 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM C177-19 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
 - .3 ASTM C518-17 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
 - .4 ASTM C553-13 (2019) Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
 - .5 ASTM C591-20 Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
 - .6 ASTM C1289-20 Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
 - .7 ASTM E90-09 (2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - .8 ASTM E330/E330M-14 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
 - .9 ASTM E2074-00e1 Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies (Withdrawn 2007)
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181-99 Ready-Mixed Organic Zinc-Rich Coating.
 - .2 CGSB 41-GP-19M-84 Rigid Vinyl Extrusions for Windows and Doors.
- .3 CSA Group (CSA)

- .1 CSA-G40.20-13/G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CSA W59-18 Welded Steel Construction (Metal Arc Welding).
- .4 Canadian Steel Door Manufacturers' Association (CSDMA)
 - .1 CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2000
 - .2 CSDMA Recommended Specifications for Commercial Steel Doors and Frames, 2006.
 - .3 CSDMA Selection and Usage Guide for Commercial Steel Door and Frame Products, 2009.
- .5 Underwriters Laboratories Canada (ULC)
 - .1 ULC 104-2015 Standard Method for Fire Tests of Door Assemblies.
 - .2 ULC 105- 2016 Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104.
 - .3 ULC 106-2015 Standard Method for Fire Tests of Window and Glass Block Assemblies
 - .4 ULC 701-2011 Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .5 ULC 702.1- 2014 Standard for Thermal Insulation, Mineral Fibre, for Buildings.
 - .6 ULC 704-11 Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
- .6 Underwriters Laboratories (UL)
 - .1 UL10B Fire Tests of Door Assemblies.
 - .2 UL10C Standard for Positive Pressure Fire Tests of Door Assemblies.
- .7 National Fire Protection Association (NFPA)
 - .1 NFPA 80-2019 Standard for Fire Doors and Other Opening Protectives.
 - .2 NFPA 252-2017 Fire Tests of Door Assemblies.
- .8 American National Standards Institute (ANSI)
 - .1 ANSI 250.4-2018 Test Procedure and Acceptance Criteria for — Physical Endurance for Steel Doors, Frames and Frame Anchors
 - .2 ANSI 250.10-2011 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Provide shop drawings
 - .1 Indicate each type of door, frame, steel, construction and core.
 - .2 Indicate fire ratings.
 - .3 Indicate material thicknesses, mortises, reinforcements, anchorages, location of exposed fasteners, openings, arrangement of hardware, and finishes.
 - .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

1.5 System Description

- .1 Design exterior frame assembly to accommodate expansion and contraction when subjected to minimum and maximum surface temperature of -35° C to 35° C.

1.6 Defining Opening Sizes

- .1 Width - Widths of openings shall be measured from inside to inside of frame jamb rabbets. (Referred to as "frame rabbet width" or "nominal door width")
- .2 Height - Heights of openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame. (Referred to as "frame rabbet height" or "nominal door height")
- .3 Door Sizes - Doors shall be sized so as to fit the above openings and allow a 3 mm nominal clearance at jams and head of frame. A clearance of 13 mm maximum shall be allowed between the bottom of the door and the finished floor (exclusive of floor coverings).
- .4 Tolerances - Doors and frame product shall be manufactured and installed in accordance with the CSDMA's, "Recommended Dimensional Standards for Commercial Steel Doors and Frames".

1.7 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.8 Requirements of Regulatory Agencies

- .1 Steel fire rated doors and frames: labeled and installed by an organization accredited by Standards Council of Canada in conformance with ULC 104 or NFPA 252 for ratings specified or indicated.
- .2 Provide fire labeled frame products for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with ULC 104, ASTM E2074 or NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

1.9 Testing and Performance

- .1 Fire labeled products shall be provided for those openings requiring fire protection ratings as scheduled on the drawings. Products shall be tested in strict conformance with ULC 104 and listed by Underwriters Laboratory of Canada Ltd. or Warnock Hersey under an active Factory Inspection Program.
- .2 Product quality shall meet the standards established by the Canadian Steel Door Manufacturer's Association.
- .3 Door construction shall meet acceptance criteria of ANSI A250.10 and shall be certified as meeting Level A (1,000,000 cycles) and Twist Test Acceptance Criteria deflection not to exceed 6.4 mm/13.6 kg force, total deflection at 136.1 kg force not to exceed 64 mm and permanent deflection not to exceed 3.0 mm when tested in strict conformance with ANSI A250.4. Test shall be conducted by an independent nationally recognized accredited laboratory.
- .4 Core materials for insulated doors shall attain a thermal resistance rating of RSI 2.17 when tested in accordance with ASTM C177 or ASTM C518.

1.10 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Acceptable Materials

-
- .1 Steel doors and frame product manufactured in accordance with this Specification by CSDMA members, are eligible for use on this project.
 - .2 Steel: Commercial grade steel to ASTM A653, CS, Type B, Coating Designation ZF75 (A25) minimum. Minimum steel thicknesses shall be in accordance with Appendix 1 of the CSDMA, Recommended Specifications for Commercial Steel Door and Frame Products unless noted otherwise.
 - .3 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653, ZF75.
 - .4 Door Core Materials
 - .1 Interior Doors: Structural small cell, 24.5mm maximum kraft paper 'honeycomb'. Weight 36.3 kg per ream minimum, density: 16.5 kg/m³ minimum sanded to required thickness. ULC approved.
 - .2 Exterior Doors: Polyisocyanurate: Rigid, modified polyisocyanurate, closed cell board. Density; 32 kg/m³ minimum, thermal values; RSI 2.17 minimum, in accordance with ASTM C591 (un-faced) or ASTM C1289 (faced).
 - .5 Primers:
 - .1 Touch-up prime CAN/CGSB-1.181, organic zinc rich, rust inhibitive.
 - .1 Maximum VOC limit 50 g/L to GC-03.
 - 2.2 Adhesives
 - .1 Adhesive: maximum VOC content 50 g/L to SCAQMD Rule 1168.
 - .2 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
 - .3 Polyisocyanurate: heat resistant, epoxy resin based, low viscosity, contact cement.
 - .4 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, low VOC sealant/adhesive or U.L.C. approved equivalent.
 - 2.3 Accessories
 - .1 Glazing Stops: Minimum 0.9 mm base thickness sheet steel with wipe zinc finish to ASTM A525. Fasteners to be #6 x 32 mm cadmium plated oval head scrulox self-drilling type screws. Tamper proof screws.
 - .2 Exterior top caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.
 - .3 Frame Thermal Breaks: Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.
 - .4 Door silencers: single stud rubber/neoprene type.
 - .5 Fiberglass: to ULC 702, loose batt type, minimum density of 24 kg/m³.
 - .6 Metallic paste filler: to manufacturer's standard.
 - .7 Sealant: As specified in Section 07 92 00.
 - 2.4 Fabrication - Frame Products
 - .1 General
 - .1 Fabricate frames in accordance with CSDMA specifications.
 - .2 Fabricate frames to profiles and maximum face sizes as indicated.

- .3 Exterior frame product shall be 1.60 mm welded type construction, thermally broken.
 - .4 Interior frame product shall be 1.60 mm. Interior frames, transoms, sidelights and window assemblies shall be welded type construction.
 - .5 Blank, reinforce, drill and tap frames for templated hardware and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
 - .6 Prepare frames to receive electrical conduit for door operators where indicated and required.
 - .7 Protect mortised cutouts with steel guard boxes.
 - .8 Provide anchorage appropriate to floor, wall and frame construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb. For rebate opening heights up to and including 1520 mm provide two (2) anchors, and an additional anchor for each additional 760 mm of height or fraction thereof, except as indicated below. Frames in previously placed concrete, masonry or structural steel shall be provided with anchors located not more than 150 mm from the top and bottom of each jamb, and intermediate anchors at 660 mm on centre maximum. Fasteners for such anchors shall be provided by others.
 - .9 Minimum reinforcing, anchor and other component thickness shall be in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".
 - .10 Each interior door opening shall be prepared for single stud rubber door silencers, three (3) for single door openings, two for double door openings, except on gasketed frame product.
 - .11 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
 - .12 Fire-rated frame products shall be provided for those openings requiring fire protection as determined and scheduled by the Consultant. Frames, transom and sidelight assemblies shall be listed for conformance with ULC 104. Window assemblies shall be listed for conformance with ULC 106. All fire-rated frame products shall bear the label of and be listed by a nationally recognized testing agency having a factory inspection service. Labeling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer. Fire-rated frame products shall be constructed as listed for labeling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.
- .2 Welded Type
- .1 Welding in accordance with CSA W59.
 - .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
 - .3 Cope accurately and securely weld butt joints of mullions, centre rails and sills.
 - .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
 - .5 Where frame product is to be installed prior to the adjacent partition, a floor anchor shall be securely attached to the inside of each jamb profile. Each floor anchor shall be provided with two holes for securing to the floor. For conditions that do not permit the use of a floor anchor, an additional wall anchor, located within 150 mm of the base of the jamb, shall be substituted.
 - .6 Weld in two temporary jamb spreaders per door opening to maintain proper alignment during shipment and handling, which shall not be used for installation.

- .7 Glazing stops shall be formed steel channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
- .8 When required due to site access, when advised by the contractor responsible for coordination or installation, as specified on the drawings or due to shipping limitations, frame product for large openings shall be fabricated in sections as designated on the approved submittal drawings, with splice joints for field assembly and welding by others.
- .9 Prior to shipment, mark each frame product with an identification number as shown on the approved submittal drawings.
- .10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .11 Manufacturer's nameplates on frames and screens are not permitted

2.5 Fabrication - Doors

- .1 General
 - .1 Interior doors: insulated steel construction with honeycomb core laminated to minimum 1.19 mm nominal thickness steel face sheets under pressure.
 - .2 Exterior doors: insulated steel construction with polyisocyanurate core laminated to minimum 1.19 mm nominal thickness steel face sheets under pressure.
 - .3 Voids between vertical stiffeners shall be filled with fiberglass batt type insulation.
 - .4 Doors: swing type, flush.
 - .5 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketing and hardware in accordance with ASTM E330.
- .2 Longitudinal edges shall be mechanically inter-locked, adhesive assisted. Seams: visible grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.
- .3 Doors shall be mortised, blanked, reinforced, drilled and tapped at the factory for templated hardware and electronic hardware, in accordance with the approved hardware schedule and templates provided by the hardware supplier.
- .4 Holes 12.7 mm diameter and larger shall be factory prepared, except mounting and through-bolt holes, which are by others, on site, at time of hardware installation. Holes less than 12.7 mm diameter shall be factory prepared only when required for the function of the device (for knob, lever, cylinder, thumb or turn pieces) or when these holes over-lap function holes.
- .5 Doors shall be reinforced where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware.
- .6 Provide top and bottom of doors with inverted, recessed, welded steel channels. Exterior doors shall be provided with rigid PVC top caps.
- .7 Minimum reinforcing and component thickness shall be in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".
- .8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .9 Fire-rated doors shall be provided for those openings requiring fire protection as indicated. Such products shall be listed for conformance with ULC 104. All fire-rated doors shall bear the label of and be listed by a nationally recognized testing agency having a factory inspection service.

Labeling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer. Fire-rated doors shall be constructed as listed for labeling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.

- .10 Prior to shipment, mark each door with an identification number as shown on the approved submittal drawings.
- .11 Manufacturer's nameplates on doors are not permitted.

2.6 Glazing Stops

- .1 Glazing stops shall be accurately fitted, butted at corners with removable stops located on push side of door.
- .2 Provide tamper proof screws on all doors and screens.

2.7 Finishes

- .1 Doors and frames shall wipe coat zinc, ready for painting.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

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

3.2 Installation

- .1 Install doors and frames to CSDMA Installation Guide, NAAMM-HMMA 840, Installation Guide for Commercial Steel Doors and Frames.
- .2 Fire-rated door and frame product shall be installed in accordance with NFPA-80.
- .3 Prior to installation, remove temporary shipping spreaders.
- .4 Prior to installation, the area of floor on which the frame is to be installed, and within the path of the door swing, shall be checked and corrected for flatness.
- .5 Check door and frame product for correct size, swing, rating and opening number.
- .6 The supplier shall be advised of any discrepancies prior to installation.
- .7 Set frames plumb, square, level and at correct elevation.
- .8 Secure anchorages and connections to adjacent construction.
- .9 Brace frames rigidly in position while building-in. Install wood spreaders at third points of frame rebate height to maintain frame width. Provide vertical support at centre of head for openings exceeding 1200 mm in width.
- .10 During the setting of frame product, check and correct as necessary for opening width, opening height, square, alignment, twist and plumb, in accordance with the CSDMA "Recommended Dimensional Standards for Commercial Steel Doors and Frames".
- .11 Remove wood spreaders after frames have been built-in.
- .12 Make allowance for deflection to ensure structural loads are not transmitted to frame product.
- .13 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 10 - Door Hardware. Coordinate with Section 08 71 10 for preparation and installation of automatic door operators.
- .14 Adjust operable parts for correct clearances and function.

- .15 Install glazing and door silencers.
- .16 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows:
 - .1 Hinge side: 1.0 mm.
 - .2 Latch side and head: 1.5 mm.
 - .3 Finished floor and thresholds: 13 mm.
- .17 Caulk perimeter of frames. Refer to Section 07 92 00 – Joint Sealants.

3.3 Finish Repairs

- .1 Touch up with primer finishes damaged during installation.
- .2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.4 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 06 20 00 Finish Carpentry
- .3 Section 07 26 00 Vapour Retarders
- .4 Section 07 92 00 Joint Sealants.
- .5 Section 08 71 10 Finishing Hardware
- .6 Section 08 80 05 Glazing

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM B221-20 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
 - .2 ASTM B456-17 Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
 - .3 ASTM B633-19 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
 - .4 ASTM E330/E330M-14 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
 - .5 ASTM E783-02(2018) Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
 - .6 ASTM E1105-15 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference
 - .7 ASTM E1186-17 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-97 Anticorrosive Structural Steel Alkyd Primer.
- .3 CSA Group (CSA)
 - .1 AAMA/WDMA/CSA 101/I.S.2/A440-11, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights
 - .2 CSA A440S1-09 Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights
 - .3 CSA-A440.4-07(R2012) Window, Door, and Skylight Installation
 - .4 CSA-A440.2-14/A440.3-14 Fenestration energy performance/User guide to CSA A440.2-14, Fenestration energy performance.
 - .5 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.

- .4 Aluminum Association (AA), Designation System for Aluminum Finishes (2000)
- .5 Ontario Ministry of Municipal Affairs and Housing (MMAH)
 - .1 Ontario Building Code
 - .2 MMAH Supplementary Standard SB-10, Energy Efficiency Requirements.
- 1.4 Submittals
 - .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Submit shop drawings.
 - .1 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, interior and exterior trim, junction between combination units, elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes, fasteners, and caulking. Indicate location of manufacturer's nameplates.
 - .2 Submit a complete finishing hardware schedule for each door.
 - .3 Submit test reports from approved independent testing laboratories, certifying compliance with specified performance characteristics and physical properties, for:
 - .1 Energy efficiency (MMAH SB-10 compliance for complete assembly including glass units)
 - .2 Finish, weathering characteristics.
 - .3 Air infiltration
 - .4 Water tightness.
 - .5 Wind load resistance.
 - .6 Condensation resistance.
 - .7 Forced entry resistance.
 - .8 Mullion deflection.
 - .4 Closeout Submittals: Provide operation and maintenance data for doors, screens and hardware for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- 1.5 System Description
 - .1 Performance Requirements: Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follows:
 - .1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
 - .2 Insulating glass units in combination with aluminum storefront framing shall be designed by the supplier to comply with energy efficient requirements specified in MMAH Supplementary Standard SB-10. Submit engineered shop drawings, calculations and certificates certifying compliance with that standard.
- 1.6 Shipping, Handling and Storage
 - .1 Refer to Section 01 61 00 – Common Product Requirements.
 - .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- 1.7 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.
- 1.8 Field Quality Control

- .1 Manufacturer's field services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .2 Schedule site visits to review work at stages listed:
 - .1 After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.
 - .2 Twice during progress of work at 25% and 60% complete.
 - .3 Upon completion of work, after cleaning is carried out.
 - .3 Field Tests: Consultant shall select units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
 - .1 Testing: Testing shall be performed per AAMA 503 by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements.
 - .1 Air Leakage Tests: Conduct tests in accordance with ASTM E783. Allowable air leakage shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft², whichever is greater.
 - .2 Water Infiltration Tests: Conduct tests in accordance with ASTM E1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 383 Pa.
 - .2 Evaluate installed system by thermo-photographic scan.
 - .4 Obtain reports within three days of review and submit immediately to Consultant.
- 1.9 Sequencing
- .1 Co-ordinate work of this Section with air barrier placement, flashing placement, and other related components or materials.
- 1.10 Project Conditions
- .1 Do not install sealants when ambient and surface temperature is less than 5 °C. Maintain this minimum temperature during and after installation of sealants
- 1.11 Warranty
- .1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.
 - .2 Provide a warranty stating that the painted finish will be non-fading, nonconvertible, and permanently a part of the metal surface for a period of five years from the date of Substantial Performance. The warranty shall state that any item showing failure during the warranty period will be replaced or refinished to the original condition, at no cost to the Owner.

PART 2 PRODUCTS

2.1 Manufacturers

- .1 Manufacture: The following manufacturers are considered as acceptable subject to approval by the Consultant, of supporting technical literature, samples, drawings, engineering data and performance data:

- .1 Alumicor
- .2 Commdoor
- .3 CRL United States Aluminum
- .4 Kawneer

2.2 Materials

- .1 Materials: to AAMA/WDMA/CSA 101/I.S.2/A440 supplemented as follows:
 - .1 All doors and storefront framing shall be by same manufacturer.
 - .2 Sash: aluminum, thermally broken.
 - .3 Main frame: aluminum, thermally broken.
 - .4 Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.
- .2 Aluminum Extrusions: Alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish and not less than 1.8 mm wall thickness at any location for the main frame and complying with ASTM B221: 6063-T6 alloy and temper.
- .3 Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum framing members, trim hardware, anchors, and other components. Manufacturer's standard corrosion-resistant, non-staining, nonbleeding fasteners and accessories compatible with adjacent materials. Stainless steel where exposed.
- .4 Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
- .5 Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- .6 Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- .7 Sealant: For sealants required within fabricated systems, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
- .8 Glass: As scheduled and as specified in Section 08 80 05.
- .9 Exterior aluminum sills and facings: extruded aluminum and brake formed aluminum sheet metal of type and size to suit job conditions; minimum 3 mm thick, complete with joint covers, jamb drip deflectors, chairs, anchors and anchoring devices.

2.3 Screen Types

- .1 Entrance Framing:
 - .1 Exterior Units: Thermally Broken Storefront Framing: thermally broken, inside glazed.
 - .1 Classification rating: to CSA-A440/A440.1.
 - .2 Air Tightness: A3.

- .3 Water tightness: B3.
- .4 Wind load resistance: C3.
- .5 Surface condensation control: compliant with standard CSA-A440.2/A440.3.
- .6 Forced Entry: Pass test for resistance to forced entry.
- .7 Basis of Design: Kawneer 451 T series
- .2 Depth of framing units as indicated or as required by engineered design.

2.4 Doors

.1 Exterior Doors

- .1 To size indicated on schedules and drawings.
- .2 Thermally broken medium stile with intermediate horizontal rails where detailed.
- .3 The door stile and rail face dimensions of the entrance door will be as follows:
 - .1 Vertical Stile 103.2 mm,
 - .2 Top Rail 103.2 mm,
 - .3 Bottom Rail 179.4 mm
- .4 Major portions of the door members to be 3.2 mm nominal in thickness and glazing molding to be 1.3 mm thick.
- .5 Reinforce doors for continuous hinges.
- .6 Factory painted permafluor finish.
- .7 Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.
- .8 Provide adjustable glass jacks to help center the glass in the door opening.
- .9 Provide flush stops for insulating glass in exterior doors.
- .10 Exterior glass: 25 mm sealed units, insulating glass specified in Section 08 80 05.

2.5 Door Hardware

- .1 Provide the following hardware for aluminum doors, as appropriate to location and configuration:
 - .1 Exterior Door 101:
 - .1 1 ½ pair stainless steel ball bearing butt hinges.
 - .1 Door width: Over 915 mm: 127 mm x 114mm hinge.
 - .2 Style CO-12 Architects Classic Pull with factory painted permafluor finish.
 - .3 Kawneer 1786 Rim Exit Device.
 - .1 Cylinder provided under Section 08 71 10
 - .4 Extruded aluminum threshold for barrier free access, 102 mm wide x 12 mm high. Thermally broken.
 - .5 Weather-seal to head and jambs. Aluminum with sponge neoprene a minimum of 6.0 mm thick, width to suit frame. Type TW2000.
 - .6 Door sweeps to be Sealeze EB 395 EPDM blade gasket x door width.
 - .7 Automatic Door Operator: Supplied under finishing hardware schedule.

.2 Exterior Door 114:

- .1 1 ½ pair stainless steel ball bearing butt hinges.
 - .1 Door width: Over 915 mm: 127 mm x 114mm hinge.
- .2 Style CO-12 Architects Classic Pull with factory painted permafluor finish.
- .3 Kawneer 1786 Rim Exit Device.
 - .1 Cylinder provided under Section 08 71 10
- .4 Extruded aluminum threshold for barrier free access, 102 mm wide x 12 mm high. Thermally broken.
- .5 Weather-seal to head and jambs. Aluminum with sponge neoprene a minimum of 6.0 mm thick, width to suit frame. Type TW2000.
- .6 Door sweeps to be Sealeze EB 395 EPDM blade gasket x door width.
- .7 Automatic Door Operator: Supplied under finishing hardware schedule.

2.6 Glazing

- .1 Glaze doors and screens in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
- .2 Glass: As scheduled and as specified in Section 08 80 05– Glazing.

2.7 Fabrication

- .1 Fabricate in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 supplemented as follows:
 - .1 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less and plus or minus 3 mm for units with a diagonal measurement over 1800 mm.
 - .2 Face dimensions detailed are maximum permissible sizes.
 - .3 Brace frames to maintain squareness and rigidity during shipment and installation.
 - .4 Finish steel clips and reinforcement with shop coat primer to CAN/CGSB-1.40.

2.8 Air Barrier and Vapour Retarder

- .1 Equip frames with site installed air barrier and vapour retarder material for sealing to building air barrier and vapour retarder as follows:
 - .1 Material: identical to, or compatible with, building air barrier and vapour retarder materials to provide required air tightness and vapour diffusion control throughout exterior envelope assembly.
 - .2 Material width: adequate to provide required air tightness and vapour diffusion control to building air barrier and vapour retarder from interior.

2.9 Aluminum Finishes

- .1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
- .2 Kawneer Permafluor (70% PVDF), AAMA 2605, Fluoropolymer Coating. Colour to be selected from full range of manufacturer's standards.

2.10 Isolation Coating

- .1 Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements

except containing no asbestos, formulated for 0.762 mm thickness per coat.

PART 3 EXECUTION

3.1 Screen Installation

- .1 Install in accordance with AAMA/WDMA/CSA 101/I.S.2/A440, shop drawings and manufacturer's instructions.
- .2 Arrange components to prevent abrupt variation in colour.
- .3 Erect and secure units in prepared openings, plumb and square, free from warp, twist or superimposed loads.
- .4 Secure work accurately to structure and in a manner not restricting thermal movement of materials.
- .5 Provide shims under sill frame at setting block locations, and as recommended by manufacturer.
- .6 Conceal all anchors and fitments. Exposed heads of fasteners not permitted.
- .7 Maintain dimensional tolerances after installation. Maintain alignment with adjacent work.
- .8 Isolate aluminum surfaces from dissimilar materials adjacent after installation, using coating of bituminous paint.
- .9 Seal framing joints with butyl polyisobutylene or silicone sealant.
- .10 Install glazing splines and gaskets uniformly, with accurately formed corners and bevels. Ensure that proper contact is made with glass and rabbet interfaces.
- .11 Continuously and uniformly compress glazing splines and gaskets during installation.

3.2 Sill Installation

- .1 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Use one piece lengths at each location.
- .2 Cut sills to fit opening.
- .3 Secure sills in place with anchoring devices located at ends and evenly spaced 600 mm on centre in between.
- .4 Fasten joint cover plates and drip deflectors with self-tapping stainless steel screws.
- .5 Maintain 6 to 9 mm space between butt ends of continuous sills. For sills over 1200 mm in length, maintain 3 to 6 mm space at each end.

3.3 Door Installation

- .1 Erect and secure aluminum framing plumb, square and level, free from warp, twist or superimposed loads.
- .2 Use concealed fastenings where possible. Where concealed fasteners are not feasible, use flat headed screws in countersink holes. Exposed bolt or nut heads are not permitted.
- .3 Match exposed fastenings with finish or surfaces on which they occur.
- .4 Assess each component for appearance and colour. Any variations in appearance and colour will not be permitted.
- .5 Secure work adequately and accurately to the structure in the required position.
- .6 Install and adjust hardware in accordance with hardware templates and manufacturer's instructions.

