

Project Manual Specifications

For

TOWN OF MARATHON

NEW PUBLIC WORKS FACILITY 2 Penn Lake Road, Marathon Ontario

Issued for Tender, Permit, and Construction August 11, 2022 Mandatory Site Meeting August 31, 2022 Closing Date September 15, 2022

Architectural Project No. 2208



CRITCHLEY HILL ARCHITECTURE INC

NORTH BAY ONTARIO 705.995.2391 CRITCHLEYHILL.CA

1 Consultants

.1 The following are the consultants and sub-consultants who have prepared the Contract Documents.

PRIME CONSULTANT / ARCHITECT

Critchley Hill Architecture Inc. 123 McIntrye Street W North Bay, Ontario P1B 2Y5

Tel: (705) 995-2391

2 Sub-Consultants

CIVIL ENGINEERS

Hatch 200 South Syndicate Ave, Suite 301 Thunder Bay, Ontario P7E 1C9

Tel: (807) 623 3449 Fax: (807) 623 5925

STRUCTURAL ENGINEERS

TBT Engineering Consulting Group 1918 Yonge Street Thunder Bay, ON P7E 6T9

Tel: (807) 624-5160 Fax: (807) 624-5161

MECHANICAL & ELECTRICAL ENGINEERS

TBT Engineering Consulting Group 1918 Yonge Street Thunder Bay, ON P7E 6T9

Tel: (807) 624-5160 Fax: (807) 624-5161

END OF SECTION

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PART 1GENERAL

1.1 INVITATION

.1 Critchley Hill Architecture Inc. on behalf of the Town of Marathon shall receive tenders from Prequalified General Contractors for the supply of all of the goods and/or services specified in this tender call.

The sealed Tender Form <u>clearly marked</u> "New Public Works Facility" shall be received no later than 2:00:00 PM CDT on or before Thursday September 15, 2022.

Closing time will be taken from the Universal Time Clock (UTC) at http://www.time.gov/.

Merx E-Submissions

The Tender Form shall be submitted by Merx e-submission on or before the respective dates and times as noted above.

To submit a bid through Merx e-submission, contractor <u>must register and order</u> this opportunity. Documents <u>must be</u> downloaded from Merx including all addendum.

Please note that large bids or bids with many documents can be a factor in the amount of time it takes to upload and submit your bid. It is recommended that you allow for at <u>least 4 hours</u> before closing time to upload and submit a tender package.

The file(s) name of the e-submission shall read "**New Public Works Facility**". Insert your "Company Name" in the file name.

Attach all required documents in .pdf format. The total file size of pdf documents may not exceed 100 MB.

- .1 Tenders must be submitted on the Tender Form issued with Tender Documents.
- .2 All tender submissions will be closed to the public.
- .3 All blanks on Tender Forms must be filled in.
- .4 Bidders shall be solely responsible for the delivery of Tender in the manner and time prescribed.
- .5 All prices (unless otherwise specifically requested in Tender Documents) shall be for "Complete Job" prices and shall be understood to include for all materials, labour and other expenses as herein outlined in these contract documents including but not limited to fees, insurances, permits, compensation and other items required by governing regulations as well as overhead and profit for the work concerned.
- .6 Tenders must be submitted by e-submission Only. <u>No</u> other email address or facsimile transmission shall be used to submit tender documents.

1.2 INTENT

.1 The intent of this bid call is to obtain an offer from prequalified General Contractors to provide services to construct the **New Public Works Facility**, within a Stipulated Price contract, in accordance with the Contract Documents.

1.3 CONTRACT DOCUMENTS AND OWNER IDENTIFICATION

.1 The Contract Documents are identified as the:

New Public Works Facility

2 Penn Lake Road, Marathon Ontario Town of Marathon Project No. 2022

.2 The Owner of the Project:

Town of Marathon

1.4 PREQUALIFIED GENERAL CONTRACTORS

.1 The following is a list of Prequalified General Contractors for this tender call:

Tom Jones Corporation

560 Squier Place, Box 10662 Thunder Bay, Ontario P7B 6V1 Attention: Parker Jones, pjones@tomjonescorp.com

MBuilds

Suite 200, 955 Cobalt Cresent Thunder Bay, ON P7B 5Z4 Attention: Peter Bulluze <u>pbelluz@manshield.com</u> Finn Way General Contractors 1301 Walsh Street West Thunder Bay, ON P7E 4X6 Attention: David Karimi, davidk@finnway.com

CGV Builders

56 Connaught Avenue Cochrane, ON P0L 1C0 Attention: Michel Brousseau, m.brousseau@cgvgroup.ca

1.5 CONTRACT /BID DOCUMENTS

- .1 Form of Contract
 - .1 The CCDC Document 2, Stipulated Price Contract, 2020 will be used to form the Construction Contract. This document will be appended to this document to form the Contract Documents for the project. A sample of this document will be made available to Bidders upon individual request to the Consultant.
- .2 Definitions
 - .1 Contract Documents: Defined in CCDC 2 2020 Edition, Definitions.
 - .2 Bid Documents: Contract Documents supplemented with Instructions to Bidders, Soils Investigation Data, Designated substances survey, Bid Form, Bid Securities, and Bid Supplementary Forms identified herein.
 - .3 Bid, Offer, or Bidding: Act of submitting an offer.
 - .4 Bid Price: Monetary sum identified by the Bid Form.
- .3 Availability
 - .1 Bid Documents may be obtained on Merx.com

- .2 Bid Documents are made available only for the purpose of obtaining offers for this project. Their use does not confer a license or grant for other purposes.
- .4 Examination
 - .1 Upon receipt of Bid Documents verify that documents are complete; notify Consultant should the documents be incomplete.
 - .2 Immediately notify the Consultant upon finding discrepancies or omissions in the Bid Documents.
- .5 Queries / Addenda
 - .1 Direct questions to:

Marie Derosier c/o Critchley Hill Architecture Inc. 123 McIntyre Street West North Bay, Ontario P1B 2Y5 Tel: 705-995-2391 email: maried@critchleyhill.ca

- .2 Addenda may be issued during the bidding period. All addenda become part of the Contract Documents. Include costs in the Bid Price.
- .3 Verbal answers are only binding when confirmed by written addenda.
- .4 Clarifications requested by bidders must be in writing not less than 7 working days before date set for receipt of bids. The reply will be in the form of an addendum, a copy of which will be forwarded to known bidders no later than 4 working days before receipt of bids.
- .6 Product/System Options
 - .1 Where the Bid Documents stipulate a particular product, alternative will be considered by the Consultant up to ten (10) working days before receipt of bids.
 - .2 When a request to substitute a product is made, the Consultant may approve the substitution and will issue an Addendum to known bidders.
 - .3 In submission of alternatives to products specified, bidders shall include in their bid, any changes required in the work to accommodate such alternatives. A later claim by the bidder for an addition to the contract price because of changes in work necessitated by use of alternatives shall not be considered.
 - .4 The submission shall provide sufficient information to enable the Consultant to determine acceptability of such products.
 - .5 Provide complete information on required revisions to other work to accommodate each alternative, the dollar amount of additions to or reductions from the Bid Price, including revisions to other work.
 - .6 Unless alternatives are submitted in this manner and subsequently accepted, provide products as specified.

1.6 SITE ASSESSMENT

- .1 Site Examination
 - .1 Carefully examine and study all of the Contract Documents and inspect the Site of the work in order to determine all conditions affecting the work and associated costs.
 - .2 Each bidder shall visit the site of the work before submitting a Bid and shall by personal

examination be satisfied as to the local conditions that may be encountered during construction. Each Bidder shall make its own estimate of the available facilities and any difficulties that may be encountered and the nature of the sub surface materials and conditions. In connection with the site visit each Bidder shall examine the surrounding and adjacent public and private properties for existing conditions and limitations including but not limited to the rights and interest of other parties that may be interfered with during the construction.