- .7 All hardware shall be installed by technicians skilled in the application of architectural hardware and satisfactory to the aluminum door supplier. Instruction sheets, details and templates shall be read and understood before installation.
- .8 Coordinate installation of electrically operated hardware with Electrical and Security subcontractors.
- .9 Coordinate installation of Automatic Door Operators with Section 08 71 10.

3.4 Caulking

- .1 Apply sealant in accordance with Section 07 92 00 - Joint Sealants. Conceal sealant within units except where exposed use is permitted by Consultant.

3.5 Protection

- .1 Protect the work of this trade from damage. Protect work of other trades resulting from the work of this Section.
- .2 Provide at the factory, strippable coatings on all exposed surfaces of aluminum. This coating and protective wrappings shall remain on the surfaces through the period that other trades' works proceed on the building and shall be removed on completion of the building.
- .3 Make good all damaged work caused by failure to provide adequate protection. Remove unsatisfactory work and replace at no expense to the Owner.

3.6 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Wash down exposed interior metal surfaces using a solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.
- .3 Clean exposed exterior non-metal surfaces as recommended by manufacturer of the material.
- .4 Clean interior and exterior surfaces as soon as adjacent construction which might soil surfaces, is completed.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 20 00 Finish Carpentry
- .2 Section 08 11 00 Metal Doors and Frames
- .3 Section 08 14 16 Flush Wood Doors
- .4 Section 08 50 00 Aluminum Doors and Screens

1.3 References

- .1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
 - .1 ANSI/DHI A115.1G-1994 Installation Guide for Doors and Hardware
 - .2 ANSI/ICC A117.1-2017 Accessible and Usable Buildings and Facilities
 - .3 ANSI/BHMA A156.1-2013 American National Standard for Butts and Hinges.
 - .4 ANSI/BHMA A156.2-2011 Bored and Preassembled Locks and Latches.
 - .5 ANSI/BHMA A156.3-2014 Exit Devices.
 - .6 ANSI/BHMA A156.4-2013 Door Controls - Closers.
 - .7 ANSI/BHMA A156.5-2014 Auxiliary Locks and Associated Products.
 - .8 ANSI/BHMA A156.6-2010 Architectural Door Trim.
 - .9 ANSI/BHMA A156.8-2010 Door Controls - Overhead Stops and Holders.
 - .10 ANSI/BHMA A156.10-2011 Power Operated Pedestrian Doors.
 - .11 ANSI/BHMA A156.12-2013 Interconnected Locks and Latches.
 - .12 ANSI/BHMA A156.13-2012 Mortise Locks and Latches Series 1000.
 - .13 ANSI/BHMA A156.15-2011 Release Devices - Closer Holder, Electromagnetic and Electromechanical.
 - .14 ANSI/BHMA A156.16-2013 Auxiliary Hardware.
 - .15 ANSI/BHMA A156.18-2012 Materials and Finishes.
 - .16 ANSI/BHMA A156.19-2013 Power Assist and Low Energy Power - Operated Doors.
 - .17 ANSI/BHMA A156.21-2014 Thresholds.
 - .18 ANSI/BMHA A156.22-2012 Door Gasketing and Edge Seal Systems
- .2 Canadian Steel Door Manufacturers' Association (CSDMA)
 - .1 CSDMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction): Standard Hardware Location Dimensions.
- .3 National Wood Window and Door Association (NWWDA)
- .4 Door Hardware Institute (DHI)
- .5 Accessibility for Ontarians with Disabilities Act (AODA)

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.
- .3 Samples:
 - .1 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
 - .2 After approval samples will be returned for incorporation in the Work.
- .4 Hardware List:
 - .1 Submit contract hardware list.
 - .2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .5 Manufacturer's Instructions: Submit manufacturer's installation instructions.
- .6 Provide operation and maintenance data for door closers, locksets, door holders, electrified hardware and fire exit hardware for incorporation into Operations and Maintenance Manuals specified in Section 01 78 00 - Closeout Submittals.

1.5 Quality Assurance

- .1 Regulatory Requirements:
 - .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
 - .2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
 - .3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .4 Receive the delivery of the Finishing Hardware and identify all items against the Finishing Hardware Schedule. Ensure each hardware item is accompanied by the correct template, installation instructions, special tools, fastening devices and other loose items. Advise the finish hardware supplier and Consultant in writing of errors or omissions.
- .5 Storage and Protection: Store finishing hardware in locked, clean and dry area.
- .6 Remove all hardware from doors and frames prior to painting. After painting is complete and dry, reinstall all hardware to manufacturer's recommendations.

1.7 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.8 Warranty

- .1 Warrant all hardware against defects of workmanship and material, for a period of one year, except for door closers which shall be warranted for ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

- .1 All hardware shall be supplied as specified in the Finishing Hardware Schedule.
- .2 All finishes shall be as indicated in the Finishing Hardware Schedule by international codes.
- .3 All door handles shall be lever type meeting requirements of the Ontario Building Code.
- .4 Power Door Operators and controls shall be CSA approved and shall meet the requirements of the Ontario Building Code and the Accessibility for Ontarians with Disabilities Act (AODA).

2.2 Fastenings

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

2.3 Keying

- .1 Keying: All permanent cylinders to be grandmaster-keyed as directed by the Owner. The factory shall key all locks and cylinders and maintain keying records. The factory shall establish a System Information Document (SID) to designate primary system administrators and require a separate letter of authorization for all future shipments of keyed products.
- .2 Remove all construction cores and install all permanent cores. Unless otherwise directed by the Owner.
- .3 Construction master/change keys are to be delivered by the contractor directly to The Owner.
- .4 Ship all permanent cylinders and keys separately. Identify door number and keyset symbol on each envelope for direct factory delivery to the owner.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Furnish door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 Examination

- .1 Before installing any hardware, carefully check all architectural drawings of the work requiring hardware, verify door swings, door and frame materials and operating conditions, and assure that all hardware will fit the work to which it is to be attached.
- .2 Check all shop drawings and frame and door lists affecting hardware type and installation, and certify to the correctness thereof, or advise the hardware supplier and Consultant in writing of required revisions.

3.3 Templates

- .1 Check the hardware schedule, drawings and specifications, and furnish promptly to the applicable trades any patterns, templates, template information and manufacturer's literature required for the proper preparation for and application of hardware, in ample time to facilitate the progress of the work.

3.4 Installation

- .1 Installation of hardware shall be in accordance with ANSI A115.1G, manufacturer's templates and instructions.
- .2 Install each item of mechanical and electromechanical hardware and access control equipment to comply with the manufacturer's written instructions and according to specifications. All items to be installed with fasteners identified by manufacturer's installation instructions unless otherwise noted.
- .3 Mounting Heights: Install door hardware at heights indicated in the following applicable publications unless; specifically indicated or required by local governing regulations, requirements to match for special templates, necessary coordination with door elevations, and or to ensure consistency with pairs of doors.
 - .1 DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames"
 - .2 DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors"
 - .3 ANSI/ICC A117.1 Accessibility Guidelines for Buildings and Facilities
 - .4 NWWDA
 - .5 AODA
- .4 Power door operator products and accessories are required to be installed by an AAADM certified technician as approved by the manufacturer. Adjust for proper opening and closing operation after final balancing of HVAC system.
- .5 Coordinate installation of electric door strikes, keypad locks, card readers, washroom duress systems, and other electronic door control and security devices with Electrical contractor including supply and installation of wiring and all terminations.
- .6 All hardware shall be installed by carpenters, skilled in the application of architectural hardware and satisfactory to the hardware supplier. Refer to Section 06 20 00 - Finish Carpentry. Instruction sheets, details and templates shall be read and understood before installation.
- .7 Install all materials as listed in the Finishing Hardware Schedule on the doors and frames listed. Interchanging of hardware will not be allowed.
- .8 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .9 Where door stop contacts door pulls, mount stop to strike bottom of pull.
- .10 Remove construction cores when directed by Owner's Representative.

- .11 After installation, templates, installation instructions and details shall be put in a file and turned over to the Owner, when building is Substantially Performed.

3.5 Field Quality Control

- .1 Conduct periodic inspections to ensure that door frames are installed plumb, level and square with verification by installer prior to installation of doors and door hardware.
- .2 Hardware supplier to attend site meetings as required to ensure proper execution of the guidelines set forth herein.
- .3 Hardware supplier will perform final field inspection of installed door hardware after final adjustment of all products and will document and report any deficiencies or omissions for correction and written acceptance by the Contractor.

3.6 Adjusting

- .1 Adjust door hardware, operators, closers and controls for optimum, smooth operating condition, safety and for weather tight closure.
- .2 Lubricate hardware, operating equipment and other moving parts.
- .3 Adjust door hardware to provide tight fit at contact points with frames.

3.7 Demonstration

- .1 Instruct Owner's maintenance personnel in the proper adjustment, operation and maintenance of mechanical and electromechanical door hardware, electronic devices and maintenance of finishes.

3.8 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .3 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
- .4 Remove protective material from hardware items where present.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 07 92 00 Joint Sealants
- .2 Section 08 11 00 Metal Doors and Frames
- .3 Section 08 50 00 Aluminum Doors and Screens
- .4 Section 08 87 20 Decorative Window Films
- .5 Section 08 88 13 Fire Resistant Glazing
- .6 Section 10 28 10 Toilet and Bath Accessories

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C162-05 (2015) Standard Terminology of Glass and Glass Products.
 - .2 ASTM C542-05(2017) Standard Specification for Lock-Strip Gaskets
 - .3 ASTM C1048-18 Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass
 - .4 ASTM C1376-15 Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass
 - .5 ASTM C1503-18 Standard Specification for Silvered Flat Glass Mirrors
 - .6 ASTM D790-17 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
 - .7 ASTM D1003-13 Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics
 - .8 ASTM D1929-20 Standard Test Method for Determining Ignition Temperature of Plastics
 - .9 ASTM D2240-15e1 Standard Test Method for Rubber Property—Durometer Hardness
 - .10 ASTM E84-20 Standard Test Method for Surface Burning Characteristics of Building Materials
 - .11 ASTM E330/E330M-14 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
 - .12 ASTM E1300-16 Standard Practice for Determining Load Resistance of Glass in Buildings
- .2 American National Standards Institute (ANSI).
 - .1 ANSI Z97.1 American National Standard for Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
- .3 National Fire Protection Association
 - .1 NFPA 80 Standard for Fire Doors, Fire Windows.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-12.1-17 Safety Glazing
 - .2 CAN/CGSB-12.2-91 (R2017) Flat, Clear Sheet Glass.
 - .3 CAN/CGSB-12.3-91 (R2017) Flat, Clear Float Glass.

- .4 CAN/CGSB-12.4-91 (R2017) Heat Absorbing Glass
- .5 CAN/CGSB-12.8-17 Insulating Glass Units
- .5 CSA Group (CSA)
 - .1 AAMA/WDMA/CSA 101/I.S.2/A440-11, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights.
- .6 Consumer Product Safety Commission
 - .1 CPSC 16 CFR 1201 Safety Standard for Architectural Glazing Materials.
- .7 Environmental Choice Program (ECP).
 - .1 CCD-045-95 Sealants and Caulking.
- .8 Flat Glass Manufacturers Association (FGMA).
 - .1 FGMA Glazing Manual - 1997.
- .9 Glass Association of North America (GANA)
 - .1 GANA Glazing Manual 50th Anniversary Edition-2008.
 - .2 GANA Laminated Glazing Reference Manual - 2009.
 - .3 GANA Sealant Manual-2008.
 - .4 GANA Guide to Architectural Glass (2010).
 - .5 GANA/PGC International Protective Glazing Manual (2010).
- .10 South Coast Air Quality Management District, California State (SCAQMD)
 - .1 SCAQMD Rule 1168-03, Adhesives and Sealants Applications.
- 1.4 Submittals
 - .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.
 - .3 Certificates: submit product certificates signed by manufacturer certifying materials and assemblies comply with specified performance characteristics and criteria and physical requirements.
 - .4 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
 - .5 Samples: Submit duplicate 300 x 300 mm size samples of glass and sealant material.
 - .6 Manufacturer's Instructions: Submit manufacturer's installation instructions.
 - .7 Provide maintenance data for glazing for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.
- 1.5 Quality Assurance
 - .1 Perform work in accordance with FGMA Glazing Manual and Laminators Safety Glass Association Standards Manual for glazing installation methods.
 - .2 Installer: Company specializing in the installation of structural glazing with five years proven experience and approved by the manufacturer for installation of their products.
 - .3 Safety glass products shall comply with the testing requirements of CAN/CGSB-12.1, Type 1 for Laminated Glass and Type 2 for Tempered Glass.
 - .4 Comply with published recommendations of glass product manufacturers and organizations below,

except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this section or referenced standards.

.1 GANA Publications

.2 AAMA Publications

.3 IGMA/IGMAC Publications

.5 Provide safety glass permanently marked with the company name or logo and CAN/CGSB-12.1 if the product meets categories 1 and 2, or mark as CAN/CGSB 12.1M-1 if the product meets the requirements of Category 1 only.

.6 Insulating Glass products are to be permanently marked either on spacers or at least one insulating unit component with appropriate certification label of the Insulating Glass Manufacturers Alliance (IGMA) or Insulating Glass Manufacturers Association of Canada (IGMAC)

.7 Single-source fabrication responsibility: All glass fabricated for each type shall be processed and supplied by a single fabricator.

.8 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.9 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 System Description

.1 Performance Requirements: Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follows:

.1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

1.7 Design Requirements

.1 Design glass, glazing channels, connections, attachments and glazing accessories to withstand loads designated by the Ontario Building Code and to accommodate all building deflections.

.2 Size glass to withstand wind loads, dead loads and positive and negative live loads acting normal to plane of glass to a design pressure of 1.2 kPa as measured in accordance with ANSI/ASTM E330.

.3 Limit glass deflection to 1/200 with full recovery of glazing materials.

.4 Glass thicknesses indicated are minimum and are for detailing only. Confirm glass thickness by analyzing project conditions, including in-service conditions and loads. Coordinate glass thicknesses with manufacturers of framing systems.

1.8 Project Conditions

.1 Install glazing when ambient temperature is 10 ° C minimum. Maintain ventilated environment for 24 hours after application.

.2 Maintain minimum ambient temperature before, during and for 24 hours after installation of glazing compounds.

1.9 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

.3 Provide glass units with interleaving protection between lites. Keep glass and interleaving dry and store cases in clean, cool, dry areas with temperatures above the dew point. Circulation of cool, dry air in storage areas is essential. Open cases and inspect units periodically for moisture accumulation.

- .4 Do not store glass in direct sunlight without an opaque protective covering over same.

1.10 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.11 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.
- .2 Warrant insulating glass units for ten years from date of Substantial Performance against seal failure, interpane dusting, or interpane misting.
- .3 Warrant low-emissivity coatings when applied to the second or third surfaces of an insulating glass unit, for ten years against peeling or coating deterioration due to product failure.

PART 2 PRODUCTS

2.1 Materials-Flat Glass

- .1 Float glass: to CAN/CGSB-12.3, glazing quality, 6 mm thick minimum.
Sheet glass: to CAN/CGSB-12.2, selected, 6 mm thick minimum.
- .2 Tempered Safety Glass: To CAN/CGSB-12.1, transparent, 10 mm thick unless indicated otherwise. Type 2-tempered.
 - .1 Class B-float.
 - .2 Category 1 11.
 - .3 Edge treatment: ground, bevel edge.
- .3 Mirror Glass: Silvered mirror glass: to ASTM C1503, minimum 6 mm thick.
 - .1 Type 1B-Float glass for high humidity use. All edges ground and polished.

2.2 Insulating Glass Units

- .1 Insulating Glass Units: To CAN/CGSB-12.8-M, double glazed sealed units, not less than 25 mm thick. Minimum 12.7 mm air space
 - .1 Exterior Units: Insulating Glass Type 1:
 - .1 Outboard Lite: 6 mm clear tempered with Solarban 67 low-e coating on second surface.
 - .2 12.7 mm air space, argon filled.
 - .3 Inboard Lite: 6mm clear tempered.
 - .4 Performance: All performance data shall be calculated according to ASHRAE standard procedures and verified using the LBL "Window 4.1" program:
 - .1 Winter nighttime U value: 0.24
 - .2 Summer Daytime U value: 0.22
 - .3 Shading Coefficient: 0.33
 - .4 Solar Heat Gain Coefficient: 0.29
 - .5 Relative Heat Gain: 68.7
 - .6 LSG: 1.86
 - .7 Visible Light Transmittance: 54%

.8 Ultraviolet Transmittance: 11%

.5 Product: Vitro 6mm Solarban 67 (2) on Clear + 12.7 mm Argon + 6mm Clear

2.2 Fire Rated Glass

.1 Refer to Section 08 88 13

2.3 Window Film

.1 As specified in Section 08 87 20.

2.4 Glazing Products

- .1 Select appropriate glazing sealants, tapes, gaskets and other glazing materials of proven compatibility with other materials that they contact. These include glass products, insulating glass unit seals and glazing channel substrates under installation and service conditions, as demonstrated by testing and field experience.
- .2 Setting blocks: Neoprene 80-90 Shore A durometer hardness to ASTM D 2240, to suit glazing method, glass light weight and area.
- .3 Spacer shims: Neoprene 50-60 Shore A durometer hardness to ASTM D 2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self-adhesive on one face.
- .4 Glazing tape:
 - .1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D 2240; coiled on release paper; black colour.
 - .2 Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume 2%, designed for compression of 25%, to effect an air and vapour seal.
- .5 Glazing splines: resilient polyvinyl chloride, extruded shape to suit glazing channel retaining slot, colour as selected.
- .6 Lock-strip gaskets: to ASTM C542.
- .7 Glazing Gaskets: To ASTM C864.
- .8 Sealant: as specified in Section 07 92 00 – Joint Sealants. Low VOC.
- .9 Mirror adhesive: Synthetic rubber based adhesive, waterproof and mildew resistant: Lepage PL 610 Construction Mirror Adhesive. Low VOC compliant to SCAQMD Rule 1168-03.
- .10 Mirror Clips: CRL zinc plated steel Vancouver type 'H' clips. Size to suit.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

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

3.2 Examination

- .1 Verify that openings for glazing are correctly sized and within tolerance.
- .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.3 Preparation

- .1 Clean contact surfaces with solvent and wipe dry.

- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.
- 3.4 Installation – General
 - .1 Perform work in accordance with GANA Glazing Manual for glazing installation methods.
- 3.5 Installation: Exterior Wet/Dry Method (Preformed Tape and Sealant)
 - .1 Cut glazing tape to length and set against permanent stops, 6 mm below sight line. Seal corners by butting tape and dabbing with sealant.
 - .2 Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.
 - .3 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.
 - .4 Rest glazing on setting blocks and push against tape and heel head of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.
 - .5 Install removable stops with spacer strips inserted between glazing and applied stops 6 mm below sight line.
 - .6 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.
 - .7 Apply cap head of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.
- 3.6 Installation: Interior - Dry Method
 - .1 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.
 - .2 Apply cap bead of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.
 - .3 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.
 - .4 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.
 - .5 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.
 - .6 Place glazing tape on free perimeter of glazing.
 - .7 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
 - .8 Knife trim protruding tape.
 - .9 Glaze hollow metal doors and pressed steel screens. Glass type as indicated.
- 3.7 Mirrors
 - .1 Install frameless mirrors in adhesive and with steel H clips, concealed fasteners.
 - .2 Install mirrors in one piece.
 - .3 Framed mirrors are specified in Section 10 28 10.
- 3.8 Cleaning
 - .1 Proceed in accordance with Section 01 74 11 – Cleaning.
 - .2 Perform cleaning to remove construction and accumulated environmental dirt.

- .3 Remove traces of primer, caulking.
 - .4 Remove glazing materials from finish surfaces.
 - .5 Remove labels after work is complete.
 - .6 Clean glass using approved non-abrasive cleaner in accordance with manufacturer's instructions.
 - .7 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- 3.9 Protection of Finished Work
- .1 After installation, mark light with an "X" by using removable plastic tape.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 08 11 00 Metal Doors and Frames
- .2 Section 08 80 05 Glazing

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM E84-20 Standard Test Method for Surface Burning Characteristics of Building Materials
 - .2 ASTM E308-18 Standard Practice for Computing the Colors of Objects by Using the CIE System
 - .3 ASTM E903-20 Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres
 - .4 ASTM G155-13 Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .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 Selection Samples: For each product specified, two complete sets of samples representing manufacturer's full range of available colours and patterns.
- .4 Verification Samples: For each finish product specified, two samples representing actual product, colour, and patterns.
- .5 Provide maintenance data for decorative window films for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 Performance Requirements

- .1 Fire Performance: Surface burning characteristics when tested in accordance ASTM E84:
 - .1 Flame Spread: maximum 25.
 - .2 Smoke Developed: maximum 450.

1.6 Quality Assurance

- .1 Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten years of experience.

- .2 Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five years demonstrated experience in installing products of the same type and scope as specified.
 - .1 Provide documentation that the installer is authorized by the Manufacturer to perform Work specified in this section.
- .3 Provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film manufacturer.
- 1.7 Shipping, Handling and Storage
 - .1 Refer to Section 01 61 00 – Common Product Requirements.
 - .2 Store products in manufacturer's unopened packaging until ready for installation.
 - .3 Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.
- 1.8 Project Conditions
 - .1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- 1.9 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.
- 1.10 Warranty
 - .1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

- 2.1 Manufacturer
 - .1 Acceptable Manufacturer: 3M Window Film.
- 2.2 Single Patterned Film
 - .1 FASARA Glass Finishes Frost/Matte SH2MAML, Milky White, Milano
 - .1 Class A - ASTM E84 Fire Classification,
 - .2 Visible Light Transmission (ASTM E903, ASTM E308): Not more than 59 percent.
 - .3 Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E903): Not less than 0.75.

PART 3 EXECUTION

- 3.1 Examination
 - .1 Do not begin installation until substrates have been properly prepared.
 - .2 If substrate preparation is the responsibility of another installer, notify Consultant of unsatisfactory preparation before proceeding.
- 3.2 Preparation
 - .1 Clean surfaces thoroughly prior to installation.
 - .2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 Installation

- .1 Install in accordance with manufacturer's instructions.
- .2 Cut film edges neatly and square at a uniform distance of 3 mm to 1.5 mm of window sealant. Use new blade tips after 3 to 4 cuts.
- .3 Spray the slip solution, composed of one capful of baby shampoo or dishwashing liquid to 1 gallon of water, on window glass and adhesive to facilitate proper positioning of film.
- .4 Apply film to glass and lightly spray film with slip solution.
- .5 Squeegee from top to bottom of window. Spray slip solution to film and squeegee a second time.
- .6 Bump film edge with lint-free towel wrapped around edge of a 5-way tool.
- .7 Upon completion of film application, allow 30 days for moisture from film installation to dry thoroughly, and to allow film to dry flat with no moisture dimples when viewed under normal viewing conditions.

3.4 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Remove left over material and debris from Work area.
- .3 Use necessary means to protect film before, during, and after installation.
- .4 Touch-up, repair or replace damaged products before Substantial Performance.
- .5 After application of film, wash film using common window cleaning solutions, including ammonia solutions, 30 days after application. Do not use abrasive type cleaning agents and bristle brushes to avoid scratching film. Use synthetic sponges or soft cloths.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 08 11 00 Metal Doors and Frames
- .2 Section 08 80 05 Glazing

1.3 References

- .1 National Fire Protection Association (NFPA)
 - .1 NFPA 80 - 2019 Standard for Fire Doors and Other Opening Protectives
 - .2 NFPA 252 - 2017 Standard Methods of Fire Tests of Door Assemblies.
 - .3 NFPA 257 - 2017 Standard on Fire Test for Window and Glass Block Assemblies.
- .2 Underwriters Laboratories, Inc. (UL)
 - .1 UL 9 Fire Tests of Window Assemblies.
 - .2 UL 10B for Fire Tests of Door Assemblies.
 - .3 UL 10C Positive Pressure Fire Tests of Door Assemblies.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 104 -2015 Standard Method for Fire Tests of Door Assemblies.
 - .2 ULC 106 - 2015 Standard Method for Fire Tests of Window and Glass Block Assemblies
- .4 Consumer Products Safety Commission (CPSC)
 - .1 CPSC 16 CFR 1201 Safety Standard for Architectural Glazing Materials.
- .5 Glass Association of North America (GANA)
 - .1 GANA – Glazing Manual
 - .2 FGMA – Sealant Manual

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings: Submit shop drawings showing layout, profiles and product components.
- .3 Samples: Submit 150 x 150 mm glass samples.
- .4 Technical Information: Submit latest edition of manufacturer's product data.
- .5 Provide maintenance data for fire resistant glazing for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 System Description

- .1 Performance Requirements: Provide a fire rating glazing manufactured, fabricated and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.
 - .1 Fire Rating: Fire resistant glazing shall be fire rated from 20-180 minutes with hose stream and is impact safety rated to meet CPSC 16 CFR 1201 Category I and II.

- .2 Fire resistant glazing shall be tested in accordance with NFPA 80, NFPA 252, NFPA 257, UL 9, UL 10B, UL 10C, ULC 104 and ULC 106.
- .3 Testing Laboratory: Fire test shall be conducted by a nationally recognized independent testing laboratory.
- .2 Listings and Labels: Fire rated glazing shall be under current follow-up service by a nationally recognized independent testing laboratory approved by OSHA and maintain a current listing or certification. Assemblies shall be labeled in accordance with limits of listings.
- 1.6 Project Conditions
 - .1 Field Measurements: Verify actual measurements for openings by field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.
- 1.7 Shipping, Handling and Storage
 - .1 Refer to Section 01 61 00 – Common Product Requirements.
 - .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- 1.8 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.
- 1.9 Warranty
 - .1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

- 2.1 Fire Rated Glazing
 - .1 Material:
 - .1 Fire protective safety laminated glass ceramic with hose stream, fire rating as indicated.
 - .2 Conforming to ULC 104 & ULC 106
 - .2 Product and Manufacturer:
 - .1 PYRAN Platinum L as manufactured by SCHOTT Technical Glass Solutions
 - .2 Keralite Select L as manufactured by VETROTECH SAINT-GOBAIN NORTH AMERICA INC
 - .3 Firelite Plus Premium as manufactured by Nippon Glass.
 - .3 Design Requirements:
 - .1 Thickness: 8 mm thick.
 - .2 Weight: 19.5 kg/m²
 - .3 Sound Transmission Rating: 36 STC.
 - .4 Appearance: Neutral colouration free of amber tints.
 - .5 Fire Rating: Fire rated from 20-180 minutes with hose stream.
 - .6 Impact Safety Rating: Meet CPSC 16 CFR 1201 Category I & II.
 - .7 Cradle to Cradle Certification: Must be C2C Silver Certified.
 - .8 Polished finish.

- .9 ANZI Z97 Impact Safety Filmed and Laminated
- .10 Environmental Impact: Manufacturing process and final composition free from toxins or hazardous heavy metals.
- .4 Each piece of fire-rated glazing material shall be labeled with a permanent logo including name of product, manufacturer, testing laboratory and fire rating.
- 2.2 Accessories
 - .1 Glazing Accessories: Manufacturer recommended fire rated glazing accessories as follows:
 - .1 Glazing tape: Closed cell polyvinyl chloride (PVC) foam, Pemko Manufacturing Company, FG3000S90 or Unifax Corporation Fiberfrax Alumino-Silicate fiber glazing tape.
 - .2 Setting blocks: Calcium silicate or hardwood.
 - .3 Cleaners, primers, sealers: Type recommended by manufacturer of glass and gaskets.
- 2.3 Related Products
 - .1 Glazing shall be installed in an equally rated framing system.
- 2.4 Source Quality
 - .1 Obtain fire rated glazing products from a single manufacturer.
 - .2 Fabrication Dimensions: Fabricate to required dimensions.
- PART 3 EXECUTION
 - 3.1 Manufacturer's Instructions
 - .1 Comply with manufacturer's product data including product technical bulletins and installation instructions.
 - 3.2 Examination
 - .1 Verify substrate conditions, have been previously installed under other sections, and are acceptable for product installation in accordance with manufacturer's instructions.
 - 3.3 Installation
 - .1 Comply with referenced GANA manuals and instructions of manufacturers of glass, glazing sealants and glazing compounds.
 - .2 Protect glass from edge damage during handling and installation. Inspect glass during installation and set aside pieces with edge damage that could affect performance.
 - .3 Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
 - .4 Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.
 - .5 Arrange two setting blocks located at quarter points of glass with edge block no more than 150 mm from corners.
 - .6 Glaze vertically into labeled fire rated frames or fire rated walls with the same fire rating as the glass and push against tape for full contact at perimeter of pane or unit.
 - .7 Place glazing tape on free perimeter of glazing in same manner described above.
 - .8 Install removable stop and secure without displacing the tape.

.9 Install so that appropriate markings remain permanently visible.

.10 Field cutting or tampering is strictly prohibited.

3.4 Cleaning

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

.2 Protect glass from contact with contaminating substances resulting from construction operations.
Remove such substances by method approved by manufacturer.

.3 Wash glass on both faces not more than four days prior to date schedule for inspections intended to establish date of Substantial Performance. Wash glass by method recommended by glass manufacturer.

.4 Remove temporary coverings and protection of adjacent work areas.

.5 Remove construction debris from project site and legally dispose of debris.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 07 92 00 Joint Sealants
- .2 Section 09 21 16 Gypsum Board
- .3 Section 09 91 23 Interior Painting

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A653/A653M-20 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM C22/C22M-00(2021) Standard Specification for Gypsum
 - .3 ASTM C28/C28M-10(2020) Standard Specification for Gypsum Plasters
 - .4 ASTM C206-14 Standard Specification for Finishing Hydrated Lime
 - .5 ASTM C631-09(2020) Standard Specification for Bonding Compounds for Interior Gypsum Plastering
 - .6 ASTM C841-03(2018) Standard Specification for Installation of Interior Lathing and Furring
 - .7 ASTM C847-18 Standard Specification for Metal Lath
 - .8 ASTM C919-22 Standard Practice for Use of Sealants in Acoustical Applications
 - .9 ASTM C954-18 Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
 - .10 ASTM C1002-20 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
- .2 United States National Park Services (NPS)
 - .1 NPS Preservation Brief No. 21 - Repairing Historic Flat Plaster - Walls and Ceilings
 - .2 NPS Preservation Brief No. 23 - Preserving Historic Ornamental Plaster.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: for each type of product.
- .3 Preconstruction Test Reports: Existing mortar analysis.
- .4 Qualification Statements: Verifying qualifications and years of experience for installer. Include list of completed projects having similar scope of Work identified by name, location, date, reference names, and phone numbers.
- .5 Mix Designs: for each type of plaster. Include description of type and proportions of ingredients.
- .6 Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 Quality Assurance

.1 Qualifications:

- .1 Installer Qualifications: Company specializing in restoring plaster comparable in material, design, and extent to that indicated for this Project, and whose work has a record of successful in-service performance with the following qualifications:

- .1 Company Experience: Minimum five years under current organizational structure.
- .2 Project Experience: Minimum five years experience on at least five projects of similar nature in past five years.

.2 Preconstruction Testing: Engage a qualified testing agency to perform preconstruction testing on existing plaster.

- .1 Remove 4 samples of existing plaster from different locations.
- .2 Retain one sample for later comparison.
- .3 Break up remaining samples individually with mallet until constituent parts remain. Examine under microscope to determine:
 - .1 Approximate proportions of aggregate, cement, and lime.
 - .2 Type, size, and colour of aggregate.
 - .3 Presence of fillers and types of additives.

.3 Field Mockups: Build mockups to demonstrate aesthetic effects and qualities of materials and execution and set quality standard for restoration work.

- .1 Location: As directed.
- .2 Size: 10 feet long by 8 feet wide.
- .3 Include lath, plaster, each surface texture, and each colour.
- .4 Illustrate materials, profiles, finishes, and attachment.
- .5 Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- .6 Approval of mockups is also for other material and construction qualities specifically approved by Consultant in writing.
- .7 Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups, unless such deviations are specifically approved by Consultant in writing.
- .8 Approved mockups may become part of the completed Work if undisturbed at time of Substantial Performance.

.4 Preinstallation Meetings: Conduct meeting at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

- .1 Convene minimum prior to commencing work of this Section.
- .2 Attendance Required: Consultant, Owner, Contractor, installer, and other parties directly affecting or affected by work of this Section.
- .3 Review methods and procedures related to work of this Section including, but not limited to, the following:

- .1 Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
- .2 Inspect and discuss condition of substrates and other preparatory work performed by other trades.
- .3 Review structural load limitations and condition of existing support framing.
- .4 Review preparation and other requirements for performing work of this Section.
- .5 Discuss and agree upon quality control procedures.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Delivery Requirements: Deliver materials in manufacturer's undamaged packaging, complete with installation instructions.
- .4 Storage and Handling Requirements: Store materials off ground, under cover, protected from weather, direct sunlight, construction activities and at temperature conditions recommended by manufacturer.
- .5 Store sand to prevent inclusion of foreign matter.

1.7 Project Conditions

- .1 Ambient Conditions:
 - .1 Gypsum and Ornamental Plaster:
 - .1 Do not apply plaster when ambient or substrate temperature is less than 10 ° C or more than 30 ° C.
 - .2 Maintain minimum ambient temperature of 10 ° C during and after application of plaster.

1.8 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Lath

- .1 Expanded-Metal Lath: ASTM C847, cold-rolled carbon-steel sheet, ASTM A653, G60, hot-dip galvanized zinc coated.
 - .1 Paper Backing: FS UU-B-790, Type I, Grade D, Style 2 vapour-permeable paper.
 - .2 Diamond-Mesh Lath: Flat over open backing; self-furring over solid backing, 3.4 lb/sq. yd.

2.2 Trim Accessories

- .1 General: Comply with ASTM C841 for gypsum plaster and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
- .2 Metal Accessories: Fabricated from zinc; shapes as required to match original.

2.3 Gypsum Plaster Materials

- .1 Gypsum: ASTM C22.
- .2 Aggregate: Natural or manufactured sand, size, colour, and texture to match existing.

- .3 Additives: As determined by existing plaster analysis, to match existing plaster.

2.4 Ornamental Plaster Materials

- .1 Gypsum Plaster: ASTM C28.
- .2 Lime: ASTM C206, Type N, normal finishing hydrated lime.
- .3 Adhesive: Waterproof type, formulated for bonding gypsum based products.
- .4 Molding Material: Urethane, 30 durometer hardness.
- .5 Templates: Wood or metal.
- .6 Patching Compound: Gypsum based.

2.5 Gypsum Plaster Mixes

- .1 Scratch, Brown, and Finish Coats: Mix gypsum , additives, and aggregate in proportions to match existing plaster. Add water to achieve workable consistency.
- .2 Patching Compound: Mix with water in accordance with manufacturer's instructions.

2.6 Ornamental Plaster Mixes

- .1 Plaster: Mix gypsum, lime, and water in proportions required to produce plaster mix of consistency required for application

2.7 Miscellaneous Materials

- .1 Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- .2 Bonding Compound: ASTM C631.
- .3 Steel Drill Screws: For metal-to-metal fastening, ASTM C1002 or ASTM C954, as required by thickness of metal being fastened; with pan head that is suitable for application; in lengths required to achieve penetration through joined materials of no fewer than three exposed threads.
- .4 Fasteners for Attaching Metal Lath to Substrates: Complying with ASTM C841.
- .5 Patching Compound: Premixed, containing gypsum and aggregate.
- .6 Tie Wire: Galvanized annealed steel, minimum 18 gauge.
- .7 Thermal Insulation: As specified in Division 07 Section "Thermal Building Insulation."
- .8 Acoustical Joint Sealant: As specified in Section 07 92 00

2.8 Fabrication of Cast Plaster

- .1 Fabricate molds from existing undamaged plaster.
- .2 For continuous elements, fabricate molds with overage on length to permit filed fitting.
- .3 Cast replacement units with sharp lines and edges, with profiles to match existing.
- .4 After removal of units from molds, remove excess material and mold lines; tool exposed edges to smooth surfaces.

PART 3 EXECUTION

3.1 Examination

- .1 Verification of Conditions:

- .1 Examine substrates and conditions, with Installer present, for conditions affecting performance of work.
- .2 Examine nonstructural and structural metal framing, substrates, and hollow-metal frames, for compliance with requirements and other conditions affecting performance of the Work.
- .3 Verify conditions are ready to receive work of this Section.
- .4 Prepare written report, endorsed by Installer, listing conditions detrimental to performance.
- .5 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

- .1 Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

3.3 Installation- General

- .1 Fire-Resistance-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on Drawings.

3.4 Gypsum Plaster Repair/Restoration

Repair of Small Cracks and Minor Damage

- .1 Remove existing damaged plaster back to a point at which sound material is reached.
- .2 Remove loose and foreign matter which could impair adhesion.
- .3 Fill voids with patching compound; apply with sufficient pressure to eliminate voids and ensure adhesion.
- .4 Finish to match adjacent surfaces.

.2 Repair of Large Cracks

- .1 Remove existing damaged plaster back to a point at which sound material is reached.
- .2 Remove loose and foreign matter which could impair adhesion.
- .3 Fill voids with patching compound; apply with sufficient pressure to eliminate voids and ensure adhesion.
- .4 Embed tape in wet compound. Apply additional compound to cover tape. 5. Finish to match adjacent surfaces.

.3 Repair of Delaminated Plaster Layers

- .1 Remove existing damaged plaster layers down to a point at which sound material is reached.
- .2 Remove loose and foreign matter which could impair adhesion.
- .3 Apply bonding compound in accordance with manufacturer's instructions.
- .4 Fill voids with patching compound; apply with sufficient pressure to eliminate voids and ensure adhesion.
- .5 Finish to match adjacent surfaces.

.4 Repair of Damaged Plaster Over Wood Lath

- .1 Remove existing damaged plaster down to lath.
- .2 Reattach loose lath with nails or wire ties.

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- .3 Install metal lath over existing wood lath. Cut lath approximately 1/2 inch smaller on all sides than area to be patched. Attach to wood lath with nails or wire ties.
 - .4 Apply scratch, brown, and finish coats to thickness to match existing plaster. 5. Finish to match adjacent surfaces.
 - .5 Repair of Damaged Plaster Over Metal Lath
 - .1 Remove existing damaged plaster down to lath.
 - .2 Reattach loose lath with nails or wire ties.
 - .3 Apply scratch, brown, and finish coats to thickness to match existing plaster.
 - .4 Finish to match adjacent surfaces.
 - .6 Repair of Damaged Plaster Over Gypsum Lath
 - .1 Remove existing damaged plaster and gypsum lath.
 - .2 Apply gypsum lath with ends and edges occurring over supports.
 - .1 Cut panels with maximum 1/8 inch gaps at perimeter and around openings and penetrations.
 - .2 Mechanically fasten panels to framing. Place fasteners minimum 3/8 inch from edges of panels. Drive heads slightly below surface.
 - .3 Apply scratch, brown, and finish coats to thickness to match existing plaster.
 - .4 Finish to match adjacent surfaces.
 - .7 Repair of Damaged Plaster Over Masonry
 - .1 Remove existing damaged plaster down to masonry.
 - .2 Rout out mortar joint to 5/8 inch depth.
 - .3 Apply bonding compound in accordance with manufacturer's instructions.
 - .4 Apply scratch, brown, and finish coats to thickness to match existing plaster. 5. Finish to match adjacent surfaces.
- 3.5 Ornamental Plaster Restoration
- .1 In-Place Restoration - Minor Damage
 - .1 Remove existing damaged plaster back to a point at which sound material is reached.
 - .2 Reattach loose cast elements with countersunk screws. Fill screw holes with patching compound; finish flush.
 - .3 Fill voids with patching compound; tool to match existing profiles. Finish smooth and flush with adjacent surfaces.
 - .2 In-Place Restoration - Major Damage and Missing Elements
 - .1 Remove existing damaged plaster back to a point at which sound material is reached.
 - .2 For continuous straight-line elements, attach temporarily wood strips to existing surfaces to act as guide for template. for circular elements, establish central reference point.
 - .3 Apply plaster using sufficient pressure to prevent voids and ensure adhesion to substrate.
 - .4 Strike off plaster to profile of existing using template; add additional plaster and strike off until smooth, full profiles are achieved.

- .5 Prior to adhering cast plaster to existing surfaces, clean surfaces of loose and foreign matter which could impair adhesion.
- .3 Replacement of Cast Elements
 - .1 Remove existing damaged plaster back to a point at which sound material is reached, in straight lines.
 - .2 Attach new cast plaster to substrate with countersunk screws. Fill screw holes with patching compound; finish flush.
 - .3 Fill joints between units with patching compound; finish flush with adjacent surfaces.
- 3.6 Cleaning
 - .1 Proceed in accordance with Section 01 74 11 – Cleaning.
 - .2 Clean as recommended by manufacturer. Do not use materials or methods which may damage finish or surrounding construction.
 - .3 Waste Management: Legally dispose of waste off Owner's property

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit product data wood floor restoration products.
- .3 Closeout Submittals: Provide maintenance data including procedures for stain removal, stripping, sealing and finishing for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.3 Quality Assurance

- .1 Employ skilled mechanics/applicators, trained and experienced in wood floor refinishing work with a minimum of three years proven experience.
- .2 Provide mockup of 1 m² of wood floor refinishing in area designated by the Consultant.
 - .1 When accepted, mock up shall demonstrate minimum standard for work of this Section. Accepted mock up may remain as part of the Work.

1.4 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Materials shall be delivered in the manufacturer's unopened containers marked with the brand name. Materials shall be delivered, handled, and stored in accordance with manufacturer's instructions in a manner that will prevent deterioration and contamination.

1.5 Environmental Requirements

- .1 Areas to receive wood refinishing shall be maintained at a temperature above 10 °C for 24 hours before and after restoration work.

1.6 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Wood Filler: Minwax High Performance Wood Filler.
- .2 Stain: Minwax water based wood stain in colour selected by Consultant.
- .3 Floor Finish: Minwax Super Fast-Drying Polyurethane for Floors. Satin finish.
- .4 Thresholds: New, wood species to match hardwood flooring, complete with fasteners. Low profile.

PART 3 EXECUTION

3.1 Preparation

- .1 Protect work during installation and protect finished surfaces while other work is being executed in the area.
- .2 Provide tarpaulins or dust screens to prevent the spread of dust beyond work areas.
- .3 Check for appropriate heating facilities and required working conditions.

- .4 All sanding equipment shall have vacuum and dust bags.

3.2 Refinishing Wood Flooring

.1 Floor Finishing:

- .1 Check and record moisture content of flooring before beginning application of finish.
- .2 Clean, sand and prepare existing hardwood floors in accordance with finish manufacturer's instructions.
- .3 Apply wood filler to areas to be repaired, using a plastic putty knife. Spread on a thin layer followed by a sufficient amount to fill the gap. (To fill deep holes, spread on 3.0 mm layers one at a time until the hole is filled.) Slightly over-fill to allow for sanding down.
- .4 Sand flooring in accordance with manufacturers guidelines for specific products. Sand in minimum three passes (coarse, medium and fine). Power sand floor surface smooth and true.
- .5 Hand sand perimeter and any recesses, nooks etc.
- .6 Vacuum clean and remove dust using tack cloths. Remove all the dust from the floor, molding, and walls. Wipe down the walls and moldings once to get the dust onto the floor, and then use a damp rag on the moldings to remove any residue. Let the dust settle, and then vacuum.
- .7 Apply stain in accordance with manufacturer's instructions. Allow to dry and reapply stain as necessary to achieve even colour throughout.
- .8 Apply 3 coats of polyurethane floor finish.
- .9 Screen and vacuum and tack between each coat after it dries.
- .2 Install thresholds at openings and where indicated. Attach threshold to adjacent rigid floor surface. Threshold to act as ramp between floor surfaces over expansion space.
- .3 Protection:
 - .1 Upon completion, this work shall be ready for final inspection and acceptance by the Consultant.
 - .2 Protect the finished floor from all trades that will follow using non-staining coverings
 - .3 Prohibit traffic on floor for 48 hours after application of finish.

3.3 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 92 00 Joint Sealants
- .3 Section 09 22 16 Non-Structural Metal Framing
- .4 Section 09 91 23 Interior Painting

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C475/C475M-17 Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .2 ASTM C514-04(2014) Standard Specification for Nails for the Application of Gypsum Board
 - .3 ASTM C840-17a Standard Specification for Application and Finishing of Gypsum Board
 - .4 ASTM C954-15 Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
 - .5 ASTM C1002-16 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
 - .6 ASTM C1047-14a Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
 - .7 ASTM C1396/C1396M - 17 Standard Specification for Gypsum Board
 - .8 ASTM E90-09 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 - .9 ASTM E814-13a Standard Test Method for Fire Tests of Penetration Firestop Systems
 - .10 ASTM E1966-15 Standard Test Method for Fire-Resistive Joint Systems
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 19-GP-21M Sealing and Bedding Compound for Acoustical Purposes
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 ULC 114-2018 Standard Method of Test for Determination of Non-Combustibility in Building Materials
 - .3 ULC 129- 2015 Standard Method of Test for Smoulder Resistance of Insulation (Basket Method)
 - .4 ULC List of Equipment and Material, Volume III, Fire Resistance Ratings.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for gypsum board assemblies and include product characteristics, performance criteria, physical size, finish and limitations.
- 1.5 Quality Assurance
 - .1 Dry wall installers: minimum 5 years proven experience.
 - .2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
 - .3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
 - .4 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- 1.6 Design Requirements
 - .1 Provide fire resistance rating of installed partitions as indicated and according to referenced IULC design.
- 1.7 Shipping, Handling and Storage
 - .1 Refer to Section 01 61 00 – Common Product Requirements.
 - .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
 - .3 Protect gypsum board materials before, during and after installation and to protect the installed work and materials of other trades affected by this work. Store materials in a dry area inside the building. Do not remove wrapping until ready for use. Prevent damage to all edges and surfaces.
- 1.8 Project Conditions
 - .1 Maintain temperature minimum 10 ° C, maximum 21 ° C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.
 - .2 Apply board and joint treatment to dry, frost free surfaces.
 - .3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.
- 1.9 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

- 2.1 Gypsum Board
 - .1 To ASTM C1396/C1396M. Standard for non-rated applications, Type X or Type C for rated applications, 1220 mm wide x maximum practical length, ends square cut, edges tapered with round edge, 12.7 mm thick or to thickness indicated on drawings.
- 2.2 Fastening and Adhesives
 - .1 Drywall Screws: To ASTM C954 or ASTM C1002 self-drilling, self-tapping, case hardened, length to suit board thickness and provide minimum 12 mm penetration into support.
 - .2 Nails: To ASTM C514.
 - .2 Joint Tape: To ASTM C475, 50 mm perforated with preformed seam, mould and mildew resistant.
 - .3 Joint Filler and Topping: To ASTM C475 vinyl or latex base, slow setting.

- .4 Laminating Compound: as recommended by manufacturer, asbestos-free.

2.3 Acoustic Insulation

- .1 Acoustic Insulation: Mineral or Glass Fibre Acoustic Insulation:
 - .1 Mineral Fibre Acoustic Insulation: To ASTM C665, Mineral fibre blanket insulation, minimum density of 40 kg/m³:
 - .1 AFB Acoustical Fire Batts manufactured by Roxul Inc.
 - .2 Creased SAFB manufactured by Owens Corning Canada.
 - .2 Acoustic sealant: as specified in Section 07 92 00 - Joint Sealants.

2.4 Accessories

- .1 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, zinc-coated by hot-dip process 0.5 mm base thickness, perforated flanges, one piece length per location.
- .2 Insulating Strip: Rubberized, moisture resistant, 3.0 mm thick, 12 mm wide closed cell neoprene strip, with self-sticking permanent adhesive on one face; lengths as required.
- .3 Sealants: as specified in Section 07 92 00 - Joint Sealants.

PART 3 EXECUTION

3.1 General

- .1 Prior to installation of gypsum wallboard, ensure that all required vapour barriers, air seals, gaskets and the like installed under another Section have been inspected and accepted by Municipal authorities and the Consultant. Failure to do so will result in removal of all gypsum board installed prior to approval and replacement, at no additional cost to the Owner.
- .2 Unless otherwise indicated on the drawings, all gypsum board partitions shall extend from floor level to the underside of floor or roof structures above.

3.2 Acoustic Insulation

- .1 Install acoustic blankets full width and length, with tight joints, between wall framing and around penetrating electrical service boxes, piping, air ducts and frames.
- .2 Place acoustic blankets where indicated on the Drawings and to thickness required to obtain acoustic performance indicated for the assembly.
- .3 Place acoustic blankets between studs ensuring friction fit, free of sags, folds or open joints that may let sound pass through.
- .4 Install blankets from the bottom up, tightly adjusted and trim accurately with a utility knife.

3.3 Gypsum Board Application

- .1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.
- .2 Do not apply gypsum board until bucks, anchors, blocking, electrical, and mechanical work are approved.
- .3 Apply gypsum board at right angles to framing members or furring using screw fasteners. Maximum spacing of screws 300 mm o.c.
- .4 Laminate gypsum board to masonry wall surfaces where indicated.

- .5 Carry gypsum board from floor to underside of floor or roof structure above. Furr out and carry gypsum board around any structural members as may be required. Neatly cope gypsum board to fill deck flutes where gypsum board abuts floor or roof deck.

3.4 Accessories

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges.
- .2 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.
- .3 Install insulating strips continuously at edges of gypsum board or casing beads abutting exterior door or window frames, to provide thermal break.
- .4 Install continuous bead of acoustic sealant at all penetrations through sound control partitions.
- .5 Provide control joints in gypsum board facing. Control joints shall be supported with metal studs or furring channels on both sides of the joint. Control joints shall be provided:
 - .1 At abutting structural elements, steel columns.
 - .2 At expansion or control joints in the substrate;
 - .3 At maximum 6.0 m spacings on long partition and bulkhead runs;
 - .4 At each door jamb.