- .3 A **Mandatory** site visit to the project site has been arranged for bidders on: **Wednesday August 31, 2022** @ **1:00pm local time**. This site meeting is mandatory for all bidders. Bidders who do not attend the mandatory site meeting or that do not sign the attendance sheet will be disqualified and their bids will be returned, unopened, by the Owner. An Owner or employee of each prequalified contracting company must represent their respective company at the meeting. A brief summary of the project and the site including pre-loading conditions will be reviewed.
- .3 No Bidder shall claim, at any time after submission of its Bid, that there was any misunderstanding of the terms and conditions of the Contract Documents relating to site conditions.
- .4 No adjustment to the Progress Schedule or to the Bid price will be made for difficulties encountered due to conditions, features, and peculiarities of the site that were evident at the time of the close of Bids.
- .5 The act of submitting a tender is confirmation that the Bidder has visited the project site and surrounding properties and has become familiar with the place of work including the complete geotechnical investigation.
- .6 Contractors are to meet on the property to be developed for the new facility.

1.7 QUALIFICATIONS

- .1 The Bidder may be asked to provide detailed information on the professional qualifications of all staff who are expected to be involved with the work. Also, it is critical that the Bidder identify a single senior individual who shall co-ordinate the work from beginning to end. All work shall be performed diligently and to a high standard of professional competence by all parties
- .2 Subcontractors
 - .1 The Owner reserves the right to reject a proposed subcontractor for reasonable cause.
 - .2 Refer to CCDC 2 Article GC 3.6.
 - .3 It is suggested that the Contractor give careful consideration to the suitability of the subcontractors listed on the Tender Form.

1.8 BID SUBMISSION

- .1 Bid Ineligibility
 - .1 Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetic errors, erasures, alterations, or irregularities of any kind, may at the discretion of the Owner, be declared informal.
 - .2 Bids with Bid Forms and enclosures which are improperly prepared may at the discretion of the Owner, be declared informal.
 - .3 Bids that fail to include security deposit, bonding or insurance requirements shall at the discretion of the Owner, be declared informal.

- .4 The Town of Marathon shall not be held responsible for any such equipment malfunctions, printing malfunctions, power failures or any other such instances that would otherwise prohibit the tender form from being submitted.
- .5 Bids that are submitted by general bidders that did not prequalify or did not attend the mandatory site visit shall be disqualified and returned to the Bidder without further consideration.
- .6 Bid Tender Form that do not have a price for each separate price, alternate, or additional price shall be declared informal and returned to the Bidder without further consideration by the Owner.
- .2 Submissions
 - .1 Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.
 - .2 Submit one copy of the executed offer on the Bid Forms provided, signed together with the required security.
 - .3 Improperly completed information, irregularities in bid bond, may be cause not to open the bid or declare the bid informal.

1.9 BID ENCLOSURES/REQUIREMENTS

- .1 Schedule
 - .1 Proponent to provide a detailed Gantt Chart of project milestones and completion date.
- .2 Security Deposit
 - .1 Each Tender Form Section 00 41 00 shall be submitted with a <u>Bid Bond</u> in the name of an approved surety, made payable to owner in an amount equal to **10% (ten percent) of the Tender Price,** as a guarantee that the Bidder will, if the tender is accepted, execute a general construction contract as specified herein and provide the specified Performance and Labour and Materials Bonds within ten (10) days of acceptance.
 - .2 Endorse the Bid Bond in the name of the Owner as obligee, signed and sealed by the principal Contractor and surety.
 - .3 Use Bid Bond form CCDC 220.
- .3 Agreement to Bond
 - .1 Submit with the Tender Form Section 00 41 00 and Bid Bond, an Agreement to Bond, stating that the surety providing the Bid Bond is willing to supply the Performance and Labour and Materials Payment Bond required.
 - .2 Include the cost of bonds in the Bid Price.
- .4 Performance Assurance

.1

- The accepted bidder shall provide a 50% of Construction Costs Performance Bond and 50% of Construction Cost Labour and Materials Payment Bond.
- .5 Undertaking of Insurance
 - .1 Submit with the Tender Form Section 00 41 00 a signed "Undertaking of Insurance" on a standard form provided by the insurance company stating their intention to provide insurance to the bidder in accordance with the insurance requirements of the Contract Documents.
- .6 Bid Form Requirements