3.5 Access Doors

- .1 Install access doors to electrical and mechanical fixtures specified in respective Sections.
- .2 Rigidly secure frames to furring or framing systems, to satisfy fire rating requirements.

3.6 Taping and Filling

- .1 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- .2 Finish corner beads, control joints and trims as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.
- .4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .5 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.

3.7 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 09 21 16 Gypsum Board

1.3 References

- .1 ASTM International (ASTM).
 - .1 ASTM A653/A653M-17 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM C645-14e1 Standard Specification for Nonstructural Steel Framing Members
 - .3 ASTM C754-17 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
 - .4 ASTM C841-03(2018) Standard Specification for Installation of Interior Lathing and Furring.
 - .5 ASTM C1002-16 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
 - .6 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 - .7 ASTM E814 - 13a(2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
 - .8 ASTM E1966-15 Standard Test Method for Fire-Resistive Joint Systems
- .2 Canadian General Services Board (CGSB).
 - .1 CAN/CGSB-1.40-97 Primer, Structural Steel, Oil Alkyd Type.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 ULC List of Equipment and Material, Volume III, Fire Resistance Ratings.
- .4 CSSBI Lightweight Steel Framing Manual

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for metal framing and include product characteristics, performance criteria, physical size, finish and limitations.

1.5 Quality Assurance

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Metal Stud Framing Systems

- .1 Non-load bearing channel stud framing: to ASTM C645, stud size as indicated, roll formed from 0.53 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.
 - .1 Thickness of materials to conform to referenced standards unless noted otherwise.
- .2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height.
- .3 Metal channel stiffener: 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.
- .4 Tie Wire: 0.90 mm, galvanized, soft annealed, steel wire or clip as recommended by the manufacturer of furring channels.

2.2 Metal Furring and Suspension Systems

- .1 Channel framing: to ASTM C645, stud size as indicated, roll formed from 0.53 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board.
 - .1 Thickness of materials to conform to referenced standards unless noted otherwise.
- .1 Metal Furring Runners, Hangers, Tie Wires, Inserts, Anchors: to ASTM C645 , electro-zinc coated steel.
- .2 Runner Channels: 38 x 19 x 0.59 mm and 38 x 9.5 x 0.45 mm, hot dip or electro-galvanized sheet steel. Use of various sizes governed by applied loads and applicable spans.
- .3 Drywall Furring Channel: Channel shaped furring member for screw attachment of drywall with knurled face. For interior use. Furring masonry or concrete surfaces. Cross furring under steel joist or suspended metal channels in suspended ceiling systems: 70 x 22 x 0.9 mm with knurled face, hot dip or electro-galvanized sheet steel. Bailey D-1001.
- .4 Hangers: minimum 4.1 mm diameter (or as required by ULC fire rating design requirements) mild steel rods.

2.2 Fasteners

- .1 Powder activated fasteners: to suit structural conditions and fastening requirements and in accordance with manufacturer's recommendations: Ramset; Hilti; or approved equivalent.
- .2 Sheet Metal Screws: To CSA A82.31-M, and ASTM C1002, self-drilling, self-tapping, case hardened, length to suit board thickness and provide minimum 12 mm penetration into support.

2.3 Accessories

- .1 Acoustic sealant: To ASTM E814 and ASTM E1966, with STC performance rating of 55 to ASTM E90.
- .2 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self-sticking adhesive on one face, lengths as required.

- .3 Zinc Rich Paint: to CGSB 1-GP-181M. Low VOC type.

PART 3 EXECUTION

3.1 Examination

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

3.2 Erection

- .1 Unless otherwise indicated on the drawings, all gypsum board partitions shall extend from floor level to the underside of floor or roof structures above.
- .2 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.
- .3 Place studs vertically at 400 mm on centre unless noted otherwise and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .4 Erect metal studding to tolerance of 1:1000.
- .5 Attach studs to bottom and ceiling track using screws.
- .6 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .7 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- .8 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
- .9 Install heavy thickness single jamb studs at openings.
- .10 Erect track at head of door/window openings and sills of window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .11 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .12 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.
- .13 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .14 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use 50 mm leg ceiling tracks.
- .15 Install continuous insulating strips to isolate studs from un-insulated surfaces.

- .16 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions.

3.3 Wall Furring

- .1 Install wall furring for gypsum board wall finishes in accordance with CSA A82.31-M, except where specified otherwise and shown on drawings.
- .2 Frame openings and around built-in equipment, cabinets, access panels, etc., on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- .3 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

3.4 Suspended and Furred Ceilings and Bulkheads

- .1 Erect hanger and runner channels for suspended gypsum board ceilings in accordance with CSA A82.31-M except where specified otherwise and indicated on drawings.
- .2 Securely anchor hanger to structural supports 1220 mm o.c. maximum along runner channels and not more than 150 mm from ends. Under no circumstances shall hanger wires be secured to or supported from mechanical or electrical materials or equipment or penetrate mechanical ductwork.
- .3 Space runner or furring channels as shown on drawings and not more than 610 mm o.c. maximum nor 150 mm from walls. Run channels in long direction of board. Bend hanger sharply under bottom flange of runner and securely wire in place with a saddle tie. Provide channels below mechanical or electrical equipment and mechanical ductwork to maintain maximum spacing.
- .4 Install furring channels transversely across runner channels in short direction of wallboard at 610 mm o.c. maximum or 150 mm from walls and interruptions in ceiling continuity. Secure channels to support with furring clips or wire. Where splicing is necessary lap minimum 200 mm and wire tie each end with double loops of 0.90 mm galvanized tie wire, 25 mm from each end of overlap.
- .5 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 610 mm around perimeter of fixture. Coordinate with Electrical.
- .6 Install work level to tolerance of 1:1200.
- .7 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles, etc.
- .8 Install furring channels parallel to, and at exact locations of steel stud partition header track.
- .9 Furr for gypsum board faced vertical bulkheads within or at termination of ceilings.

3.5 Gypsum Board

- .1 Installation of gypsum board is specified in Section 09 21 16

3.6 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 07 92 00 Joint Sealants
- .2 Section 09 21 16 Gypsum Board
- .3 Section 09 91 23 Interior Painting

1.3 References

- .1 ASTM International (ASTM)
 - .1 ACTM C144-18 Standard Specification for Aggregate for Masonry Mortar
 - .2 ASTM C150/C150M-20 Standard Specification for Portland Cement
 - .3 ASTM C207-18 Standard Specification for Hydrated Lime for Masonry Purposes
- .2 American National Standards Institute (ANSI)
 - .1 ANSI A108/A118/A136.1:2017 American National Specifications for the Installation of Ceramic Tile.
 - .2 ANSI A137.1: 2017 American National Standard Specifications for Ceramic Tile
- .3 Canadian General Standards Board (CGSB)
 - .1 CGSB 71-GP 22M 1978 Adhesive, Organic, for Installation of Ceramic Wall Tile
- .4 International Standards Organization (ISO)
 - .1 ISO 10545 Series Ceramic Tiles, Standards for Testing
 - .2 ISO 13006-2012 Ceramic Tiles, Definitions, Classifications, Characteristics and Marking.
 - .3 ISO 13007-2010 Ceramic Tiles, Grouts and Adhesives.
- .5 Terrazzo, Tile and Marble Association of Canada (TTMAC)
 - .1 TTMAC 2019-2021 Specifications Guide 09 30 00, Tile Installation Manual.
 - .2 TTMAC Hard Surface Maintenance Guide.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Provide product data. Include manufacturer's information on:
 - .1 Ceramic tile, marked to show each type, size, and shape required.
 - .2 Mortar and grout.
 - .3 Divider strip.
 - .4 Levelling compound.
 - .5 Waterproofing isolation membrane.
- .3 Submit duplicate samples of tile. Samples to be submitted on 300 x 600 mm sample board for each colour, texture, size and pattern of tile. Grout sample joints for representative sample of final installation.

- .4 Trim and Accessories: submit duplicate samples of each trim.
- .5 Maintenance Data: Provide maintenance data for tile work, for incorporation into Maintenance Manuals specified under Section 01 78 00.

1.5 Quality Assurance

- .1 Do tile work in accordance with Installation Manual 200, Ceramic Tile, by Terrazzo, Tile and Marble Association of Canada (TTMAC), except where this specification is more stringent.
- .2 For the installation of ceramic tile, use only skilled tradesmen who are familiar with the referenced standards and with the requirements for this Work.
- .3 The setting material manufacturer's representative shall review the details with the Contractor prior to the start of work. Instruct the Contractor on the proper installation procedures to ensure compliance with the guarantee requirements.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver packaged materials in original unopened containers.
- .3 Keep delivered material dry and free from stains. Store cementitious material off damp surfaces.
- .4 Use all means necessary to protect materials, before, during and after installation and to protect the installed work and materials of all other trades.
- .5 In the event of damage, immediately make all repairs and replacements necessary to the approval of the Consultant and at no additional cost to the Owner.
- .6 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 Project Conditions

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 °C for 48 hours before, during and after installation.
- .2 Do not install tiles at temperatures less than 12 °C or above 38 °C.
- .3 Do not apply epoxy mortar and grouts at temperatures below 15 °C or above 25 °C.
- .4 Provide and maintain temporary lighting. Lighting levels shall be sufficient to complete work including inspections. Provide minimum lighting levels of 400 lux at work areas.

1.8 Qualifications

- .1 Installer of ceramic tiles shall have a minimum of 10 years of experience including at least five projects of similar scope and scale. Submit documented proof of experience prior to commencing work of this Section.

1.9 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.10 Maintenance

- .1 Upon completion of the installation and as a condition of acceptance, deliver to the Owner 2% of tile and accessory tiles in each colour and pattern of ceramic tiles installed under this section for the Owners maintenance program. Identify each carton for location and installation date. Submission must be made all at one time and prior to Substantial Performance.

PART 2 PRODUCTS

2.1 Materials

- .1 Materials shall be graded and containers grade sealed, delivered to the job site in their original packages or containers with the manufacturer's labels and seals intact.
- .2 Tile and grout colours shall be selected by the Consultant from the manufacturer's standard range of colours.
- .3 Tile shall conform to ANSI A137.1.
- .4 Provide coves, corners, reveals, surf caps, inners and outers as required to complete the work.

2.2 Ceramic Tile

- .1 CT-1: Ceramic Wall Tile: Olympia Colour and Dimensions Series, bright glazed, 8 x 20". Colours to be selected by Consultant from full range of manufacturer's standards. Up to three colours may be selected.

2.3 Mortar, Adhesives and Grout Material

- .1 Primer: Low VOC, low viscosity primer as recommended by manufacturer to suit substrate and site conditions; provide proof of bonding ability of setting systems where manufacturer recommends that a primer is not necessary to installation.
- .2 Surface Preparation Materials:
 - .1 Portland Cement Mortar: Scratch and bond coat, levelling bed containing the following:
 - .1 Portland Cement: Meeting or exceeding requirements of CSA A3000, Type GU.
 - .2 Hydrated Lime: Meeting or exceeding requirements of ASTM C207, Type N.
 - .3 Sand: Meeting or exceeding requirements of ASTM C144, passing 16 mesh.
 - .4 Water: Potable.
 - .2 Self Levelling and Smoothing Underlayment: Cementitious and self levelling smoothing underlayment meeting or exceeding requirements of ANSI A108.1, Type 2.
- .3 Wall Tile Systems:
 - .1 Thin Set Interior Installation: Dry set mortar meeting or exceeding requirements of ANSI A118.1 formulated for thin set applications, factory sanded mortar consisting of Portland cement, sand and additives requiring only addition of potable water for installation complete with bond enhancing latex additive.
- .4 Adhesive Systems:
 - .1 Epoxy Adhesive: Thin set adhesive system using 100% solids epoxy resin and epoxy hardener meeting or exceeding requirements of ANSI A108.1; stain proof, chemical resistant and having high temperature resistance and water cleanable.
 - .2 Organic Adhesive: Thin set wall tile adhesive system using non-flammable, water resistant, latex adhesives for interior use meeting or exceeding requirements of ANSI A108.1, Type 1.
- .5 Tile Grout Systems:
 - .1 Unsanded Portland Cement Grout: factory blended dry-set stain resistant, latex modified Portland cement meeting or exceeding requirements of ANSI A118.6, specifically formulated for joints less than or equal to 3 mm in width.

2.4 Patching and Levelling Compound

- .1 Levelling Compound: Laticrete 3701 latex or 226 Mapecem mortar mixed with Planicrete 50.

2.5 Accessories

- .1 CT Edge Protection: Schluter RONDEC, size to suit tile thickness. Satin anodized aluminum. Trim to come with all connectors or end caps required for a complete and finished installation. As a minimum, provide edge protection at the following locations:

- .1 Top of CT wall tile.
- .2 All outside corners of wall tile.

- .2 Sealant: as specified in Section 07 92 00.

2.6 Mixes

- .1 Mix premanufactured mortars and grouts in accordance with referenced standards, and mortar and grout manufacturer's written instructions; mix site mixed materials as follows:
 - .1 Scratch Coat (by volume): Mix 1 part Portland cement, 4 parts sand, and latex additive where required by TTMAC detail.

PART 3 EXECUTION

3.1 Surface Conditions

- .1 Surfaces on which tile is to be applied, shall be thoroughly cleaned down.
- .2 Verify that concrete substrates have been allowed to cure for a minimum of 28 days in accordance with TTMAC requirements.
- .3 Verify that substrates for bonding tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and are within starting flatness tolerances as specified in Section 03 30 00, and are ready for application of levelling materials specified in this Section.
- .4 Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of Work, and similar items located in or behind tile have been completed before installing tile.
- .5 Drywall surfaces on which wall tile is to be applied, shall be free from dust, excess plaster and shall be plain and true without any irregularities. Prepare existing gypsum board surfaces as recommended by TTMAC and product manufacturer to support tile installation.
- .6 Existing painted plaster wall surfaces to receive ceramic tile shall be thoroughly cleaned of all paint down to concrete or concrete block surfaces using paint stripper. Prepare painted surfaces in accordance with manufacturer's instructions and TTMAC recommendations.
- .7 In the event of discrepancies, immediately notify the Consultant and do not proceed with installation in such areas until all such discrepancies have been fully resolved.
- .8 Check that conditions of temperature, humidity, traffic and usage are suitable as required by Installation Manual specifications. Minimum temperature to be not less than 10°C.
- .9 Check that surfaces ready to receive tiling are cured, level and/or graded, plumb, smooth, firm, free from loose particles, droppings, projection, grease, solvent, paint and other foreign matter and from other unsuitable conditions.
- .10 Install transition strips, reducers and edge trim at exposed edges of all tiled walls in accordance with manufacturer's instructions.

3.2 Installation

- .1 Install tiling in accordance with requirements of TTMAC Tile Installation Manual and parts of ANSI A108 Series of tile installation standards that apply to types of bonding and grouting materials, and to methods required for complete tile installation.
- .2 Extend tile work under or behind equipment and fixtures to form a complete covering without interruptions:

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- .1 Terminate Work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
 - .2 Make cut edges smooth, even and free from chipping.
 - .3 Do not split tile.
 - .3 Accurately form intersections and returns; perform cutting and drilling of tile without marring visible surfaces:
 - .1 Cut, drill, and fit tile to accommodate work of other subcontractors penetrating or abutting work of this Section.
 - .2 Carefully grind cut edges of tile abutting trim, finish, or built in items for straight aligned joints.
 - .3 Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile and to provide a uniform joint appearance.
 - .4 Lay tile in pattern indicated on Drawings and as follows:
 - .1 Align joints when adjoining tiles on walls, and trim are the same size.
 - .2 Centre tile patterns between control and movement joints; notify Consultant for further instructions where tile patterns do not align with control or movement joints.
 - .3 Cut tile accurately and without damage.
 - .4 Smooth exposed cut edges with abrasive stone, where exposed.
 - .5 Chipped or split edges are not acceptable.
 - .5 Bonding Bed: Set tile in place while bond coat is wet and tacky and as follows:
 - .1 Adjust amount of bonding materials placed on substrates based on temperature and humidity to prevent skinning over of bonding materials.
 - .2 Use sufficient bond coat to provide a minimum 80% contact for tiles smaller than 300 mm x 300 mm with bonding material evenly dispersed and pressed into back of tile; refer to back buttering requirements for larger materials and installations having Moderate or higher Load Bearing Performance requirements.
 - .3 Notch bond coat in horizontal straight lines and set on freshly placed bonding material while moving (sliding) tile back and forth at 90° to notches.
 - .4 Verify that corner and edges are fully supported by bonding material.
 - .5 Set tiles to prevent lippage greater than 1 mm over a 3 mm grout joint.
 - .6 Keep two-thirds of grout joint depth free of bonding materials.
 - .7 Clean excess bonding materials from tile surface prior to final set.
 - .8 Sound tiles after bonding materials have cured and replace hollow sounding tile before grouting.
 - .6 Back Buttering: Obtain 100% mortar coverage in accordance with applicable requirements for back buttering of tile in referenced TTMAC and ANSI A108 series of tile installation standards for the following applications:
 - .1 Tile installed with chemical resistant mortars and grouts
 - .2 Tile having tiles 300 mm or larger in any direction
 - .3 Tile having tiles with raised or textured backs
 - .7 Control and Movement Joints: Install control joints and expansion joints in tile work in accordance

with TTMAC Detail 301MJ

3.3 Grouting

- .1 Grouting: Install grout in accordance with manufacturer's written instructions, the requirements of TTMAC, and as follows:
 - .1 Allow proper setting time before application of grout.
 - .2 Pre-seal or wax tiles requiring protection from grout staining.
 - .3 Force grout into joints to a smooth, dense finish.
 - .4 Remove excess grout in accordance with manufacturer's written instructions and polish tile with clean cloths.
- .2 Grout all tile using specified grout in strict accordance with manufacturer's written instructions all to give a flush, hard joint.
- .3 Joints in tile shall be filled solid and flush with grout.
- .4 Prepare joints and mix grout in accordance with manufacturer's printed instructions. Force maximum amount of grout into joints, avoiding air traps or voids.
- .5 Remove all excess grout by washing diagonally across the joints. Check for voids, air pockets and gaps and fill same. Remove all discoloured grout and replace with new.
- .6 Cure all joints.

3.4 Cleaning and Protection

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Cleaning: Clean tile surfaces so they are free of foreign matter using manufacturer recommended cleaning products and methods after completion of placement and grouting and as follows:
 - .1 Remove grout residue from tile as soon as possible.
 - .2 Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation; protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning.
 - .3 Flush surface with clean water before and after cleaning.
- .3 Protection: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or other tile deficiencies as follows:
 - .1 Protect finished areas from traffic until setting materials have sufficiently cured in accordance with TTMAC requirements.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 09 21 16 Gypsum Board
- .2 Section 09 53 00 Acoustical Suspension

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C423-17 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - .2 ASTM E84-21a Standard Test Method for Surface Burning Characteristics of Building Materials
 - .3 ASTM E1264-19 Standard Classification for Acoustical Ceiling Products
 - .4 ASTM E1414/E1414M-21a Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
 - .5 ASTM E1477-98A(2017) Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
 - .1 Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.
- .3 Submit duplicate 300 x 300 mm samples of each type of acoustical units.

1.5 Quality Assurance

- .1 Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.
 - .1 Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - .2 Surface Burning Characteristics: As follows, tested per ASTM E84 and complying with ASTM E1264 Classification.
 - .3 Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory

- .2 Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.6 Project Conditions

- .1 Permit wet work to dry before beginning to install.
- .2 Maintain uniform minimum temperature of 15° C and humidity of 20-40% before and during installation.
- .3 Store materials in work area 48 hours prior to installation.
- .4 Building areas to receive ceilings shall be free of construction dust and debris.

1.7 Performance Requirements

- .1 Surface-Burning Characteristics: Conform to ULC S102 or ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- .2 Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to applicable code.

1.8 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Protect on site stored or installed absorptive material from moisture damage.

1.9 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.10 Extra Materials

- .1 Provide extra materials of acoustic units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide acoustical units amounting to 5% of gross ceiling area for each pattern and type required for project.
- .3 Ensure extra materials are from same production run as installed materials.

PART 2 **PRODUCTS**

2.1 Materials

- .1 Acoustic units for suspended ceiling system: to ASTM E1264
- .2 Panel Type 1: CGC Fissured.
 - .1 Class A.
 - .2 Composition: Water Felted Mineral Fiber
 - .3 Pattern regular fissured.
 - .4 Texture: medium.
 - .5 Flame spread: ASTM E1264, Class A (U.L.C.), 25 or less.
 - .6 Smoke developed 50 or less in accordance with ULC 102.
 - .7 Noise Reduction Coefficient (NRC): ASTM C423; Classified with UL label, 0.55
 - .8 Ceiling Attenuation Class (CAC): ASTM C1414; Classified with UL label, 35

- .9 Light Reflectance (LR) range of 0.81 to ASTM E1477.
- .10 Dimensional Stability: Standard
- .11 Edge Profile: Square Lay-In
- .12 Colour: White.
- .13 Size 610 x 1219 x 16 mm thick.
- .14 Shape flat.
- .15 Surface coverings: Ecolabel certified paint.
- .3 Alternate manufacturer: Products as manufactured by the following are acceptable, subject to Consultants approval of style, finish, performance characteristics and texture:
 - .1 Armstrong Industries
 - .2 Certainteed
- .4 Ceiling Suspension System: as specified in Section 09 53 00.

PART 3 EXECUTION

3.1 Examination

- .1 Do not install acoustical panels until work above ceiling has been inspected by Consultant.

3.2 Installation

- .1 Co-ordinate with Section 09 53 00 - Acoustical Suspension.
- .2 Coordinate layout and installation of ceilings with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, and fire-suppression system.
- .3 Install acoustical panels and tiles in ceiling suspension system.
- .4 Install acoustical units parallel to building lines with edge unit not less than 50% of unit width, with directional pattern running in same direction. Refer to reflected ceiling plan.
- .5 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding

3.3 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 09 51 13 Acoustic Panel Ceilings

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A307-21 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
 - .2 ASTM A641/A641M-19 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - .3 ASTM A1011/A1011M-18a Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
 - .4 ASTM C635/C635M-17 Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay in Panel Ceilings.
 - .5 ASTM C636/C636M-19 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
 - .6 ASTM A653 / A653M – 20 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .7 ASTM E84-21a Standard Test Method for Surface Burning Characteristics of Building Materials
 - .8 ASTM E119-20 Standard Test Methods for Fire Tests of Building Construction and Materials
 - .9 ASTM E1264-19 Standard Classification for Acoustical Ceiling Products

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
- .3 Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.
- .4 Submit one representative model of each type of ceiling suspension system.
 - .1 Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.

1.5 Design Requirements

- .1 Determine the superimposed loads that will be applied to suspension systems by components of the building other than the ceiling and ensure that adequate hangers are installed to support the additional loads in conjunction with the normal loads of the system.
- .2 Design supplemental suspension members and hangers where width of ducts and other construction within ceiling plenum produces hanger spacing that interferes with location of

hangers at required spacing to support standard suspension system members:

- .1 Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- .3 Rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of L/360 to ASTM C635 deflection test.

1.6 Performance Requirements

- .1 Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to applicable code.

1.7 Quality Assurance

- .1 Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.
- .2 Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - .1 Surface Burning Characteristics: Tested per ASTM E84 and complying with ASTM E1264 Classification.
- .3 Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.
- .4 Where required, provide fire-resistance rated suspension system: certified by a Canadian Certification Organization accredited by Standards Council of Canada.

1.8 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.9 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Components: All main beams and cross tees, base metal and end detail shall be commercial quality hot-dipped galvanized steel as per ASTM C635. Main beams and cross tees shall be double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping pre-finished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
- .2 Face width: 22 mm
- .3 Edge Moldings and Trim: Hemmed angle moulding to match main beams and cross tees.
- .4 Structural Classification: Intermediate Duty System, ASTM C635.
- .5 Colour: White and match the actual colour of the specified ceiling tile.
- .6 Standard of Acceptance:
 - .1 Armstrong Prelude XL
 - .2 Donn DXT

- .3 Certainteed Classic Environmental Stab.
- .7 Attachment Devices: Size for five times design load indicated in ASTM C635, Table 1, Direct Hung unless otherwise indicated or required.
- .8 Threaded Rod: to ASTM A397. Galvanized or zinc plated.
- .9 Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft annealed, with a yield stress load of at least three times design load, but not less than 2.06 mm thick.
- .10 Channel Framing and Fittings: Strut type metal framing and components to ASTM A1011 or ASTM A653. Unistrut P1000SL or equivalent. Galvanized.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

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

3.2 Examination

- .1 Do not proceed with installation until all wet work such as concrete, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.3 Preparation

- .1 Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.
- .2 Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
 - .1 Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.4 Installation

- .1 Install suspension system and panels in compliance with ASTM C636; CISCA Seismic Guidelines and in accordance with the manufacturer's installation instructions.
- .2 Install wall moldings at intersection of suspended ceiling and vertical surfaces.
- .3 Do not erect ceiling suspension system until work above ceiling has been inspected by Consultant.
- .4 Secure hangers to overhead structure using attachment methods as indicated by manufacturer. Do not suspend ceiling systems from building services including plumbing lines, conduit, cable trays or duct work.
- .5 Hanger and bracing wires shall not attach to or bend around obstructions including but not limited to: piping, ductwork, conduit and equipment. Provide trapeze or other supplementary support members at obstructions to allow typical hanger spacing. Brace assemblies must be configured and/or located in order to avoid obstructions in addition to maintaining the required brace assembly spacing.
- .6 Install hangers spaced at maximum 1219 mm centres and within 152 mm from ends of main tees. Install hanger wires plumb and straight.
- .7 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter with border units not less than 50% of standard unit width.

- .8 Ensure suspension system is coordinated with location of related components.
- .9 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles, and speakers.
- .10 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 610 mm around perimeter of fixture.
- .11 Interlock cross member to main runner to provide rigid assembly.
- .12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
- .13 Install access splines to provide ceiling access.
- .14 Finished ceiling system to be square with adjoining walls and level within 1:1000

3.5 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Touch up scratches, abrasions, voids and other defects in painted surfaces

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 09 65 43 Linoleum Flooring
- .2 Section 09 68 00 Carpeting

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM E84-20 Standard Test Method for Surface Burning Characteristics of Building Materials
 - .2 ASTM F710-19e1 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 - .3 ASTM F1066-04(2018) Standard Specification for Vinyl Composition Floor Tile
 - .4 ASTM F1344-15 Standard Specification for Rubber Floor Tile
 - .5 ASTM F1861-16 Standard Specification for Resilient Wall Base
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102.2-2018 Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies
- .3 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1168-03, Adhesives and Sealants Applications.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit duplicate samples of manufacturer's full range of colours for specified products for selection of colours by the Consultant.
- .3 Submit a complete list of all materials proposed to be furnished and installed under this portion of the Work, stating manufacturer's name and catalogue number for each item, and product samples in colours specified.
 - .1 Accompanying the materials list, submit two copies of the manufacturer's current recommended method of installation for each item.
- .4 Provide maintenance data for resilient flooring for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Use all means necessary to protect resilient flooring materials before, during and after installation and to protect the installed work and materials of all other trades.

1.6 Extra Materials

- .1 Provide extra stock materials of resilient flooring, base and adhesives in accordance with Section 01 78 00 – Closeout Submittals.
 - .1 Provide one carton of each colour, pattern and type flooring material required for this project for maintenance use.
 - .2 Provide one container of adhesive.
 - .3 Clearly identify each container of floor tile and each container of adhesive.
- .2 Extra materials to be from same production run as installed materials.
- 1.7 Environmental Requirements
 - .1 Maintain air temperature and structural base temperature at floor installation area above 20° C for 48 hours before, during and after installation.
- 1.8 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.
- 1.9 Warranty
 - .1 Warrant the work of this Section against defects of workmanship and material, for a period of ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

- 2.1 Materials
 - .1 Vinyl Composition Tile: to CSA A126.1 or ASTM F1066, 305 x 305 x 3.0 mm thick, non-asbestos, Class 2 through pattern tile with static load of not less than 517 kPa and U.L.C. flame spread rating of 75 or less.
 - .1 Armstrong: Standard Excelon Imperial Texture.
 - .2 Amtico: Commercial Color-Thru Duravinyll.
 - .2 Rubber Stair Treads: one piece tread with raised round pattern, full width and depth of stair with speckled pattern and 50 mm wide colour contrasting abrasive carborundum grit tape on stair nosing to meet ADA standards. Treads shall have a tapering thickness of 5.3 mm to 3.9 mm across a depth of 330 mm.
 - .1 Johnsonite Roundel Rubber Model VIRH or equivalent
 - .3 Resilient Base: To ASTM F1861, 100 mm high thermoplastic rubber, not less than 3.0 mm thickness with preformed internal and external corners. Base at resilient tile shall have standard toe.
 - .1 Johnsonite DuraCove DC Rubber Wall Base.
 - .2 Amtico Marathon.
 - .4 Rubber Tactile Warning Surface:
 - .1 Tactile Warning Tile (Attention Tile) Rubber Tiles (TW1): 4.0 mm dome height with 3.2 mm base thickness; 7.2 mm overall thickness.
 - .2 Meets current ISO/FDIS 23599 Assistive Products for the Blind & Vision-Impaired, Ontario Regulation 332/12, and Accessibility for Ontarians with Disabilities Act (AODA)
 - .3 Solid rubber floor tile to ASTM F1344.

- .4 Hardness ASTM D2240: Not Less than 85 Shore A
- .5 Slip resistance ASTM D2047 SCOF ≥ 0.6
- .6 Smoke Generation ASTM E662 < 450
- .7 Johnsonite Tactile Warning Tile – Rubber
- .5 Primers, Adhesives and Caulking: non-flammable, solvent free, waterproof, recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.
- .6 Sub-floor filler and leveler shall be white premixed latex compatible with flooring products and adhesive as recommended by flooring manufacturer for specific flooring types.
- .7 Metal edge strips: aluminum extruded, smooth, mill finish with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .8 Transition strips, mouldings and adaptors shall be rubber or vinyl, manufactured by Johnsonite, Roppe or Burke Mercer with lip to extend under floor tile with tapered edge, colour matched to flooring.
- .9 Sealer: water based, type recommended by flooring manufacturer.
- .10 Wax: type recommended by flooring manufacturer.
- .11 All colours and patterns shall be as selected by the Consultant from the complete range of manufacturer's colours and patterns.

PART 3 EXECUTION

3.1 Surface Conditions

- .1 Conform to requirements of ASTM F710.
- .2 Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- .3 Confirm that resilient flooring and base may be installed in accordance with the original design and the manufacturer's recommendations.
- .4 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer. Concrete must be cured a minimum of 35 days prior to commencement of resilient flooring application.
- .5 In the event of discrepancy, immediately notify the Consultant. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 Sub Floor Treatment

- .1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .2 Install sub floor and levelling compound to manufacturer's recommended standard limits and deviations. Levelling compound shall be applied to all subfloors and shall meet flatness requirements of flooring manufacturer and in accordance with ASTM F710.
- .3 Remove all substance and materials affecting adhesive bond.
- .4 Vacuum clean floors.
- .5 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler is cured and dry.
- .6 Prime or seal substrates to flooring and adhesive manufacturer's instructions.

- .7 Allow for excessive leveling of existing slabs.

3.3 Application

- .1 Provide a high ventilation rate, with maximum outside air, during installation, and for 48 hours after installation. Whenever possible, ventilate directly to outside. Do not allow contaminated air to re-circulate through the building ventilation system.
- .2 Install all resilient flooring in strict accordance with the manufacturer's printed instructions and recommendations.
- .3 Do not lay floor coverings and base until all trades, except painter, have completed their work and just prior to completion of the building.
- .4 Apply adhesive uniformly with recommended trowels, at coverage as recommended by the manufacturer. Do not spread more adhesive than can be covered before initial set takes place.
- .5 Lay flooring with joints parallel to building lines unless otherwise indicated, to produce symmetrical tile pattern. Patterns shall be as directed by the consultant. Allow for one field tile and one accent tile in each room or space. Border tiles shall be minimum ½ tile width.
- .6 Install flooring to square grid pattern with all joints aligned unless otherwise indicated.
- .7 As installation progresses, and after installation, roll flooring in 2 directions with a 45 kg roller to ensure full adhesion.
- .8 Cut and fit tile neatly around fixed objects.
- .9 Continue flooring throughout areas to receive movable type partitions or fitments without interrupting floor pattern.
- .10 Install flooring full depth of closets, toe spaces, and recesses.
- .11 Terminate flooring at centre line of door in openings where adjacent floor finish or colour is dissimilar.
- .12 Install transition strips at unprotected or exposed edges where flooring terminates. Locate transition strip at centre line of door where a door occurs.

3.4 Tactile Warning Tile Installation

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

3.5 Stair Tread Application

- .1 Install stair treads in one piece, full width and depth of stairs in accordance with manufacturer's printed instructions. Adhere over entire surface and fit accurately.
- .2 Caulk edges of nosings with epoxy caulking.

3.6 Base Application

- .1 Lay out base to keep number of joints to a minimum. Locate joints at maximum available spacing or at internal or pre moulded corners.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using a 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.

- .6 Scribe and fit to door frames and other obstructions. Use pre-moulded end pieces at flush door frames.
- .7 Cope internal corners. Use pre moulded corner units for right angle external corners. Use formed straight base materials for external corners of other angles, minimum 300 mm each leg.
- .8 Provide rubber base at all locations specified, regardless of floor finish.

3.7 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Remove excess adhesive from resilient floor coverings, base and adjacent finished surfaces as the work progresses.
- .3 Clean, seal and wax floor and base surfaces to manufacturer's instructions. In carpeted areas, clean base before installation of carpet.

3.8 Protection

- .1 Protect new floors until time of final inspection.
- .2 Prohibit traffic on floors for 48 hours after installation.
- .3 Immediately prior to final inspection, remove protection, clean, dry or damp mop resilient flooring and apply one additional coat of wax.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 07 92 00 Joint Sealants
- .2 Section 09 21 16 Gypsum Board
- .3 Section 09 65 19 Resilient Tile Flooring

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM D2047-17 Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine
 - .2 ASTM E648-19a1 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 - .3 ASTM E662-21a1 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 - .4 ASTM F710-21 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 - .5 ASTM F970-17 Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading
 - .6 ASTM F2034-18 Standard Specification for Sheet Linoleum Floor Covering
- .2 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1113-06 Architectural Coatings.
 - .2 SCAQMD Rule 1168-03 Adhesives and Sealants Applications.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Selection Samples: Two sets of colour chips representing manufacturer's full range of available flooring tile colours.
- .3 Quality Assurance Submittals: Manufacturer's printed installation instructions; include product storage requirements.
- .4 Provide maintenance data for linoleum flooring for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 Quality Assurance

- .1 Installer shall be competent in the installation of linoleum sheet flooring using heat-welded seams.
- .2 Provide types of flooring and accessories supplied by one manufacturer, including levelling and patching compounds, and adhesives.
- .3 If required, provide flooring material to meet the fire test performance criteria as tested by a recognized independent testing laboratory.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver materials in good condition to the job site in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.
- .3 Store materials in a clean, dry, enclosed space off the ground, and protected from the weather and from extremes of heat and cold. Protect adhesives from freezing. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.
- .4 Store all materials in manufacturer's unopened packaging until installation.
- .5 Maintain storage area conditions for all materials in accordance with manufacturer's instructions.

1.7 Project Conditions

- .1 Maintain a minimum temperature in the spaces to receive the flooring and accessories of 18 °C and a maximum temperature of 38 °C for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 13 °C in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances.
- .2 Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond and moisture tests.

1.8 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.9 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

- .1 Linoleum: To ASTM F2034, Type I. Homogenous linoleum floor covering, single layer on jute backing. Wood and cork flour, linseed oil, natural resins, pigments. Rolls of 20-30 lineal meters.
- .2 Basis of Design Product:
 - .1 Forbo Marmoleum Linear Strato.
 - .2 Colours
 - .1 LINO 1: Rocky Ice t5232
 - .2 LINO 2: Withered Prairie t5217
- .3 2.0 m wide, having a nominal total thickness of 2.5 mm. The wear surface shall consist of a homogeneous mixture of linoleum cement (linseed oil, natural tree resins, drying oil catalysts), wood flour, cork flour, colour pigments and filler calendared onto a jute fabric backing. Colours and pattern detail shall be dispersed throughout the thickness of the wear layer.
 - .1 Classification commercial use: 34
 - .2 Classification light industrial use: 43

- .3 Total thickness: 2.5 mm
- .4 Total weight: 2.9 kg/m²
- .5 Slip resistance (ramp test): R9
- .6 Residual indentation: ≤ 0.15 mm (typical value 0.08 mm)
- .7 Colour fastness to light: ≥ 6
- .8 Indoor emissions: TVOC after 28 days (EN 16516): ≤ 0.05 mg/m³
- .9 Reaction to fire (EN 13501-1): Cfl-s1, G, CS
- .10 Slip resistance (EN 13893): $\mu \geq 0.30$
- .11 Thermal conductivity (EN 12524): 0.17 W/mK
- .12 Body voltage (EN 1815): ≤ 2 kV
- .4 Provide solid colour linoleum weld rod intended for heat welding of seams. Colour shall be compatible with field colour of flooring.

2.2 Adhesives

- .1 Provide Linoleum Adhesive recommended by manufacturer used.
- .2 Adhesives shall be low VOC type to meet requirements of SCAQMD Rule 1168-03.

2.3 Accessories

- .1 For patching, smoothing, and levelling subfloors, provide fast-setting and underlayment as recommended by the flooring manufacturer.
- .2 Provide transition/reducing strips tapered to meet abutting materials.
- .3 Provide resilient edge strips, of equal gauge to the flooring, homogeneous vinyl or rubber composition, tapered or bullnose edge, with colour to match or contrast with the flooring, or as selected by the Consultant from standard colours available.

PART 3 EXECUTION

3.1 Examination

- .1 Conform to requirements of ASTM F710.
- .2 Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.
- .3 Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.
- .4 Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- .5 Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

3.2 Preparation

- .1 Install subfloor filler over all surfaces to receive new flooring.

- .2 Remove paint, varnish, oils, release agents, sealers, and waxes. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents.
- .3 Perform subfloor tests in accordance with the manufacturer's instructions to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring.
- .4 Vacuum or broom-clean surfaces to be covered immediately before the application of flooring. Make subfloor free from dust, dirt, grease, and all foreign materials.

3.3 Installation

- .1 Install flooring in strict accordance with the manufacturer's instructions.
- .2 Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.
- .3 Scribe, cut, and fit or flash cove to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.
- .4 Adhere flooring to the subfloor without cracks, voids, raising and puckering at the seams. Roll with a 45 kilogram roller in the field areas. Hand-roll flooring at the perimeter and the seams to assure adhesion. Refer to specific rolling instructions of the flooring manufacturer.
- .5 Lay flooring to provide a minimum number of seams. Avoid cross seams, filler pieces, and strips. Match edges for colour shading and pattern at the seams in compliance with the manufacturer's recommendations.
- .6 Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.
- .7 Use methods and sequence of work in conformance with written instructions of the flooring manufacturer. Finish all seams flush and free from voids, recesses, and raised areas.
- .8 Install resilient rubber base at all linoleum floors as specified in Section 09 65 19.

3.4 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Perform initial maintenance according to the manufacture's latest edition.
- .3 Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 30 00 Cast-in-Place Concrete

1.3 References

- .1 American Concrete Institute (ACI)
 - .1 ACI 308.1-11 Specification for Curing Concrete

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product data: Submit manufacturer's product data indicating:
 - .1 Product characteristics, performance criteria, and limitations.
 - .2 Preparation, installation requirements and techniques, Product storage, and handling criteria.
- .3 Samples: Submit minimum 300 x 300 mm samples indicating coating and final concrete finish.
- .4 Reports: Submit manufacturer's acceptance of substrate prior to installation in writing. Submit verification of moisture content of floor prior to installation.
- .5 Provide maintenance data for concrete floor sealer for incorporation into Operating and Maintenance Manuals specified in Section 01 78 00- Closeout Submittals.

1.5 Quality Assurance

- .1 Perform Work of this Section by a company that has a minimum of five years proven experience in installations of a similar size and nature and that is approved by manufacturer. Submit to Consultant, applicator's current certificate of approval by the material manufacturer as proof of compliance.

1.6 Project Conditions

- .1 Do not install the Work of this Section outside of environmental ranges as recommended by the manufacturer without manufacturer's written acceptance and as follows:
 - .1 Relative Humidity: In accordance with manufacturers' requirements.
 - .2 When no dust is being raised.
 - .3 In well-ventilated and broom clean areas.
- .2 Install temporary protection and facilities to maintain the product manufacturer's and specified environmental requirements for 24 hours before, during, and after installation.
- .3 Post do not enter and appropriate warning signs at conspicuous locations.

1.7 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Store materials at site in an area specifically set aside for purpose that is locked, ventilated, and maintained at a minimum temperature of 16 °C.

- .4 Ensure that health and fire regulations are complied with in storage area, and during handling and application.

1.8 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.9 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

- .1 All materials including sealers and coatings are to have low VOC content limits.
- .2 Each material used in the application of each flooring system shall be as recommended or manufactured by the supplier of the flooring system.
- .3 Concrete floor sealer: Alkali-silicate, water-soluble, inorganic concrete hardener and dustproofers; MasterKure HD 200WB by BASF Building Systems or approved alternative by Euclid or Sika Canada Inc.
- .4 Colour: clear

PART 3 EXECUTION

3.1 Examination

- .1 Verify condition of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of Work means acceptance of existing conditions.
- .2 Verify that concrete floors have cured 28 days minimum and that substrate is acceptable to sealer manufacturer.
- .3 Test surfaces for moisture content to ensure that they are suitable for application.

3.2 Preparation

- .1 Prepare substrate in accordance with manufacturer's written instructions. Diamond grind and vacuum substrate free of debris and dust.
- .2 Protect adjacent surfaces from damage resulting from Work of this section. Mask and/or cover adjacent surfaces, fixtures, and equipment as necessary.

3.3 Application

- .1 Spray apply concrete sealer to entire surface and keep from drying for 30 minutes as recommended by manufacturer.
- .2 Sprinkle surface with water as sealer begins to penetrate (after 30 minutes).
- .3 Flush surface with water and drying begins to remove excess material. Allow to harden for 24 hours.
- .4 Lightly buff floor with a commercial floor buffer and non-aggressive pad to bring up required sheen.

3.4 Protection

- .1 Erect barriers to prevent the entry and presence of personnel not performing work of this Section during application of floor sealer, and for 48 hours following completion of application.

3.5 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Remove promptly as work progresses spilled or spattered materials from surfaces of work performed under other Sections. Clean floors on completion of work. Do not mar surfaces while removing.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 07 92 00 Joint Sealants
- .2 Section 09 65 19 Resilient Tile Flooring

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM D3278-21 Standard Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus
- .2 The Carpet and Rug Institute (CRI)
 - .1 CRI 104-2015 - Carpet Installation Standard for Commercial Carpet.
- .3 Underwriters laboratories of Canada (ULC)
 - .1 CAN/ULC S102.2-18 - Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies.
- .4 National Floor Covering Association of Canada
 - .1 Floor Covering Reference Manual, 2006 edition.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Samples:
 - .1 Carpet: "Production Quality" samples 305 x 305 mm of carpets, showing quality, pattern and colour specified
 - .2 Floor Edge Strip (Molding): 152 mm long of each colour and type specified.
 - .3 Base Edge Strip (Molding): 152 mm long of each colour specified.
- .3 Shop Drawings: Installers layout plan showing seams and cuts for sheet carpet and carpet module.
- .4 Submit manufacturer's printed installation instructions for the carpet, including preparation of installation substrate, seaming techniques and recommended adhesives and tapes.
- .5 Submit maintenance instructions for carpeting, for inclusion in the Operation and Maintenance Manuals specified in Section 01 78 00-Closeout Submittals.

1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Deliver carpet in manufacturer's original wrappings and packages clearly labeled with manufacturer's brand name, size, dye lot number and related information. Transport carpet to job site in a manner that prevents damage and distortion that might render it unusable. When bending or folding is unavoidable for delivery purposes, unfold carpet and lay flat immediately.
- .4 Deliver adhesives in containers clearly labeled with manufacturer's brand name, number, installation instructions, safety instructions and flash points.

- .5 Store in a clean, dry, well-ventilated area, protected from damage and soiling. Before installation, acclimate carpet to the atmospheric conditions of the areas in which it will be installed for 2 days prior to installation

1.6 Project Conditions

- .1 Maintain areas in which carpeting is to be installed at a temperature between 18 – 35° C (with a maximum relative humidity of 65 percent for two days before installation, during installation and for three (3) days after installation.
- .2 Minimum Substrate Surface Temperature: 18° C at time of installation.
- .3 Maintain minimum temperature of 10° C for the duration of the contract.

1.7 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.8 Warranty

- .1 Manufacturer Warranty: Manufacturer shall warranty their carpet for a minimum of ten (10) years from date of Substantial Performance

PART 2 PRODUCTS

2.1 Materials

- .1 Tarkett Assertive Stria 04839 Forge 26213
 - .1 Pile construction: Patterned loop pile
 - .2 Gauge: 5/64"
 - .3 Stitches/Rows per Inch: 9 /in
 - .4 Pile thickness: 2.79 mm
 - .5 Average pile height: 5 mm
 - .6 Roll 6' x 105'
 - .7 Glue Down application.

2.2 Adhesive and Concrete Primer

- .1 Provide water resistant, mildew resistant, nonflammable, and non-staining adhesives and concrete primers for carpet installation. Provide release adhesive for modular tile carpet as recommended by the carpet manufacturer. Provide adhesives flashpoint of minimum 60 °C in accordance with ASTM D3278. Materials are to have a VOC maximum of 50 g/L when calculated according to 40 CFR 59, (EPA Method 24).

2.3 Edge Strips

- .1 Metal:
 - .2 Hammered surface aluminum, pinless, clamp down type designed for the carpet being installed.
 - .1 Floor flange not less than 38 mm wide, face not less than 16 mm (5/8 inch) wide.
 - .2 Finish: Clear anodic coating.
- .3 Vinyl Edge Strip:
 - .1 Beveled floor flange minimum 50 mm wide.
 - .2 Beveled surface to finish flush with carpet for tight joint and other side to floor finish.

2.4 Seaming Tape

- .1 Provide tape for seams as recommended by the carpet manufacturer for the type of seam used in installation. Seam sealant is to have a maximum VOC content of 50 g/L when calculated according to 40 CFR 59, (EPA Method 24). Do not use sealants that contain 1,1,1-trichloroethane or toluene.

2.5 Accessories

- .1 Direct Glue Down Adhesive: Recommended by carpet manufacturer.
- .2 Carpet Protection: Non-staining heavy duty kraft paper or 0.15 mm thick polyethylene film.
- .3 Leveling compound: as recommended by carpet manufacturer.
- .4 Rubber Thresholds: Black rubber strip material, 127 mm wide by 12.7 mm high bevelled edge, Series E890, "Johnsonite", supplied by Reynolds Smith Corporation, Waterloo, Ontario.

PART 3 EXECUTION

3.1 Preparation

- .1 Prepare floor surfaces in accordance with CRI 104 and manufacturer's printed instructions.
- .2 Ensure carpet underlayment specified in Section 06 10 00 is installed.

3.2 General Installation

- .1 Isolate area of installation from rest of building.
- .2 Perform all work by manufacturer's approved installers. Conduct installation in accordance with the manufacturer's printed instructions, National Floor Covering Association of Canada Floor Covering Reference Manual, and CRI CIS.
- .3 Protect edges of carpet meeting hard surface flooring with molding and install in accordance with the molding manufacturer's printed instructions.
- .4 Follow ventilation, personal protection, and other safety precautions recommended by the adhesive manufacturer. Continue ventilation during installation and for at least three (3) days following installation.
- .5 Do not permit traffic or movement of furniture or equipment in carpeted area for 24 hours after installation.
- .6 Complete other work which would damage the carpet prior to installation of carpet.
- .7 Follow carpet manufacturer's recommendations for matching pattern and texture directions.
- .8 Cut openings in carpet where required for installing equipment, pipes, outlets, and penetrations. Bind or seal cut edge of sheet carpet. Use additional adhesive to secure carpets around pipes and other vertical projections.

3.3 Installation

- .1 Install broadloom carpet direct glue down smooth, uniform, and secure, with a minimum of seams.
- .2 Apply regular, unnoticeable, and treated seams with a seam adhesive. Run side seams toward the light, where practical, and where such layout does not increase the number of seams. Install breadths parallel, with carpet pile in the same directions.
- .3 Match patterns accurately. Neatly cut and fit cutouts, at door jambs, columns and ducts securely.
- .4 Locate seams at doorways parallel to and centered directly under doors. Do not make seams perpendicular to doors or at pivot points.

- .5 Provide seams at changes in directions of corridors to follow the wall line parallel to the carpet direction. Lay the carpet lengthwise down the corridors with widths less than 1.82 m.

3.4 Edge Strip Installation

- .1 Install edge strips over exposed carpet edges adjacent to uncarpeted finish flooring.
- .2 Anchor metal strips to floor with suitable fasteners. Apply adhesive to edge strips, insert carpet into lip and press it down over carpet.
- .3 Anchor vinyl edge strip to floor with adhesive. Apply adhesive to edge strip and insert carpet into lip and press lip down over carpet.

3.5 Protection

- .1 Vacuum carpets clean. Protect traffic areas of carpeted floors with carpet protection. Tape edges and joints to prevent shifting.
- .2 Cover surfaces with kraft paper and provide walk boards where construction traffic and activities cannot be avoided.
- .3 Do not move furniture or equipment on unprotected carpeted surfaces.