- .1 State in the Bid Form, the time required to complete the work. The Substantial Completion date in the Agreement shall be calculated based on the number of weeks of construction indicated in the Bid Form commencing from the date of award of contract. The commencement date of the construction schedule in the agreement will be the date of Award of Contract.
- .2 Include the names of all Subcontractors and the portion(s) of the work the Bidder will perform as per the list provided within the Bid Form.
- .7 Bid Signing
 - .1 The Bid Form shall be signed by the bidder.
 - .2 Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature.
 - .3 Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word partner under each signature.
 - .4 Limited Company: Signature of a duly authorized signing officer (s) in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature. If the bid is signed by officials other than the President and Secretary of the company, or the President and Secretary of the company, or the President-Secretary-Treasurer of the company, a copy of the by-law resolution of the Directors authorizing them to do so, must also be submitted with the bid.
- .8 Taxes
 - .1 Base Bid Price (Tender Price) <u>excludes</u> required Harmonized Sales Tax (HST).
- .9 Cash Allowances
 - .1 Cash Allowances shall be **included** in the Base Bid in accordance with Part 4 of the General Conditions of the Contract. Cash Allowances are identified in Division 01.

1.10 OFFER ACCEPTANCE/REJECTION

- .1 Duration of Offer.
 - .1 Bids shall remain open to acceptance and shall be irrevocable for a period of sixty (60) days after the bid closing date.
- .2 Bid Evaluation and Acceptance
 - .1 The Owner will evaluate the offers (Tenders) received and identify the offer which represents "best value"; the interpretation of which will be made by the Owner.
 - .2 If requested by the Owner, Bidders will meet with the Owner to discuss their offer.
 - .3 The Owner reserves the right to accept or reject any or all offers the lowest or any other tender not necessarily accepted.
 - .4 During bid evaluation the Base Bid and Construction Time will be used to evaluate the successful bid. The alternate prices, separate prices and additional prices associated with the lowest bid will be evaluated for discrepancies and best value. The owner reserves the right to negotiate the value of the alternate prices; separate prices, alternate, and additional prices. If negotiations over the value of alternate prices fail, separate prices and additional prices fail, the owner reserves the right to proceed with the next low bidder.
 - .5 After acceptance by the Owner, the Consultant on behalf of the Owner, will issue to the successful bidder, a written bid acceptance.
 - .6 After a bid has been accepted, all rejected bids will be returned to the respective bidders.

- .7 The Owner is not obligated to provide an explanation of its decision with regard to the acceptance or rejection of any tender.
- .8 In addition to the provisions stated in Separate, Additional, and Alternative Prices of Section 00 41 00 Tender Form, the Owner reserves the right, if necessary to reduce costs to further delete or substitute work during negotiations with the low bidder as part of the evaluation of the base bid.

1.11 MUNICIPAL FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY ACT (MFIPPA)

.1 Bidders are advised that the Town is governed by Ontario's Municipal Freedom of Information and Protection of Privacy Act ("MFIPPA") and information submitted to the Town in response to this RFT may be subject to disclosure under MFIPPA. A Bidder should identify any information in its Bid or any accompanying documentation supplied in confidence for which confidentiality is to be maintained by the Town and is advised to consult with their own legal advisors regarding the appropriate way to identify such information. The Town will make reasonable efforts to safeguard confidential information, subject to its disclosure requirements under MFIPPA or any disclosure requirements imposed by law or by order of a court or tribunal. Bidders are advised that their bids will, as necessary, be disclosed, on a confidential basis, to advisers retained by the Town to advise or assist with the RFT process, including the evaluation of bids. If a Bidder has any questions about the collection and use of information pursuant to this RFT, questions are to be submitted to the RFT Contact.

1.12 NO INFLUENCE

.1 The Town prohibits its representatives from using their official position for personal financial gain, or from accepting any personal advantage from anyone under circumstances which might reasonably be interpreted as an attempt to influence the recipient in the conduct of their duties, extend any gratuity or special favor to the proponent, or to influence the outcome of any proposal. The Town reserves the right to disqualify the tender of any bidder who engages in any acts or practices.

1.13 BROADER PUBLIC SECTOR PROCUREMENT DIRECTIVE

.1 This Process is subject to the Broader Public Sector Procurement Directive, Canadian Free Trade Agreement (CFTA) and the Canada-European Union Comprehensive Economic and trade Agreement (CETA).