3.6 Cleaning

Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 05 50 00 Metal Fabrications
- .2 Section 08 11 00 Metal Doors and Frames
- .3 Section 09 91 23 Interior Painting

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A780/A780M-20 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
- .2 Environmental Protection Agency (EPA)
 - .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings)
- .3 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, 2018
 - .2 Standard GPS-1-08 and GPS-2-08 MPI Green Performance Standard for Painting and Coatings.
- .4 Society for Protective Coatings (SSPC)
 - .1 Systems and Specifications, SSPC Painting Manual 2009
- .5 South Coast Air Quality Management District, California State (SCAQMD)
 - .1 SCAQMD Rule 1113-96 Architectural Coatings
- .6 Green Seal GS-11 Green Seal Environmental Standard for Paints and Coatings, January 1997
- .7 National Fire Code of Canada

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit full range colour sample chips to indicate where colour availability is restricted.
 - .2 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards.
 - .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties and SCAQMD Rule 1113-96.

- .5 Provide maintenance data for paint products for incorporation into Operating and Maintenance Manuals specified in Section 01 78 00- Closeout Submittals. Include following:

- .1 Product name, number, type and use.
- .2 Colour numbers.
- .3 MPI Environmentally Friendly classification system rating.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Contractor: to have a minimum of five years proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
 - .2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
 - .3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.
- .2 Conform to latest MPI requirements for exterior painting work including preparation and priming.
- .3 Paint materials to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.
- .4 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Consultant.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver and store materials in original containers, sealed, with labels intact. Labels to indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .3 Provide and maintain dry, temperature controlled, secure storage. Store materials and equipment in well-ventilated area with temperature range 7 °C to 30 °C. Store materials and supplies away from heat generating devices.
- .4 Observe manufacturer's recommendations for storage and handling.
- .5 Keep areas used for storage, cleaning and preparation, clean and orderly. After completion of operations, return areas to clean condition.
- .6 Remove paint materials from storage only in quantities required for same day use.
- .7 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .8 Remove damaged, opened and rejected materials from site.

1.7 Fire Safety Requirements

- .1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
- .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

- .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.8 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Place materials defined as hazardous or toxic in designated containers. Handle and dispose of hazardous materials in accordance with Municipal regulations.
- .3 Unused materials must be disposed of at official hazardous material collections site.
- .4 Paint and related materials are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from the Ministry of the Environment.
- .5 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .6 Place materials defined as hazardous or toxic waste in containers or areas designated for hazardous waste.

1.9 Maintenance

- .1 Extra Materials:
 - .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Quantity: provide one four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
 - .3 Deliver to Owner and store where directed.

1.10 Ambient Conditions

- .1 Heating, Ventilation and Lighting:
 - .1 Ventilate enclosed spaces in accordance with Section 01 51 00 – Temporary Utilities.
 - .2 Do not perform painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10 °C for 24 hours before, during and after paint application until paint has cured sufficiently.
 - .3 Provide continuous ventilation for seven days after completion of application of paint
 - .4 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Unless specifically pre-approved by Consultant and product manufacturer, perform no painting work when:
 - .1 Ambient air and substrate temperatures are below 10 °C.
 - .2 Substrate temperature is over 32 °C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
 - .4 Relative humidity is above 85 % or when dew point is less than 3 °C variance between air/surface temperature.
 - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
 - .2 Perform no painting work when maximum moisture content of substrate exceeds 12%.

- .3 Conduct moisture tests using a properly calibrated electronic Moisture Meter.
- .4 Test concrete surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
 - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.
 - .4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.
 - .5 Do not apply paint when:
 - .1 Temperature is expected to drop below 10 °C before paint has thoroughly cured.
 - .2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
 - .3 Surface to be painted is wet, damp or frosted.
 - .6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.
 - .7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
 - .8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

PART 2 PRODUCTS

2.1 Materials

- .1 Paint materials listed in latest edition of MPI Approved Products List (APL) and from a single manufacturer for each system used are acceptable for use on this project.
- .2 Paint materials for paint systems: to be products of single manufacturer.
- .3 Only qualified products with E2 or E3 "Environmentally Friendly" ratings are acceptable for use on this project.
- .4 Use only MPI listed 'L' rated materials.
- .5 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, to be as follows:
 - .1 Be water-based water soluble water clean-up.
 - .2 Be non-flammable biodegradable.
 - .3 Be manufactured without compounds which contribute to ozone depletion in upper atmosphere.
 - .4 Be manufactured without compounds which contribute to smog in the lower atmosphere.
 - .5 Do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
- .6 Water-borne surface coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of

applicable governmental acts, by-laws and regulations including Fisheries Act and Canadian Environmental Protection Act (CEPA).

- .7 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .8 Water-borne surface coatings and recycled water-borne surface coatings must have flash point of 61 °C or greater.
- .9 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:
 - .1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
 - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
- .10 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes must meet a minimum "Environmentally Friendly" E2 or E3 rating.
- .11 Recycled water-borne surface coatings must contain 50 % post-consumer material by volume.
- .12 Recycled water-borne surface coatings must not contain:
 - .1 Lead in excess of 600.0 ppm weight/weight total solids.
 - .2 Mercury in excess of 50.0 ppm weight/weight total product.
 - .3 Cadmium in excess of 1.0 ppm weight/weight total product.
 - .4 Hexavalent chromium in excess of 3.0 ppm weight/weight total product.
 - .5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.
- .13 The following must be performed on each batch of consolidated post-consumer material before surface coating is reformulated and canned. These tests must be performed at a laboratory or facility which has been accredited by the Standards Council of Canada.
 - .1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.
 - .2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
 - .3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

2.2 Colours

- .1 Consultant will provide Colour Schedule.
- .2 Exterior colour schedule will be based upon selection of three base colours and two deep tint accent colours.
- .3 Selection of colours will be from manufacturer's full range of colours.
- .4 Where specific products are available in restricted range of colours, selection will be based on limited range.
- .5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible

difference between coats.

2.3 Mixing and Tinting

- .1 Perform colour tinting operations prior to delivery of paint to site.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Add thinner to paint manufacturer's recommendations. Do not use kerosene or organic solvents to thin water-based paints.
- .4 Thin paint for spraying according in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 Gloss/Sheen Ratings

- .1 Paint gloss: defined as sheen rating of applied paint, in accordance with following values:

Gloss Level Category/	Units @ 60 Degrees	Units @ 85 Degrees
G1 – matte finish	0 to 5	Max. 10
G2 – velvet finish	0 to 10	10 to 35
G3 – eggshell finish	10 to 25	10 to 35
G4 – satin finish	20 to 35	Min. 35
G5 – semi-gloss finish	35 to 70	
G6 – gloss finish	70 to 85	
G7 – high gloss finish	> 85	

- .2 Gloss level ratings of painted surfaces as specified.

2.5 Exterior Painting Systems

- .1 Steel Doors, Frames and Metal Fabrications:
 - .1 EXT 5.1D – Alkyd G5 semi-gloss finish over alkyd primer.
- .2 Dressed Lumber: (wood window frames)
 - .1 REX 6.3B Alkyd G5 semi-gloss finish.

PART 3 EXECUTION

3.1 General

- .1 Perform preparation and operations for painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and application instructions, and data sheets.

3.2 Examination

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Consultant damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

3.3 Preparation

- .1 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting Manual except where specified otherwise.
- .2 Clean and prepare exterior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
 - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly. Allow sufficient drying time and test surfaces using electronic moisture meter before commencing work.
 - .5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.
 - .6 Many water-based paints cannot be removed with water once dried. Minimize use of kerosene or such organic solvents to clean up water-based paints.
- .3 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements and SSPC-SP 6. Remove such contaminants from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

3.4 Protection

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .4 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas.

3.5 Application

- .1 Apply paint materials in accordance with paint manufacturer's written application instructions.
- .2 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins.

Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.

- .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Consultant.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
 - .3 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Consultant.
 - .4 Apply coats of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
 - .5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
 - .6 Sand and dust between coats to remove visible defects.
 - .7 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.
 - .8 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.
- 3.6 Field Quality Control
- .1 Standard of Acceptance:
 - .1 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- 3.7 Cleaning
- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
 - .2 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
- 3.8 Restoration
- .1 Remove protective coverings and warning signs as soon as practical after operations cease.
 - .2 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 05 50 00 Metal Fabrications
- .2 Section 06 20 00 Finish Carpentry
- .3 Section 08 11 00 Metal Doors and Frames
- .4 Section 08 14 16 Flush Wood Doors
- .5 Section 09 01 60.92 Wood Flooring Restoration
- .6 Section 09 21 16 Gypsum Board
- .7 Section 09 91 13 Exterior Painting

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A780/A780M-20 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
- .2 Environmental Protection Agency (EPA)
 - .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
- .3 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, 2018
 - .2 Standard GPS-1-08 and GPS-2-08 MPI Green Performance Standard for Painting and Coatings.
- .4 Society for Protective Coatings (SSPC)
 - .1 Systems and Specifications, SSPC Painting Manual 2009
- .5 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102-18 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
- .6 South Coast Air Quality Management District, California State (SCAQMD)
 - .1 SCAQMD Rule 1113-96, Architectural Coatings.
- .7 Green Seal GS-11 Green Seal Environmental Standard for Paints and Coatings, January 1997.
- .8 National Fire Code of Canada

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:

- .1 Submit full range colour sample chips.
- .2 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards.
- .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties and SCAQMD Rule 1113-96.
- .5 Provide maintenance data for paint products for incorporation into Operating and Maintenance Manuals specified in Section 01 78 00- Closeout Submittals. Include following:
 - .1 Product name, number, type and use.
 - .2 Colour numbers.
 - .3 MPI Environmentally Friendly classification system rating.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Contractor: to have a minimum of five years proven satisfactory experience.
 - .2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
 - .3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.
- .2 Conform to latest MPI requirements for painting work including preparation and priming.
- .3 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.
- .4 Paint materials to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.
- .5 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Consultant.
- .6 Provide mock-up in accordance with Section 01 45 00 - Quality Control.
 - .1 Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen and textures. Locate where directed.
 - .2 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
 - .3 Allow 24 hours for inspection of mock-up before proceeding with work.
 - .4 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.

-
- .2 Deliver and store materials in original containers, sealed, with labels intact. Labels to indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
 - .3 Provide and maintain dry, temperature controlled, secure storage. Store materials and equipment in well-ventilated area with temperature range 7 ° C to 30 ° C. Store materials and supplies away from heat generating devices.
 - .4 Observe manufacturer's recommendations for storage and handling.
 - .5 Keep areas used for storage, cleaning and preparation, clean and orderly. After completion of operations, return areas to clean condition.
 - .6 Remove paint materials from storage only in quantities required for same day use.
 - .7 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
 - .8 Remove damaged, opened and rejected materials from site.
- 1.7 Fire Safety Requirements
- .1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
 - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.
- 1.8 Waste Management and Disposal
- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.
 - .2 Place materials defined as hazardous or toxic in designated containers. Handle and dispose of hazardous materials in accordance with Municipal regulations.
 - .3 Unused materials must be disposed of at official hazardous material collections site.
 - .4 Paint and related materials are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from the Ministry of the Environment.
 - .5 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
 - .6 Place materials defined as hazardous or toxic waste in containers or areas designated for hazardous waste.
- 1.9 Maintenance
- .1 Extra Materials:
 - .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Quantity: provide one four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
 - .3 Deliver to Owner and store where directed.

1.10 Ambient Conditions

.1 Heating, Ventilation and Lighting:

- .1 Ventilate enclosed spaces in accordance with Section 01 51 00 – Temporary Utilities.
- .2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 ° C for 24 hours before, during and after paint application until paint has cured sufficiently.
- .3 Provide continuous ventilation for seven days after completion of application of paint.
- .4 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
- .5 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

- .1 Unless pre-approved in writing by Consultant and product manufacturer, perform no painting when:
 - .1 Ambient air and substrate temperatures are below 10 ° C.
 - .2 Substrate temperature is above 32 ° C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
 - .4 The relative humidity is under 85% or when the dew point is more than 3 ° C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 ° C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
- .2 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
- .3 Perform painting work when maximum moisture content of the substrate is below:
 - .1 Allow new concrete to cure minimum of 28 days.
 - .2 15% for wood.
 - .3 12% for plaster and gypsum board.
- .4 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".
- .5 Test concrete and plaster surfaces for alkalinity as required.

.3 Surface and Environmental Conditions:

- .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
- .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
- .3 Apply paint when previous coat of paint is dry or adequately cured.

PART 2 PRODUCTS

2.1 Materials

- .1 Provide paint materials for paint systems from single manufacturer.

- .2 Products to meet requirements of GS-11 or SCAQMD Rule 1113-96
- .3 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .4 Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use.
- .5 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.
- .6 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:
 - .1 Non-flammable, biodegradable.
 - .2 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
 - .3 Manufactured without compounds which contribute to smog in the lower atmosphere.
 - .4 Do not contain methylene chloride, chlorinated hydrocarbons or toxic metal pigments.
 - .5 Recycled content of 15% post-consumer and ½ post-industrial waste.
- .7 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .8 Flash point: 61 °C or greater for water-borne surface coatings and recycled water-borne surface coatings.

2.2 Colours

- .1 Consultant will provide Colour Schedule.
- .2 Colour schedule will be based upon selection of eight base colours and six deep tint accent colours.
- .3 Selection of colours will be from manufacturer's full range of colours.
- .4 Where specific products are available in restricted range of colours, selection will be based on limited range.
- .5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 Mixing and Tinting

- .1 Perform colour tinting operations prior to delivery of paint to site.
- .2 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .3 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 Gloss/Sheen Ratings

- .1 Paint gloss: defined as sheen rating of applied paint, in accordance with following values:

Gloss Level Category/	Units @ 60 Degrees	Units @ 85 Degrees
G1 – matte finish	0 to 5	Max. 10

G2 – velvet finish	0 to 10	10 to 35
G3 – eggshell finish	10 to 25	10 to 35
G4 – satin finish	20 to 35	Min. 35
G5 – semi-gloss finish	35 to 70	
G6 – gloss finish	70 to 85	
G7 – high gloss finish	> 85	

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

2.5 Interior Painting Systems

- .1 Concrete Horizontal Surfaces (concrete floors):
 - .1 INT 3.2A Latex floor enamel low gloss finish.
- .2 Wood Horizontal Surfaces (wood floor refinishing)
 - .1 As specified in Section 09 01 60.92
- .3 Metal Fabrications:
 - .1 INT 5.3A Latex G5 semi-gloss finish
- .4 Galvanized Metal: interior doors, frames, railings, misc. steel, pipes, and ducts.
 - .1 INT 5.3A Latex G5 semi-gloss finish
- .5 Concrete Masonry:
 - .1 INT 4.2D High performance architectural latex G5 semi-gloss finish.
- .6 Wood Clear Polyurethane Finish:
 - .1 INT 6.3K Polyurethane varnish G6 gloss finish.
- .7 Electrical Equipment Backboards:
 - .1 INT 6.4P Fire retardant, pigmented coating. Low odour/low VOC. Semi-gloss (UL/ULC rated).
- .8 Gypsum Board and Plaster: Walls
 - .1 INT 9.2A Latex G3 eggshell finish over latex sealer.
- .9 Gypsum Board and Plaster: Ceilings and Bulkheads:
 - .1 INT 9.2A Latex G2 velvet finish over latex sealer.
- .10 All other surfaces not noted above: high performance finish suitable for commercial and institutional environment and in accordance with MPI painting manual.

PART 3 EXECUTION

3.1 General

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and application instructions, and data sheets.

3.2 Examination

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report damages, defects, unsatisfactory or unfavourable conditions to Consultant before proceeding with work.

3.3 Preparation

- .1 Protection:
 - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking and in accordance with paint manufacturers and MPI recommendations. If damaged, clean and restore surfaces as directed by Consultant.
 - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
 - .3 Protect factory finished products and equipment.
- .2 Surface Preparation:
 - .1 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
 - .2 Place "WET PAINT" signs in occupied areas as painting operations progress.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths, or compressed air.
 - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly.
 - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
 - .6 Use trigger operated spray nozzles for water hoses.
 - .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
 - .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
 - .2 Apply wood filler to nail holes and cracks.
 - .3 Tint filler to match stains for stained woodwork.
- .6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements and SSPC-SP 6. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean

brushes blowing with clean dry compressed air or vacuum cleaning.

- .7 Touch up of shop primers with primer as specified.
- .8 Do not apply paint until prepared surfaces have been accepted by Consultant.

3.4 Application

- .1 Apply paint materials in accordance with paint manufacturer's written application instructions.
- .2 Brush and Roller Application:
 - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
 - .3 Apply paint in uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.
 - .4 Brush out immediately all runs and sags.
 - .5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .6 Sand and dust between coats to remove visible defects.
- .7 Finish surfaces both above and below sight lines as specified for surrounding surfaces.
- .8 Finish alcoves as specified for adjoining rooms.
- .9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.5 Mechanical/Electrical Equipment

- .1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces.
- .2 Mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
- .3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by

manufacturer of equipment.

- .5 Do not paint over nameplates.
- .6 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .7 Paint natural gas piping yellow.
- .8 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- .9 Do not paint interior transformers and substation equipment.

3.6 Field Quality Control

- .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .2 Standard of Acceptance:
 - .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
 - .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
 - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.7 Cleaning and Restoration

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 09 21 16 Gypsum Board

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A653/A653M-20 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM A924/A924M-20 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
 - .3 ASTM B456-17 Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
 - .4 ASTM C1036-21 Standard Specification for Flat Glass
 - .5 ASTM C1503-18 Standard Specification for Silvered Flat Glass Mirror
 - .6 ASTM D1187/D1187M-97(2018) Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.81-M90 Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
 - .2 CAN/CGSB-1.88-92 Gloss Alkyd Enamel, Air Drying and Baking.
- .3 CSA Group (CSA)
 - .1 CSA-B651-12 (R2017) Accessible Design for the Built Environment.
 - .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings:
 - .1 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, building-in details of anchors for grab bars.
- .3 Samples:
 - .1 Submit samples when requested.
 - .2 Samples to be returned for inclusion into work.
- .4 Closeout Submittals:
 - .1 Provide maintenance data for toilet and bath accessories for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.

- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.6 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.7 Extra Materials

- .1 Provide special tools required for accessing, assembly/disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 78 00 - Closeout Submittals.
- .2 Deliver special tools to Owner.

PART 2 PRODUCTS

2.1 Materials

- .1 Sheet steel: to ASTM A653 with ZF001 designation zinc coating.
- .2 Stainless steel sheet metal: Type 304, with Brushed finish.
- .3 Stainless steel tubing: Type 304, commercial grade, seamless welded, minimum 1.2 mm wall thickness.
- .4 Fasteners: concealed screws and bolts hot dip galvanized, exposed fasteners to match face of unit. Expansion shields fibre, lead or rubber as recommended by accessory manufacturer for component and its intended use.

2.2 Manufacturers

- .1 Products and components listed are minimum standard of acceptance. Alternative products by recognized manufacturers of toilet and bath accessories may be accepted subject to review by the Consultant of manufacturer's product information and specifications.
- .2 Acceptable manufacturers include:
 - .1 Bobrick
 - .2 Bradley
 - .3 Frost
 - .4 Hafele
 - .5 Richelieu
 - .6 Watrous

2.3 Components

- .1 TPD: Toilet Tissue Dispenser:
 - .1 Supplied by Owner, installed by contractor.
- .2 SD: Soap Dispenser: Liquid wall mounted soap dispenser.
 - .1 Supplied by Owner, installed by contractor.
- .3 PTD: Paper Towel Dispenser:
 - .1 Supplied by Owner, installed by contractor.
- .4 GB1: Grab Bar, 38 mm diameter x 1.6 mm wall tubing of stainless steel, 76 mm diameter wall flanges, concealed screw attachment, flanges welded to tubular bar, provided with steel back plates and all accessories. Knurl bar at area of hand grips. Grab bar material and anchorage to withstand downward pull of 2.2 kN. 600 mm long.

- .1 Bobrick B-6806.99 x 24
- .5 GB2: Barrier Free Toilet Grab Bars 2 (L-shaped) 760 x 760 38 mm dia. Peened finish c/w mounting kits.
 - .1 Bobrick B-6898.99, 90° Angle Grab Bar.
- .6 Framed Mirror: Bobrick B-165 1830.
- .7 SND: Sanitary Napkin Disposal: Satin-finish stainless steel surface mounted disposal unit. Door with tumbler lock. Self-closing panel cover to cover disposal opening. Removable, leak-proof, 4.6 litre plastic receptacle. Unit size 270 x 385 x 105mm.
 - .1 Bobrick B-354 Classic Series Sanitary Napkin Waste Receptacle
- .8 Stainless Steel Shelf: To CSA B651. 455 mm long x 125mm wide, 1.2mm type 304 stainless steel, satin finish. 19mm return edge; front edge hemmed for safety. 1.6mm brackets.
 - .1 Bobrick B295 x 18
- .9 Coat Hook: Bright polished stainless steel hook with 50 x 50 mm flange, hook 25 mm wide x 165 mm high. Concealed wall plate.
 - .1 Bobrick B-682
- .10 Unframed Mirror: As specified in Section 08 80 05.

2.4 Fabrication

- .1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.
- .2 Wherever possible form exposed surfaces from one sheet of stock, free of joints.
- .3 Brake form sheet metal work with 1.5 mm radius bends.
- .4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- .5 Back paint components where contact is made with building finishes, to prevent electrolysis.
- .6 Hot dip galvanize concealed ferrous metal anchors and fastening devices to CSA G164.
- .7 Shop assemble components and package complete with anchors and fittings.
- .8 Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates, details and instructions for building in anchors and inserts.
- .9 Provide steel anchor plates and components for installation on studding and building framing.

2.5 Finishes

- .1 Chrome and nickel plating: to ASTM B456, satin finish.
- .2 Baked enamel: condition metal by applying one coat of metal conditioner to ASTM D1187, apply one coat Type 2 primer to CAN/CGSB-1.81 and bake, apply two coats Type 2 enamel to CAN/CGSB-1.88 and bake to hard, durable finish. Sand between final coats. Colour selected from standard range by Consultant.
- .3 Manufacturer's or brand names on face of units not acceptable.

PART 3 EXECUTION

3.1 Installation

- .1 Install toilet and bath accessories in accordance with the Ontario Building Code, CSA B651 and manufacturer's instructions.

- .2 Install and secure accessories rigidly in place as follows:
 - .1 Stud walls: install steel back-plate to stud prior to plaster or drywall finish. Provide plate with threaded studs or plugs.
 - .2 Hollow masonry units or existing plaster/drywall: use toggle bolts drilled into cell/wall cavity.
 - .3 Solid masonry or concrete: use bolt with lead expansion sleeve set into drilled hole.
- .3 Install grab bars on built-in anchors provided by manufacturer.
- .4 Use tamper proof screws/bolts for fasteners.
- .5 Fill units with necessary supplies shortly before final acceptance of building.
- .6 Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:
 - .1 Verify blocking has been installed properly.
 - .2 Verify location does not interfere with door swings or use of fixtures.
 - .3 Comply with manufacturer's recommendations for backing and proper support.
 - .4 Use fasteners and anchors suitable for substrate and project conditions.
 - .5 Install units rigid, straight, plumb, and level, in accordance with manufacturer's installation instructions and approved shop drawings.
 - .6 Conceal evidence of drilling, cutting, and fitting to room finish.
 - .7 Test for proper operation.

3.2 Schedule

- .1 Locate accessories where indicated. Exact locations determined by Owner.

3.3 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Clean exposed surfaces of compartments, hardware, and fittings using methods acceptable to the manufacturer.
- .3 Touch-up, repair or replace damaged products until Substantial Performance.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 20 00 Finish Carpentry
- .2 Section 10 28 10 Toilet and Bath Accessories

1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit detailed shop drawings and where applicable complete colour charts or colour samples for each item specified herein.
- .3 Submit manufacturer's preprinted technical literature for pre-manufactured products.
- .4 Submit samples of metal finishes when requested by the Consultant.

1.4 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Protect finished surfaces during shipment and installation.

1.5 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Items specified herein shall be standard manufactured items, modified if required and as specified to suit conditions of this project.
- .2 Fabricate work true to dimensions, square and plumb, to suit site conditions.
- .3 Thickness of metals shall be adequate for the various conditions with requirements specified as a minimum.
- .4 Finished work shall be free from warping, open seams, weld marks, rattles and other defects. Drilling shall be reamed and exposed edges finished smooth.
- .5 Fastenings shall be concealed or theft-proof type where possible. Exposed fastenings shall be neatly executed and shall be of the same material and finish as the base metal on which they occur.
- .6 Clear Anodic Finish: For work specified to have clear anodic finish, provide an AA-M12C22A31 finish, unless otherwise specified.

2.2 Products

- .1 **Coat Rod and Shelf:** ASI Model STL2001. Shelf to consist of four 19 mm square 1.311 mm steel tubes closed and protected with plastic end caps. Coat rod to be 25 mm diameter chromium plated heavy duty steel hanger bar. Mounting brackets to be two piece heavy duty die cast aluminum designed with an integral backplate to provide positive fastening. Shelf and brackets to be finished in manufacturer's standard Duracron finish. Colour to be selected by the Consultant.

PART 3 EXECUTION

3.1 Installation - General

- .1 Install manufactured items in accordance with manufacturer's printed instructions and recommendations.
- .2 Mount standards to solid backing capable of supporting intended loads. Install standards using fasteners suitable for supporting intended loads.
- .3 Install shelving, and accessories as indicated on the Drawings.

3.2 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 10 00 Rough Carpentry

1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Sample of specified bird spike model not less than 5 cm in length and in the specified colour.
- .3 Sample of specified bird spike mounting hardware.
- .4 Manufacturer's Installation instructions and drawings.

1.4 Quality Assurance

- .1 Installer to obtain, review and understand manufacturer's planning guides, estimating worksheets and installation instructions.
- .2 Installer must be completely familiar with the proper installation procedures for the bird spike model or models specified for installation including specified mounting hardware.
- .3 Installer must obtain and record accurate and complete dimensions for each surface specified for bird spike installation.

1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Provide storage and/or protection to keep shipping boxes dry, clean and undamaged. Do not stack or place other packaging or objects on the shipping boxes.
- .3 Keep bird barrier spikes and mounting hardware in original packaging until needed for installation.

1.6 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Manufacturer

- .1 Basis of design manufacturer: Nixalite of America Inc, 1025 16th Avenue, PO Box 727, Dept. NI, East Moline, Illinois 61244; U.S.A.P: 800.624.1189 or 309.755.8771 - F: 800.624.1196 or 309.755.0077 www.nixalite.com
- .2 Equivalent products supplied by the following are acceptable:
 - .1 Seagull Control Systems 177 East Main St #430 New Rochelle, NY 10801. Phone: 1-347-389-5533.

2.2 Bird Barrier Strips

- .1 Wires: Stainless steel, 1 mm diameter, full-hard spring temper.
- .2 Base Strip: Stainless steel, 6.3 mm x 0.5 mm, full anneal for flexibility, easy strip cutting and surface shape memory.
- .3 Spike Strip Lengths: strip lengths to suit application.

- .4 Premium Nixalite Model S or equivalent: Full row spike, 102 mm high, 102 mm wide no less than 120 wire points per 300 mm. Full 180-degree wire coverage.
- .5 Finish: Natural stainless steel finish.

2.3 Bird Spike Mounting Hardware

- .1 To be made of stainless steel or non-corrosive materials. Standard mounting hardware is supplied with Premium Nixalite Bird Barrier Spike Models in set quantities. Mounting Hardware must allow for bird spike strip installation, removal and reinstallation without damaging the installation surface, the spike strips or the mounting system.
- .2 Use the bird spike mounting hardware that best suits the installation surface. All hardware is made of either stainless steel or non-corrosive materials.

Installation Surface	Bird Spike Mounting Hardware
Masonry, stone, concrete	Mounting clip, sheet metal screw, masonry anchor
Wood, plywood, shingles	Mounting clip, sheet metal screw, washer
Sheet metal, plastic, PVC	Mounting clip, sheet metal screw, washer
Steel, cast iron, brass, bronze	Mounting clip, drive screw, washer
Pipes, cables, conduit, grates	Wire tie, wire tying tool, adhesive

- .3 Apply adhesive or sealant in all holes that penetrate the installation surface. After mounting hardware is installed, apply additional adhesive or sealant over the heads of the sheet metal screws and/or the drive screws. Do not get adhesive or sealant in the hook end of the mounting clips.
- .4 Optional Fastening:
 - .1 Glue Clips & Adhesive:
 - .1 If surface conditions do not allow for the use of the supplied bird spike mounting hardware, use the glue clip and adhesive installation method. Follow the installation instructions available from the manufacturer.

PART 3 EXECUTION

3.1 Examination

- .1 Visually inspect all installation surfaces. Make sure all surfaces are clean, dry and free from debris or other conditions that could impede the workflow of this section.
- .2 Notify Consultant of detrimental conditions. Do not proceed until these conditions have been corrected.

3.2 Preparation

- .1 Field Measurements: Verify the dimensions for each surface specified for bird spike installation. Use manufacturers Planning Guides and Estimate Worksheets to verify that sufficient quantities of bird spike strips will be installed on each surface specified for bird control.

- .2 Make sure all installation surface finishing requirements have been accomplished before installing bird spikes. They are to be the last items installed on each specified surface. Do not apply any surface coating or treatment (paint, sealer, etc.) over the installed bird spikes or the mounting hardware.
- .3 Remove or relocate all plants, foliage or foreign objects that overhang the installation surfaces. Note all conditions that could adversely affect the installation and performance of the bird spike installation.

3.3 Installation

- .1 Make sure the installation surfaces are clean, dry and free of any debris or obstructions.
- .2 Install specified bird spike strips in strict accordance with manufacturer's spike strip spacing and installation guidelines. Protect all surfaces where pest birds can land, roost and nest.
- .3 Install bird spike strips so they will protect the entire surface, not just the outside edges. No gaps are allowed in the bird spike strip coverage. Cut the bird spike strips where necessary to fit the surface properly.
- .4 Wires must extend over outside edges of each surface by at least 6 mm. The bird spike base strip must extend over the ends of each surface by at least 12 mm.
- .5 Fasten bird spike strips to the surface with the mounting hardware recommended by the manufacturer. Follow the hardware spacing guidelines and installation procedures supplied by manufacturer.

3.4 Adjustment/Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Remove debris and waste materials from project site. Inspect finished installation. Make any adjustments needed to conform to manufacturer's spacing and installation guidelines.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 30 00 Cast-In-Place Concrete
- .2 Section 09 65 19 Resilient Tile Flooring
- .3 Section 08 71 10 Door Hardware
- .4 Section 09 91 23 Interior Painting

1.3 References

- .1 American Society of Mechanical Engineers (ASME)
 - .1 ASME A17.1-2016/CSA B44-2016 Safety Code for Elevators and Escalators
 - .2 ASME A17.5-2019/CSA B44.1:19 Elevator and Escalator Electrical Equipment.
 - .3 ASME A18.1-2017 Safety Standard for Platform Lifts and Stairway Chairlifts.
- .2 American National Standards Institute (ANSI)
 - .1 ANSI B29.2-2007 (R2017) Inverted Tooth (Silent) Chains and Sprockets.
- .3 CSA Group (CSA)
 - .1 CSA B44.1 - Elevator and Escalator Electrical Equipment.
 - .2 CSA B355:19 Platform Lifts and Stair Lifts for Barrier-Free Access
 - .3 CSA C22.1-18 Canadian Electrical Code, Part I, Safety Standard for Electrical Installations
- .4 International Code Council (ICC)
 - .1 ICC A117.1-2017 Accessible and Usable Buildings and Facilities.
- .5 Accessibility for Ontarians with Disabilities Act (AODA)
- .6 Technical Standards & Safety Authority (TSSA)
- .7 Electrical Safety Authority (ESA)

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .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: Provide a complete layout of lift equipment detailing dimensions and clearances as required.
- .4 Selection Samples: For each finish product specified requiring selection of colour or finish, two complete sets of colour charts representing manufacturer's full range of available colors and patterns.

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- .5 Provide maintenance data for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.
 - .1 Include in maintenance data:
 - .1 Replacement parts list
 - .2 Legible schematic wiring diagrams covering electrical equipment as supplied and installed, including changes made in final work, with symbols listed corresponding to components or markings.
 - .3 Manufacturer's recommended maintenance tasks and frequencies.
 - 1.5 Quality Control
 - .1 Use major lift components from standard product line of one manufacturer.
 - .2 Use components only that have performed together satisfactorily, under conditions of normal use in not less than ten other public Canadian lift installations, and for a period of not less than one year.
 - .3 Major components shall be construed to mean drive means, machine tower, platform and enclosure assembly, and operating and control fixtures.
 - 1.6 Quality Assurance
 - .1 Installer Qualifications:
 - .1 Skilled tradesmen shall be employees of the installing contractor approved by the manufacturer, with demonstrated ability to perform the work on a timely basis.
 - .2 Execute work of this section only by a company that has adequate product liability insurance.
 - 1.7 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.
 - 1.8 Permits and Fees
 - .1 Obtain, submit, and pay for necessary local and/or provincial permits and inspections. Submit to the Technical Standard Safety Authority (TSSA) registration of elevating devices and also pay all costs in connection therewith, including costs associated with any and all tests to be performed by the TSSA in order to lawfully license the elevator for use by the general public. Submit all TSSA submission documents, test results, and approval certificates to the Owner prior to Date of Substantial Performance. Licenses for the elevating devices will be paid for directly by the Owner.
 - .2 Elevator contract shall include in base bid all costs associated with a 2nd TSSA inspection of all elevating devices. Do not qualify this in the base bid price. No additional costs will be entertained or considered to meet with this 2nd TSSA Inspection requirement unless a 3rd TSSA inspection of the elevating device is warranted and/or required.
 - 1.9 Shipping, Handling and Storage
 - .1 Refer to Section 01 61 00 – Common Product Requirements.
 - .2 Store products in manufacturer's unopened packaging until ready for installation.
 - .3 Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.10 Project Conditions

- .1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install systems under environmental conditions outside manufacturer's absolute limits.
- .2 Do not use wheelchair lift for hoisting materials or personnel during construction period.

1.11 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.12 Maintenance Service

- .1 Provide complete maintenance and call back service as detailed in manuals specified above, or as required by owner for a period of twelve months following Substantial Performance.
- .2 Include for recommended schedule of examinations, cleaning, adjustment and lubrication.
- .3 Repair or replace electrical and mechanical parts of lift equipment as required due to defect or normal wear and tear.
- .4 Use only genuine standard replacement parts as produced by lift manufacturer.
- .5 Perform work by competent personnel, who shall have certification of factory training, under the supervision and in the direct employ of the lift manufacturer.
- .6 Scheduled work shall be performed in the regular working hours of regular working days, and work shall be scheduled with the Owner.
- .7 Provide proof of successful experience in the complete maintenance of the specified lift type. Maintain locally an adequate stock of parts for replacement for emergency purposes and provide qualified men to ensure fulfilment of serviceability without undue loss of time in reaching the jobsite.
- .8 At each inspection, personnel shall register both in and out with designated building personnel. Maintain a log of all tasks performed including explanations of any failures or breakdowns, including corrective actions taken and parts replaced. Make log available to Owner on request and turn log over to Owner on completion of maintenance period.

1.13 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.
- .2 Extended Warranty: Provide an extended manufacturer's warranty for the entire warranty period covering the wheelchair lift materials and workmanship for the following additional extended period beyond the initial two year warranty. Preventive Maintenance Agreement required.
 - .1 Five additional years.

PART 2 PRODUCTS

2.1 Manufacturer

- .1 Acceptable Manufacturer:
 - .1 Savaria, 2 Walker Drive, Brampton, ON, Canada, L6T 5E1; Toll Free Tel: 800-661-5112; Tel: 905-791-5555; Fax: 905-791-2222; www.savaria.com

2.2 Commercial Passenger Elevator

- .1 Limited Use Limited Application elevator model:

- .1 Savaria Orion - Hydraulic
 - .1 2:1 roped hydraulic drive.
 - .2 Duty cycle: normal 30 trips per day, heavy 75 trips per day with a maximum number of start per hour on a standard installation of 15x
- .2 Work described in this section includes providing equipment, incidental material and labor required for complete, operable roped hydraulic passenger elevator installation. Elevator shall be erected, installed, adjusted, tested and placed in operation by system manufacturer, or manufacturer's authorized installer.
 - .1 Elevators shall be in accordance with the ASME A17.1-B44 and OADA compliant including local codes and regulations except where specified otherwise.
- .3 The following preparatory work to receive the lifts specified in this section is part of the work of other sections:
 - .1 Permanent 240 VAC, 40 amp single phase or 208 VAC, 30 amp three phase power to operate lift to be provided from a lockable fused/cartridge type disconnect switch with auxiliary contacts for battery operation. 110 VAC, 15 amp single phase power to operate the lighting circuit. Refer to drawings for permanent power specifications and location of disconnects.
 - .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.
- .4 Limited Use Limited Application elevator: The elevator described here, is a LULA Elevator consisting of:
 - .1 Rated Load: 1400 lb (635 kg)
 - .2 Rated Speed: 30 f.p.m. (nominal) (0.15 m/s)
 - .3 Travel: 17'-8" to be verified on site.
 - .4 Cab Configuration: Enter/exit front/rear.
 - .5 Car Platform Size: 48" W by 54" D (1219 mm by 1371 mm)
 - .6 Levels Serviced: 3
 - .7 Car Operation: Automatic.
 - .8 Power Supply: 240 Volt, 1 Phase, 40 Amp + 110 Volt, 15 amp, 1 Phase 60 Hz
 - .9 Emergency Power: Battery operation in down direction
 - .10 Controller: PLC
 - .11 Manual Lowering: Outside the hoist way in machine room or via access hatch for MRL.
- .5 Elevator Cab Design:
 - .1 Car Enclosure: Steel or s/s wall construction with optional raised PLAM panels.
 - .1 Cab Walls:
 - .1 Steel - Architectural White
 - .2 Ceiling Finish:

- .1 Steel - Architectural White with four recessed incandescent down lights.
- .3 Car doors and frames shall be 1 1/2 hour ULC Fire rated and 2 speed horizontally sliding.
 - .1 Door finish shall be: Powder coated Architectural white or black to match cab finish
- .4 Handrail: A stainless steel single handrail, with 1-1/2 inch (38 mm) diameter rail shall be located on the control wall of the cab.
- .6 Appendix E package including: directional arrow and voice annunciator.
 - .1 Yes
- .7 Automatic Landing Doors
 - .1 Landing doors and frames shall be 1 1/2 hour ULC Fire rated, 2 speed horizontally sliding with concealed mechanical interlock.
 - .1 Door finish shall be primed powder coated grey
- .8 Car Operation:
 - .1 Car Operating Panel shall consist of metal push bottoms with illuminated haloes, tactile identifications, emergency stop/alarm button, on/off key switch and emergency light mounted on a removable stainless steel panel (Type 304 #4 Stainless Steel Finish).
 - .2 Digital floor indicator and directional indicator in cab and at each landing.
 - .3 An ADA hands free phone will be supplied within car operating panel.
 - .4 Emergency Operation - The car shall be equipped with a battery operated light fixture, emergency battery lowering device and alarm in case of normal building supply failure. The battery shall be the rechargeable type with an automatic recharging system. A manual lowering device shall be located outside the hoistway in the machine room.
 - .5 Fire Service: Phase 1 fire recall service only.
- .9 Drive System:
 - .1 Hydraulic 2:1 roped drive
 - .1 Pumping Unit and Controller: The pumping unit and controller shall be in a separate machine room. The controller and pump unit shall be pre-wired and tested prior to shipment. Pump unit shall incorporate the following features:
 - .1 Smooth stops at each landing.
 - .2 Submersible pump and motor.
 - .3 Adjustable pressure relief valve.
 - .4 Manually operable down valve to lower lift in the event of an emergency. This valve shall be activated from the machine room.
 - .5 Gate valve to isolate cylinder from pump unit.
 - .6 Emergency lowering by battery power from the car control
 - .2 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 solid 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
- .3 Cable: Aircraft Cable 2 X 3/8" (10 mm) DIA. Minimum breaking strength of 12,000 lb (5455 kg) each.
- .3 Guide Yoke: The 2:1 guide yoke assembly shall be supplied with one (1) sheave, guide shoes, bearings and guards.
- .4 Guide Rails and Brackets: Steel 8 lb per ft guide rails and adjustable brackets shall be used to guide the platform and sling.
- .5 Motor/Pump: 240 1 Phase or 208 3 Phase, / 5HP
- .2 1:1 counterweight traction with direct drive gearbox and safety gear.
 - .1 Controller location:
 - .1 In remote machine room
 - .2 Drive system and controller:
 - .1 Motor: 6 pole 3 phase motor coupled to a 13:1 product specific gearbox to reduce noise level.
 - .2 The drive unit shall incorporate the following features:
 - .1 Smooth stops at each landing.
 - .2 Emergency lowering by battery power
 - .3 Guide rail system
 - .1 Steel 8lb per ft guide rails shall be used for guide rails and counterweight rails. Roller guide shall be used on the cab sling and guide shoes on the counterweight to further reduce noise
 - .2 Cable: Elevator traction cable 3 x 3/8" (10mm) DIA 8 x19 sealed with natural fiber core, regular lay. Minimum breaking strength 8,200 lb (3,727 kg) each.
- .10 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.
- .11 Terminal Stopping Devices: Normal terminal stopping devices shall be provided at top and bottom of runway to stop the car positively and automatically.
- .12 Wiring: 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.

PART 3 EXECUTION

3.1 Examination

- .1 Do not begin installation until hoistway and machine room have been properly prepared.

- .2 Site dimensions shall be taken to verify that tolerances and clearances have been maintained and meet local regulations.
- .3 Verify electrical rough-in is at correct location.
- .4 If substrate preparation is the responsibility of another installer, notify Consultant of unsatisfactory preparation before proceeding.

3.2 Preparation

- .1 Clean surfaces thoroughly prior to installation.
- .2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 Installation

- .1 Install in accordance with manufacturer's instructions.
- .2 Install all the components of the lift system that are specified in this section to be provided, and that are required by jurisdictional authorities to license the lift.
- .3 Trained employees of the lift contractor shall perform all installation work of this section.
- .4 Adjust lift for proper operation and clean unit thoroughly.
- .5 Instruct users in operation procedures and Owner's maintenance person in trouble-shooting and maintenance procedures.

3.4 Field Quality Control

- .1 Perform and meet inspection tests as required by jurisdictional authorities
- .2 Perform tests in compliance with CSA B355, ASME A17.1 or A18.1 and as required by authorities having jurisdiction.
- .3 Provide two weeks written notice of all tests to Consultant.
- .4 Schedule tests with agencies to ensure that Owner and Contractor are present.
- .5 Provide legible copies of approval certificates as required by jurisdictional authorities.

3.5 Protection

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

3.6 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 30 00 Cast-In-Place Concrete
- .2 Section 32 92 23 Sodding

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM D698-12e2 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ (600 kN-m/m³))
 - .2 ASTM D1557-12e1 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³))
- .2 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 805 Construction Specification for Temporary Erosion and Sediment Control Measures (November 2015)
 - .2 OPSS 180 General Specification for the Management of Excess Materials (November 2011)
 - .3 OPSS 206 Construction Specification for Grading (November 2009)
 - .4 OPSS 1010 Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material
- .3 Ontario Provincial Standard Details (OPSD)
 - .1 OPSD 219.130 Heavy Duty Silt Fence Barrier (November 2006)
 - .2 OPSD 805 Temporary Erosion and Sediment Control Measures (November 2015)
- .4 The Occupational Health and Safety Act.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit shop drawings of shoring and bracing required in connection with excavation. Drawings to show clearly procedural sequence to be followed.

1.5 Definitions

- .1 Earth: Site excavated material, including shale, rubble rock, building debris, shrub and tree roots and soil.
- .2 Soil: Site excavated material, free from shale, rubble rock, building debris, shrub and tree roots.
- .3 Fill: Approved materials, other than earth, clay and unapproved soil. Approved soil may be used only with approval of the Consultant in writing.
- .4 Rock: All solid rock in ledges, stratified deposits, unstratified masses, and all conglomerate deposits or any other material so firmly cemented by process of nature as to present all the characteristics of solid rock, being so hard or firmly cemented that it cannot be excavated and removed with a power shovel except after thorough and continuous drilling and blasting.
- .5 Backfilling: The operation of supplying and installing fill and approved soil materials.

- .6 Engineered Fill: Approved material used to build-up to design elevations.

1.6 Examination

- .1 Examine the building site and determine the nature and extent of the materials to be removed or the additional fill required to provide depths and levels indicated on drawings. Field check the site to review existing conditions. Verify locations of all existing utilities and services that will affect the work.
- .2 Refer to drawings for all building and site development details.

1.7 Setting Out Work

- .1 The drawings indicate the building components location and proposed and final grades. Be responsible to construct the work according to levels and locations shown on the drawings. Report any errors or discrepancies to the Consultant before commencing work.
- .2 Commencement of any part of the work shall constitute acceptance of drawings as being correct.
- .3 Employ a competent instrument man and provide all lines and levels, limit lines and boundary stakes for the execution of the work as required. All bench marks shall be carefully protected.
- .4 Provide and be responsible for, all lines, levels and dimensions which trades require to relate their work to the work of other trades. All trades shall be notified that all such levels and dimensions must be obtained from the Contractor.

1.8 Existing Underground Utilities

- .1 Arrange underground locates of all utility assets prior to excavating. Do not commence excavation in a location prior to utility members marking the location of their utilities or indicating that none exist within the outlined excavation limits. Where necessary, employ the services of a private utility locator to ensure that all utilities are located in a timely manner.
- .2 Verify the location and elevation of all existing utilities within the limits of the Work. Observe the locations of the stake outs, prior to commencing the Work. In the event there is a discrepancy between the locations of the stake outs and the locations shown on the Contract Documents, that may affect the Work, immediately notify the Consultant and the affected utility companies, in order to resolve the conflict.
- .3 All existing buried utilities located within the excavation zone and any other facilities adjacent to the excavation shall be carefully supported and protected from damage as a result of the Contractor's operations. Be responsible for repairing any damaged underground utilities, as a result of actions during the course of the work at no extra cost to the Owner.
- .4 All costs associated with this work shall be considered incidental to all related items of work in the Contract. No separate payment will be made for costs incurred in obtaining utility locates.

1.9 Protection of Existing Services

- .1 Notify the Owner, Public Utility or Municipal authorities in advance of planned excavations adjacent to their services.
- .2 Take care not to damage or displace encountered known and unknown services.
- .3 When such services are encountered during the execution of work, immediately notify the Consultant and protect, brace and support active services. Where repairs to these services become necessary use the following procedure:
 - .1 Known services, repair at no expense to the Owner.
 - .2 Unknown services, forward to the Consultant a complete breakdown of the estimated cost of such work. Proceed only upon written authorization.

- .4 In the case of damage to, or cutting off of an essential service, notify Consultant, the Owner, and Public Utility or Municipal authorities immediately and repair the service under the Consultant's direction.

1.10 Inspection and Testing

- .1 Provide proper and sufficient samples, ample opportunity and access at all times for the Consultant or Testing Agency to inspect materials, operations and completed works carried out under this Section.
- .2 Sample and test excavated material prior to shipping to landfill off the site. Samples shall be tested for compliance of acceptable material for landfill. Furnish to the Owner the results of all testing and location of landfill site used. This testing will not be undertaken by the Owner's Inspection and Testing Agency.
- .3 Provide 24 hours notice to inspection laboratory and request tests as follows:
 - .1 Sieve Analysis: Proposed fill materials will be tested to confirm stability for intended use and conformity with specifications.
 - .2 Density Test: Tests will be conducted on compacted fill, to ASTM D698.
 - .3 Frequency Test: Excavated Surfaces: When existing compacted fill surface is being prepared, make a series of three tests of surface for each 500 m² area.
 - .4 Fills under Pavement or Slabs on Grade: Make three tests for every two lifts of compacted fill for each 500 m² area.
 - .5 Backfill Structural Walls: Test each different material for approximately each 30 metres of wall being backfilled at depth increments of 610 mm.

1.11 Standards

- .1 Carry out all work in accordance with the applicable OPSS, OPSD and site drawings. The applicable Ontario Provincial Standard Specifications are listed hereafter.
- .2 The following shall apply:
 - .1 OPS 180 Management and Disposal of Excess Material
 - .2 OPS 206 Grading, Nov. 2005
 - .3 OPS 314 Untreated Granular Subbase, Base, Surface, Shoulder and Stockpiling
 - .4 OPS 805 Temporary Erosion and Sediment Control Measures

1.12 Shoring and Bracing

- .1 Shoring and trench timbering, in addition to requirements of local authorities, shall be carried out in accordance with the requirements of The Occupational Health and Safety Act, "November 1992 Ontario Regulation 213/91" and Regulations for Construction Projects by Ontario Ministry of Labour and to Construction Safety Association brochure "Trenching Safety April 1994".
- .2 Erect necessary shoring for excavations in such a manner that:
 - .1 Whenever a trench or excavated face is necessary, shore and brace to prevent failure. Engage a registered Professional Engineer fully qualified in this line of work to design, stamp shop drawings and assume responsibility for the shoring and bracing. Submit shop drawings to the Consultant.
 - .2 It will properly retain the banks of the excavations and prevent caving-in or displacement or damage to surrounding or adjacent buildings or other property.

- .3 All other work in connection with this Contract, including the Mechanical and Electrical Trades, may be carried out while it is still in place if necessary.
- .4 It will be entirely free of footings, foundation walls or other such work so that it may be removed entirely or in sections when it is no longer required or when directed, without causing any damage or injury to the structural work that has been completed.

1.13 Sedimentation Control

- .1 Maintain and/or repair sedimentation control at all watercourses and catch basins to prevent contamination by excavated fill.
- .2 Sedimentation control shall be in accordance with the Ontario Provincial Standard Specifications, OPSS 805 and local authorities.
- .3 Install additional sedimentation control as required and obtain Consultant's approval prior to commencement of site works.

1.14 Dewatering

- .1 Keep excavations and backfill dry at all times.