1.14 INAPPROPRIATE CONDUCT

- .1 The Town may disqualify a bidder's tender and give it no further consideration based on past performance or based on inappropriate conduct in a prior procurement process, and such inappropriate conduct shall include but not be limited to:
 - .1 The submission of proposals or quotations containing misrepresentations or any other inaccurate, misleading or incomplete information;
 - .2 The refusal of the proponent to honor its previous commitments; or
 - .3 Any other conduct constituting a conflict of interest. For the purposes of this section, "conflict of interest" shall have the meaning ascribed to it on the Proposal Submission Form.

1.15 AGREEMENT TO ABIDE BY THE ESTABLISHED TENDER PROCESS

.1 No proponent can be seen to be deriving, intentionally or otherwise, an advantage, information or benefit which is not available to all other Bidders or from any special or personal relationships or contacts, or seeking or obtaining any advantage or information from any staff and representatives of the The Town of marathon, whether authorized or not. The Tender Form includes a clause which confirms concurrence with the Tender Process. In signing the Tender Form, Bidders are agreeing to abide by the established process.

1.16 REFERENCE CODES STANDARDS AND REGULATIONS

.1 All Sections:

Delete suffixes for Codes, Standards and Regulations which indicate a particular year.

Add: Codes, Standards and Regulations to be latest current versions in force at the time of Tender.

- .2 Where relevant documents applicable to this work exist, follow these criterion, recommendations, and requirements as minimum standards.
- .3 In event of conflict between Codes, Regulations, or Standards, or where work shown is in conflict with these documents, obtain interpretation before proceeding. Failure to clarify any ambiguity will result in an interpretation requiring application of most demanding requirements.

1.17 PROJECT SCHEDULE

.1 Timetable

Mandatory On Site Meeting	August 31, 2022 @1:00pm
Deadline for Questions	September 6, 2022
Deadline to issue Addendum	September 9, 2022
Submission Deadline	September 15, 2022
Anticipated Execution of Agreement	September 28, 2022
Anticipated Completion Date	TBD by Successful Bidder & Owner 2024

The project must commence within 5 working days of award of contract.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 The reports, by its nature, cannot reveal all conditions that exist or can occur on the site. Should subsurface conditions be found to vary substantially from the report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the contract Price accruing to the Owner.
- .2 The Designated Substance & Hazardous Materials Survey Report and Geotechnical Report were commissioned by the client and not prepared by Critchley Hill Architecture Inc. It is included in these specifications for information only. Critchley Hill Architecture are not responsible or do not accept any form of liability for information contained in this document.
- .3 The General Contractor shall assume when quantifying their scope of work under this section that any areas of the facility not covered within the reports shall assume that all existing materials, they are disturbing shall contain designated substances.

1.2 GEOTECHNICAL REPORT

- .1 A copy of the geotechnical investigation report is included under separate cover, titled "The Corporation of the Town of Marathon Geotechnical Investigation, New Structure for Works and Operations Garage, 2 Penn Lake Road, Marathon, Ontario". Reference No 16-091-29E:02 and dated November 9, 2016 and prepared by True grit Engineering.
- .2 The report, by its nature, cannot reveal all conditions that exist or can occur on the site. Should subsurface conditions be found to vary substantially from the report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the contract Price accruing to the Owner.

1.3 DESIGNATED SUBSTANCE & HAZARDOUS MATERIALS SURVEY REPORT

- .1 A copy of a detailed Designated Substance & Hazardous Materials Survey Report is available under separate cover, titled "Project Specific Designated Substance Survey, 4 Building Demolition DSS, Marathon Ontario", Reference No. 22-105, dated May 25, 2022 and prepared by TBT Engineering Limited. The bidders are responsible for incorporating the information within the report obtained from the client into the project. Critchley Hill Architects do not clarify any accuracy or accept any responsibility for any information contained in reports.
- .2 Comply with requirements detailed in the report for procedures for the handling, removal and disposal of hazardous materials and designated substances including but not limited to asbestos, benzene, lead, mercury, polychlorinated biphenyls, and silica.

1.4 EXISTING PHOTOS AND DRAWINGS

.1 A copy of existing photos is being issued under separate cover for information only. The photos, by its nature, cannot reveal all conditions that exist or can occur on the site.