PART 2 PRODUCTS

2.1 Materials

- .1 Type A Fill: Class "A" material conforming to OPSS1010, latest edition.
- .2 Type B Fill: Class "B" material conforming to OPSS 1010, latest edition.
- .3 Sand Fill: Clean, well graded compactable sand to OPSS 1010, Granular "M" fill.
- .4 Silt fence: heavy duty geotextile, Mirafi Envirofence or equivalent.

PART 3 EXECUTION

3.1 Preparation

- .1 Clearing: Refer to Section 31 10 00 - Site Clearing.
- .2 Lines and Levels: Refer to Section 01 71 00 - Examination and Preparation.
- .3 Stock Piles: Materials shall not be stockpiled on the site except with the prior approval of the Consultant. Where permitted, stockpile materials in a manner to prevent segregation and contamination. Piles not to exceed 2000 mm in height. Stockpile materials in a location and manner not interfering with ongoing operation and use of the site and building by the Owner.
- .4 Install silt fencing as detailed and in accordance with reference standards.

3.2 Excavation Work

- .1 Excavate to elevations and dimensions indicated or required by the work, plus sufficient space to permit erection of forms, shoring and inspection. Excavation shall be made to clean lines to minimize quantity of fill material required.
- .2 Remove large rocks, stumps and other obstructions of whatever nature encountered in the course of excavation and haul away off the site. Remove all concrete, masonry, rubble or other construction debris encountered during the work.
- .3 Unauthorized Excavation - Excavation to greater than required depth shall be corrected by the Contractor at his own expense in a manner as directed by the Consultant. Fill over-excavated areas under structure bearing surfaces and footings with concrete as specified for foundations.

- .4 Keep excavation free of water by bailing, pumping or a system of drainage as required and provide pumps, suction and discharge lines or well points of sufficient capacity and maintain until such time as the permanent drainage system is installed or until the Consultant's approval of removal of equipment is obtained. Take all necessary measures to prevent flow of water into the excavation.
- .5 Protect the bottom and sides of excavated pits and trenches from freezing. Protect also from exposure to the sun and wet weather to prevent cave-ins and softening of the bed upon which concrete or drains rest.
- .6 Excavations must not interfere with the normal 45 degree plane of bearing from the bottom of any footing.
- .7 Keep bottoms of excavations clean and clear of loose materials levelled and stepped at changes of levels with exception of excavations made for drainage purposes and those to slope as required.
- .8 If the excavations reveal seepage zones, springs or other unexpected sub-surface conditions which may necessitate revisions or additions to any drainage system, inform the Consultant immediately so that remedial action can be taken.
- .9 If removal of earth causes displacement of adjacent earth, the earth so disturbed shall be removed at no additional cost to the Owner.
- .10 Conditions of Excavated Surfaces
 - .1 Excavate to a depth sufficient to expose firm undisturbed subsoil, free of organic matter and to the Testing Agency's approval.
 - .2 Remove soft, wet or unconsolidated ground and organic material encountered in excavating.
 - .3 Should the nature of the sub-soil at the depths shown prove to be unsatisfactory to the Consultant for the placing of the concrete work, then upon the Consultant's written order, the Contractor shall excavate to greater depth until a satisfactory bottom is reached.
- .11 Tolerances: General excavation shall be to the elevations shown on the drawings, plus or minus 25 mm.

3.3 Backfilling

- .1 Proceed promptly with backfilling as the building progresses, and as work to be backfilled has been inspected and approved by the Consultant. The backfill in areas where settlement cannot be tolerated, e.g. service and footing trenches under the floor slab, should be compacted to at least 100 per cent of its Standard Proctor Maximum Dry Density. The backfill should be placed in lifts not greater than 200 mm thick in the loose state, each lift being compacted with a suitable compactor to the specified density.
- .2 Do not commence backfilling operations until mechanical and electrical services have been inspected and approved by Consultant and authorities having jurisdiction. Existing floor subgrade must be proof rolled before backfilling.
- .3 Withdraw shoring material during backfill. Lumber left in place without the Consultant's approval will not be paid for by the Owner.
- .4 Backfill evenly on both sides of foundation walls to avoid unequal fill pressures on walls.
- .5 Place fill around foundation walls and footings so that footings will have a minimum of 1200 mm coverage, measured at an angle of 45 degrees from bottom of footing to protect against frost until final grading is complete.

- .6 Where fill is placed adjacent to structures or vulnerable building components or in restricted areas, the fill shall be compacted to the same degree as specified by suitable equipment approved by the Consultant. Avoid damage to or displacement of walls, columns, piers and underground services.
- .7 Add water in amounts required only to achieve the optimum moisture content, in accordance with ASTM D1557.
- .8 Backfill shall be free of snow and ice, topsoil, construction debris and oversized boulders greater than 150 mm.

3.4 Rough Grading

- .1 Preparation and Layout
 - .1 Establish extent of grading by area and elevation.
 - .2 Prior to commencement of grading work, establish location and extent of all underground utilities occurring in work areas. Maintain, reroute or extend as required. Pay all costs for this work, except costs borne by utilities companies.
 - .3 Slope grade away from building as indicated on drawings.
 - .4 Cut temporary drainage swales and create containment ponds and structures for temporary surface run-offs, until storm sewer system is installed.
 - .5 Regrade all areas that retain or pond water.
 - .6 Rough grade all areas to tolerance of plus or minus 50 mm.

3.5 Fills Under Concrete Slab

- .1 The fill shall be deposited in layers of such thickness that the equipment being used for compacting can produce the specified density but in no cases, more than 200 mm thickness. If lumps are present in the material each layer shall be continuously disced in order to ensure proper compaction.
- .2 The exposed subgrade shall be proof rolled to ensure its integrity. If the subgrade consists of engineered fill, the fill shall be compacted to at least 98% of its maximum Standard Proctor Dry Density for native materials or 100% compaction for Granular “A” and “B” materials, using equipment approved by the Consultant. Any loose, wet or deleterious material shall be sub-excavated and replaced by the Contractor with Type B Engineered fill which must be compacted to 98% Standard Proctor Maximum Density.
- .3 Immediately after levelling, each layer of fill shall be thoroughly compacted by the use of approved mechanical equipment.

3.6 Compaction Density

- .1 Use approved equipment for compaction. Maintain materials at optimum moisture content to obtain required compaction. Special care shall be taken to prevent disturbance of the existing subgrade and adjacent structures and equipment.
- .2 Be responsible for damage to the subgrade and installed materials due to improper compaction methods. Make good to approval of the Consultant.
- .3 The minimum density of fill in place shall be the following values of Standard proctor densities for corresponding locations in accordance with ASTM D698.
 - .1 Type A Fill: To 100% Standard Proctor Maximum Density.
 - .2 Type B Fill: To 100% Standard Proctor Maximum Density.

- .3 Engineered Fill: To 98% Standard Proctor Maximum Density.
 - .4 If during progress of work, tests indicate that compacted materials do not meet specified requirements, remove defective work, replace and retest at own expense.
 - .5 Ensure compacted fills are tested and approved before proceeding with placement of surface materials.
- 3.7 Fill Locations
- .1 Type A Fill:
 - .1 Under all interior and exterior concrete slabs 150 mm minimum thickness.
 - .2 Below all mechanical or electrical services, from 150 mm below invert, to springline.
 - .2 Type B Fill:
 - .1 Around all footings, foundations, grade beams and walls up to the underside of Type A fill.
 - .2 From top of approved compacted subgrade to underside of concrete slabs (interior or exterior) but not less than 200 mm thickness.
 - .3 Sand Fill:
 - .1 Below all mechanical or electrical services, minimum 150 mm deep.
 - .2 Above all mechanical or electrical pipes and trenches, from springline to 300 mm above pipe obvert.
 - .4 Engineered Fill: All fill locations up to the underside of Type B fill and where required to fill up to design elevations.
 - .5 Site excavated material: as backfill to exterior side of foundation walls only when permitted and approved by the Geotechnical engineer and below all sodded or seeded areas up to underside of topsoil, but not within 600 mm of foundation walls or structures.
- 3.8 Water on Prepared Surfaces
- .1 Promptly remove, by approved methods, water rising from seeping of the soil or resulting from rainfall wherever such water is on the surface of sub-grade soil and compacted fill.
 - .2 Where proper drainage and pumping is not carried out as specified herein, and any prepared sub-grade soil for under structural work, and any compacted fill for under concrete slabs, is softened or disturbed by water due to improper drainage and pumping, the Contractor shall remove the unsatisfactory soil and fill, and bear all incidental costs in connection with additional excavation and placing and compacting of granular fill under floor slabs.
- 3.9 Surplus Soil Disposal
- .1 Surplus soil and excavated material shall be promptly removed and disposed of off the site at legal dump sites. Conform to local bylaw requirements for trucking and disposal. Complete testing as described in Part 1 of this specification.
- 3.10 Cleaning
- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
 - .2 As excavation proceeds, keep roads and aisles clean of dirt and excavated material.
 - .3 Clean up and wash down to remove all dirt and excavated materials caused by the work of this section daily.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 07 92 00 Joint Sealants
- .3 Section 31 23 10 Excavating, Trenching and Backfilling
- .4 Section 32 17 26 Tactile Warning Surfacing

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C171-20 Standard Specification for Sheet Materials for Curing Concrete
 - .2 ASTM C309-19 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM D698-12(2021) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ (600 kN-m/m³))
- .2 CSA Group (CSA)
 - .1 CSA-A23.1-14/ CSA-A23.2 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete.
- .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 351 Construction Specification for Concrete Sidewalk
 - .2 OPSS 1010 Material Specification for Aggregates - Granular A, B, M and Select Subgrade Material
 - .3 OPSS1308 Material Specification for Joint Filler (Concrete)
- .4 Ontario Provincial Standard Details (OPSD)
 - .1 OPSD 310.010 Concrete Sidewalk

1.4 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Base: Granular "A", OPSS 1010.
- .2 Concrete: CSA A23.1-M.
- .3 Curing Compound: Chlorinated rubber based, ASTM C309 Type 2, suitable for exterior use.
- .4 Joint Filler: Premoulded, non-extruding and resilient bituminous. OPSS 1308 Type A joint filler.
- .5 Form Lumber: No. 2 S.P.F., 28 x 89 mm, free of twist and warp.
- .6 Reinforcing Steel: 152 x 152 mm MW18.7/MW18.7 welded wire mesh, in flat sheets, not rolls.
- .7 Polyethylene Sheeting: 0.100 mm thickness, to CGSB CAN2-53.33.

2.2 Concrete Mixes

- .1 Concrete Mixes and materials: in accordance with Section 03 30 00.

PART 3 EXECUTION

3.1 Preparation

- .1 Establish lines and levels as required for completion of work.
- .2 Check adequacy of preparations for sidewalks done under Section 31 23 10. Ensure that sub-base is compacted to 98% of Standard Proctor density ASTM D698.

3.2 Placing Granular Base

- .1 Sub-grade must be dry and compacted to smooth surface and required grade prior to placing granular base material.
- .2 Place Granular Base to a uniform cross-section over required area in minimum 100 mm thickness.
- .3 Finish granular base surface true to sidewalk founding elevations and compact to minimum of 98% of Standard Proctor density, ASTM D698.

3.3 Installation

- .1 Construct Sidewalks to OPSD 310.010
- .2 Coordinate installation of tactile warning surfacing specified in Section 32 17 26.
- .3 Erect formwork for sidewalks to achieve lines and grades shown on the drawings.
- .4 Cut expansion joint filler to full cross sectional shape of the sidewalk and place at intervals not exceeding 6.0 m. Locate expansion joints at intersections in accordance with OPSD 310.010. Refer to plans for patterns.
- .5 Place expansion joint filler between sidewalks and curbs, between sidewalks and building foundations and between sidewalk and any poured concrete bases or piers.
- .6 Pour concrete on prepared sub-base to required levels and dimensions. Execute all concrete work to CSA A23.1, and CSA A23.2.
- .7 Pour concrete sidewalks with minimum 125 mm depth, and with transverse slope of 2 mm/ 100 mm (2%). Sidewalk thickness adjacent to curbs shall be 150 mm thick.
- .8 Do not pour concrete when air temperature is or may fall below 5 ° C during or within 24 hours of pour, unless precautions are taken to prevent damage to concrete resulting from low temperature.
- .9 Remove and replace any concrete damaged by freezing at no extra cost.
- .10 Finish concrete with light broom finish, transverse to direction of travel.
- .11 Trowel smooth edges, minimum 75 mm wide.
- .12 Apply membrane forming curing compound as soon as surface is free of bleed water to uniformly cover exposed concrete surfaces at rate of not less than 1.0 litre/5 m². Maintain this protection for minimum 7 days.
- .13 Divide sidewalk between expansion joints into lengths not exceeding 1.5 m on centre equally spaced between expansion joints, with power driven carbide tipped blade, or other device approved for use by the Consultant.
- .14 Tool contraction joints with smooth edges, 75 mm wide.

3.4 Tactile Warning Surfacing

3.5 Coordinate installation of tactile warning surfacing with Section 32 17 26.

.1 Cleaning

.2 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 32 16 23 Sidewalks

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A48/A48M-03(2016) Standard Specification for Gray Iron Castings
 - .2 ASTM A327/A327M-11(2017) Standard Test Methods for Impact Testing of Cast Irons
 - .3 ASTM C501-84(2015) Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser
 - .4 ASTM C1028 - 07e1 Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method
- .2 Accessibility for Ontarians with Disabilities Act (AODA)

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's literature describing products, installation procedures and routine maintenance.
- .3 Samples for Verification Purposes: Submit one plate sample that shows dome size and spacing.
- .4 Submit shop drawings showing fabrication details, fastener and anchor locations, plans of plate placement including joints, and material to be used as well as outlining installation materials and procedure.
- .5 Material Test Reports: Submit complete test reports from qualified accredited independent testing laboratories to qualify that materials proposed for use are in compliance with requirements and meet or exceed the properties indicated on the specifications. All tests shall be conducted on a Cast Iron Detectable/Tactile Warning Surface Indicator Plate as certified by a qualified independent testing laboratory.
- .6 Maintenance Instructions: Submit copies of manufacturer's specified installation and maintenance practices for each type of Detectable/Tactile Warning Surface Indicator Plate and accessory as required for inclusion in the Operation and Maintenance Manuals specified in Section 01 78 00.

1.5 Quality Assurance

- .1 Provide Cast Iron Detectable/Tactile Warning Surface Indicator Plates and accessories by a single supplier with a minimum of three years' experience in the supply of Cast Iron Detectable/Tactile Warning Surface Indicator Plates.
- .2 Installer's Qualifications: Engage an experienced installer certified in writing by Cast Iron Detectable/Tactile Warning Surface Indicator Plate supplier as qualified for installation, who has successfully completed installations similar in material, design, and extent to that indicated for the project.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Cast Iron Detectable/Tactile Warning Surface Indicator Plates shall be suitably packaged or crated to prevent damage in shipment and handling. Detectable/Tactile Warning Surface Indicator plate type shall be identified by part number.

1.7 Project Conditions

- .1 Environmental Conditions and Protection: Maintain minimum temperature of 5° C in spaces to receive Cast Iron Detectable/Tactile Warning Surface Indicator Plates for at least 24 hours prior to installation, during installation, and for not less than 24 hours after installation.
- .2 The use of water for work, cleaning or dust control, etc. shall be contained and controlled and shall not be allowed to come into contact with the general public. Provide barricades or screens to protect the general public.

1.8 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction and Demolition Waste Management.

1.9 Warranty

PART 2 PRODUCTS

2.1 Manufacturer

- .1 The Gray Cast Iron Detectable/Tactile Warning Surface Indicator Plate specified is based on Advantage Cast Iron Tactile www.advantagetactile.com as distributed by Kinesik Engineered Products, 2213 North Sheridan Way Mississauga, Ontario L5K 1A3.
- .1 Provide Cast Iron Detectable/Tactile Warning Surface Indicator Plates which are in compliance with the Accessibility for Ontarians with Disabilities Act
- .2 Gray Cast Iron Detectable/Tactile Warning Surface Indicator Plates shall be according to ASTM A48M, Class 35B, and shall be bare and not coated with paint or other coatings or substances. Castings shall be sound, free from pouring faults, cracks, blowholes and other defects.
 - .1 Dimensions: The plate shall incorporate an in-line pattern of truncated domes measuring nominal 5.0 mm height, 23 mm base diameter, 11.4 mm top diameter spaced center-to-center 60 mm (+/- 1.2 mm). For wheelchair safety the field area shall consist of a series of micro texture 1.5 mm high.
- .3 Gray Cast Iron Detectable/Tactile Warning Surface Indicator Plates shall meet or exceed the following test criteria:

ASTM Reference	Test Description	Value
ASTM C1028	Static Coefficient of Friction	≥ 1.0 wet/dry
ASTM A327	Impact Resistance	No damage @ 54 J
ASTM A48	Standard Specification for Gray Iron Castings	
ASTM D695	Compressive Strength	114,000 psi
ASTM D638	Tensile Strength	35,000 psi

ASTM C501	Abrasive Wear Index	≥ 8800
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- .2 Tactile warning surface tiles shall be 610 mm deep x 914 mm minimum total accumulated width unless otherwise indicated. Tile are based on Advantage Cast Iron Tactile model ADV-CI-1824.
- .3 Existing engineered and field tested products, which have been in successful service for a period of three years and in compliance with requirements, may be incorporated in the work and shall meet or exceed the specified test criteria and characteristics.

2.2 Materials

- .1 Optional fasteners required if plates are assembled together prior to installation: Corrosion resistant, hex head bolt, 10 mm diameter x 45 mm long. Minimum two per Detectable/Tactile Warning Surface Indicator plate connection.

PART 3 EXECUTION

3.1 Installation

- .1 During all surface preparation and installation procedures, ensure adequate safety guidelines are in place and that they are in accordance with the applicable industry and government standards.
- .2 Related materials shall be in strict accordance with the contract documents and the guidelines set by their respective manufacturers.
- .3 Coordinate to ensure that the surfaces being prepared and fabricated to receive the plates are constructed correctly and adequately for plate installation. Review manufacturer and contract drawings with the Contractor prior to the construction and refer any and all discrepancies to the Consultant.
- .4 The physical characteristics of the concrete shall be consistent with the contract specifications while maintaining a slump range of 76 to 100 mm to permit solid placement of the Cast Iron Detectable/Tactile Warning Surface Indicator Plates.
- .5 When preparing to set the plate, ensure that the area to receive the plates has been finished to its final elevation. The concrete shall be poured and finished true and smooth to the required dimensions and slope prior to the plate placement. Vents in the plate allow air and displaced concrete to escape during the installation process.
- .6 Lift the Detectable/Tactile Warning Surface Indicator plate and place into position onto the wet concrete. The plate shall be placed true and square to the curb edge in accordance with the contract drawings. Press into the concrete. The Cast Iron Detectable/Tactile Warning Surface Indicator Plates shall be tamped into the fresh concrete to ensure that the field level of the plate is flush to the adjacent concrete surface.
- .7 Immediately after placement, the plate elevation is to be checked to adjacent concrete, and the concrete around the perimeter of the tile should be finished. The elevation and slope should be set consistent with contract drawings to permit water drainage to curb as the design dictates. Ensure that the field surface of the plate is flush with the surrounding concrete and back of curb so that no ponding is possible on the plate at the back side of curb, and to eliminate tripping hazards between adjacent finishes.
- .8 While concrete is workable, create a 6 mm concrete-free recess around the perimeter of the plate. Use a 9.5 mm radius edging tool to create a finished edge of concrete. A steel trowel shall be used to finish the concrete around the plate's perimeter, flush to the field level of the plate.
- .9 Clean the surface of the tile of any concrete that has protruded from the vent holes.

- .10 During and after the Detectable/Tactile Warning Surface Indicator Plate installation and the concrete curing stage, it is imperative that there is no walking, leaning or external force placed on the plate that may rock the plate causing a void between the underside of Detectable/Tactile Warning Surface Indicator Plate and concrete.
- .11 Following Detectable/Tactile Warning Surface Indicator Plate placement, review installation tolerances to contract drawings and adjust plate before the concrete sets.
- .12 Following the concrete curing stage clean the residue using a soft brass wire brush without damage to the plate surface.

3.2 Protection

- .1 Protect plates against damage during construction period to comply with Detectable/Tactile Warning Surface Indicator plate manufacturer's specification.
- .2 Protect plates against damage from rolling loads following installation by covering with plywood.

3.3 Cleaning

- .1 Proceed in accordance with Section 01 74 01 – Cleaning.
- .2 Comply with manufacturer's maintenance manual for cleaning and maintaining plate surface.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 31 23 10 Excavating, Trenching and Backfilling

1.3 References

- .1 Nursery Sod Growers Association of Ontario (NSGA).

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit grass seed mix.
- .3 Submit name and address of sod farm.

1.5 Quality Assurance

- .1 Topsoil from each source, native and imported, shall be tested for N.P.K., atrazine, minor elements, as well as clay and organic matter contents and acidity (pH) range. Topsoil shall be tested, written test report submitted and approved by Consultant, prior to delivery to site.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Protect sod during transportation, for delivery to the site in a fresh and healthy condition.
- .3 Install sod immediately, no later than 48 hours after arrival on site. Keep moist and fresh until installation.
- .4 Handle sod carefully to prevent breaking or tearing. Immediately remove damaged and dried-out sod from the site.

1.7 Warranty

- .1 Guarantee and provide maintenance as specified for sodded areas, for one year from date of Substantial Performance.

PART 2 PRODUCTS

2.1 Topsoil

- .1 Clean topsoil, imported material approved by the Consultant, and free from admixtures of subsoil, clay lumps, stones or roots over 25 mm diameter, free of toxic substances or any other foreign matter which would inhibit growth. Minimum 150 mm thickness.

2.2 Sod

- .1 Sod shall be a Certified No. 1 sod, grown and sold in accordance with the latest specifications of the Nursery Sod Growers Association of Ontario (NSGA), composition of 50% Kentucky Blue Grass and 50% Merion Blue Grass.
- .2 At the time of delivery, sod shall have a strong, fibrous root system, be free of disease, stones, burned or bare spots, with a healthy green colour and containing not more than 1% twitch grass and other weeds.
- .3 Sod shall be cut and rolled in sections of max. 1.0 m² in area and approximately 30 mm thick as specified by the NSGA.

2.3 Fertilizer

- .1 Commercial type having a 10-10-10 ratio and shall be applied such that actual nitrogen is 9.0 kg/10 m².

PART 3 EXECUTION

3.1 Preparation

- .1 Adjust subgrade to allow the placing of topsoil to minimum depths specified.
- .2 Scarify subgrade to at least 75 mm deep and remove debris and all stones 50 mm in diameter and larger.
- .3 Spread and grade topsoil evenly over approved subgrade. Provide minimum 150 mm thick topsoil. No less will be accepted.
- .4 Finished sodded area top surface shall be uniform and evenly graded between elevations indicated, free of bumps, ridges and depressions. Remove all stones and lumps over 25 mm in diameter and foreign materials.
- .5 Unless recommended otherwise on soil analysis report, apply a 10-10-10 fertilizer at the rate of 9.0 kg/10 m².
- .6 Work fertilizer well and uniformly into the topsoil within 48 hours before laying sod.
- .7 Fine grade, rake and roll surface until smooth and firm against foot prints, and free of depressions, lumps and irregularities.

3.2 Installation

- .1 Place sod closely knit together, so that no open joints are visible, and pieces are not overlapping.
- .2 Install sod to blend tightly and uniformly with adjoining grass areas and, unless otherwise detailed, to be flush with paving, top of curbs.
- .3 Immediately after installation, water with sufficient amount to saturate sod and underlying topsoil.
- .4 As soon as sod has dried sufficiently to prevent damage, roll with roller to ensure a good bond between sod and topsoil and to remove minor depressions and irregularities.

3.3 Maintenance

- .1 Maintain all sodded areas, from date of installation and until one full growing season is complete (minimum 6 months). Obtain Consultant's approval at end of maintenance.
- .2 Maintenance shall include all necessary measures to establish and maintain grass in a healthy, vigorous growing condition, for one full growing season.
- .3 Maintenance shall include, but not be limited to the following work:
 - .1 Mow grass areas at regular intervals as required to maintain grass height between 50 mm and 60 mm. Not more than 1/3 of grass blade shall be cut during one mowing. Hand clip where necessary and keep edges neatly trimmed. Remove heavy clippings immediately after mowing and trimming.
 - .2 Control weeds by cutting. Use of chemicals is strictly prohibited.
 - .3 Fertilize not less than once per season (Spring, Summer, Fall).
 - .4 Water when necessary, with sufficient quantities of water to prevent sod and underlying soil from drying out.
 - .5 Roll all sodded areas to remove minor depressions and irregularities.

- .6 Repair all erosion damage resulting from faulty workmanship and/or maintenance.
- .7 Replace all grass which has deteriorated, or which shows bare spots.
- .8 Protect all grass areas against damage, including erosion and trespassing, by providing and maintaining proper safeguards. Remove safeguards at end of maintenance period.

3.4 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Clean up all areas and remove debris

End of Section