Critchley Hill Architects do not clarify any accuracy or accept any responsibility for any information contained in the photos.

.2 Photos can be viewed at the following link

https://critchleyhillmy.sharepoint.com/:f:/g/personal/maried_critchleyhill_ca/EgnnP7Ddg1NGoa5B3 u8VWeMBVjvubgLxVZKAkzZYFZMq5A

END OF SECTION

New Public Works Facility 2 Penn Lake Road, Marathon Ontario Town of Marathon Project No. 2022

Tender Form Submitted By	Name:
	Address:
	Telephone:
	email:
Base Bid	We offer to enter into a Contract to perform the Work required by the Tender Documents for the stipulated price of:
	(\$)
	The above Base Bid offer does not include HST.
HST Amount	Amount of HST for the above Base Bid is:
Construction Time	We agree to complete the Work in accordance with the Tender Documents. We agree to be Ready-For-Takeover of the Work within months from access to site. We acknowledge and agree that the Construction Time will be evaluated with the Base Bid to determine the successful bid.
Confirmation of Documents and Addenda	We acknowledge our compliance with the Instructions to Bidders and the Tender Documents relating to the Work, including all Addenda numbered as follows:
Allowances	We have <u>included</u> all allowances as Specified under Division 01 within our Base Bid price.
Tender	We agree and acknowledge that the lowest or any of the submitted Tenders will not necessarily be accepted.
	We agree and acknowledge that this Bid is irrevocable and open to acceptance for a period of 60 days from the date of Bid Closing.

DECLARATIONS IN TENDER FORM

AGREEMENT TO ABIDE BY ESTABLISHED PROCESS

3.4.1 Conflict of Interest

For the purposes of this Tender, the term "Conflict of Interest" includes, but is not limited to, any situation or circumstance where:

- (a) in relation to the Tender process, the respondent has an unfair advantage or engages in conduct, directly or indirectly, that may give it an unfair advantage, including but not limited to;
 - i. having, or having access to, confidential information of the Town in the preparation of its quotation that is not available to other respondents, or
 - ii. communicating with any person with a view to influencing preferred treatment in the Tender process (including but not limited to the lobbying of decision makers involved in the Tender process), or
 - iii. engaging in conduct that compromises, or could be seen to compromise, the integrity of the open and competitive Tender process or render that process non-competitive or unfair, or
- (b) in relation to the performance of its contractual obligations under a contract for the Deliverables, the respondent's other commitments, relationships or financial interests';
 - i. could, or could be seen to, exercise an improper influence over the objective, unbiased and impartial exercise of its independent judgement, or
 - ii. could, or could be seen to, compromise, impair or be incompatible with the effective performance of its contractual obligations.

The Bidder shall declare in its Tender any situation that may be a conflict of interest or a potential or perceived conflict of interest of the Bidder, including but not limited to its obligations to the Town of Marathon, the contract, the contract price or any customer.

The Town of Marathon has a fiduciary responsibility to ensure that such behaviour is not permitted and reserves the right to remove from eligibility, the name of any Bidder for failure to comply with the above conditions.

The Bidder declares that this proposal is not made in connection with any other Bidder submitting a Tender for the same commodity/service and is, in all respects, fair and without collusion or fraud.

Based on the above, do you believe your firm may be in possible conflict of interest? Please check appropriate answer.

_____ No

_____ Yes – If yes is selected please submit with your documents a detailed description

BID ENCLOSURES/REQUIREMENTS

The following documents are required as part of a complete Tender Form submission (Answer Yes or No to each Question)

CONFIRMATIONS	YES	NO
Security Deposit		
Each Tender Form Section 00 41 00 shall be submitted with a <u>Bid Bond</u> in the name of an approved surety, made payable to owner in an amount equal to 10% (ten percent) of the Tender Price.		
Agreement to Bond		
Submit with the Tender Form Section 00 41 00 and Bid Bond, an Agreement to Bond, stating that the surety providing the Bid Bond is willing to supply the Performance and Labour and Materials Payment Bond required.		
Insurance		
Submit with the Tender Form Section 00 41 00 a signed "Undertaking of Insurance" on a standard form provided by the insurance company stating their intention to provide insurance to the bidder in accordance with the insurance requirements of the Contract Documents.		
Cash Allowances		
Cash Allowances shall be included in the Base Bid in accordance with Part 4 of the General Conditions of the Contract. Cash Allowances are identified in Divisior 01.		

Unit Prices

We submit the following Unit Prices for additions or deletions to the work. All prices include overhead, profit and all relative charges of the Contractor and represent the actual cost to the Owner. The adjustments to the Contract Sum shall be based on the net quantity difference from the original quantity.

Description	Add	Deduct
Earth excavation	\$ /cu.m	\$ /cu.m
Granular A	\$ /tonne	\$ /tonne
Granular B	\$ /tonne	\$ /tonne
Light Duty Asphalt (50mm)	\$ /m2	\$ /m2
Heavy Duty Asphalt (2x40mm)	\$ /m2	\$ /m2
Concrete sidewalk	\$ /m2	\$ /m2
Concrete curb & gutter 600.040	\$ /I.m	\$ /l.m
Concrete curb 600.110	\$ /l.m	\$ /l.m
Topsoil & sod	\$ /m2	\$ /m2
Asphalt removal full depth	\$ /m2	\$ /m2
Concrete in Place	\$ /m3	\$ /m3
Painting	\$ /m2	\$ /m2

List of Sub-Contractors The following are the Sub-Contractors we propose to use for the divisions or sections of the Work as outlined. The prices and applicable taxes for the sections of Work are included in the Base Bid amount.

Division / Section	Name of Sub-Contractor	Amount
Site Grading		\$
Demolition		
Concrete		
Masonry		
Structural Steel		
Framing		
Architectural Woodwork		
Roofing		
Insulated Metal Panels		
Sectional Metal Overhead Doors		
Steel Doors and Frames		
Aluminum Doors & Frames		
Windows		
Gypsum/Acoustic Ceilings		
Flooring		
Painting		
Plumbing/ Ventilation		
Electrical		

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APPENDIX ADP - Additional Prices

The following prices are offered as additions to the base bid. Additional Prices do not include Harmonized Sales Tax (HST). Additional Prices include all overhead and profit for the work. As per the Instruction to the Bidders, the Owner at their discretion, may select the alternate price upon evaluation of the bid submission.

ADDITIONAL PRICE NO. 1

Salt Storage Building

Provide an additional price for all work to construct concrete salt storage building as per structural drawing S7. Scope of work is to construct concrete foundation and walls to accommodate Owner supplied and Owner installed fabric shelters.

ADD(\$)

ADDITIONAL PRICE NO. 2

Asphalt Paving

Provide an additional price for all work to provide new asphalt and base. Refer to Civil Documents for extent of work. Sub grading is part of base bid.

ADD_

ADDITIONAL PRICE NO. 3

New Fencing

Existing fencing and gates around the property are to remain. Provide an additional price for all work to remove and replace existing fencing around property with new 5' high chain link fencing, posts, include new man gate, and power gate/operators per specifications Section 32 31 11 and drawing A1.03.

ADD_

APPENDIX AP - Alternative Prices

The following prices are offered as additions or deletions to the Base Bid for the use of alternative methods and/or materials to those specified in the tender documents. Alternate Prices do not include Harmonized Sales Tax (HST). Alternate Prices include all overhead and profit for the Work. As per the Instructions to Bidders, the Owner at their discretion, may select the alternative price upon evaluation of the bid submission.

Clearly circle "Add" or "Deduct" to define work that is added to the base bid or subtracted from the base bid.

ALTERNATE PRICE NO. 1

Board insulation and 10mil vapour retarder to be installed below the concrete slab on grade has been specified as part of base bid. Provide an alternate price to provide 50mm spray foam insulation in lieu of vapour retarder and board insulation. Note that all vertical insulation installed on the foundation shall be board insulation per base bid. See Slab on Grade Assembly SOG1

ADD or DEDUCT

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Signed, and submitted for and on behalf of:

Company Name

Address

Name and Title

Witness Name and Title

Signature

Witness Signature

Date

1 CONTRACT FORM

- .1 This section of the final Contract Documents shall contain a copy of CCDC Document 2, Stipulated Price Contract, 2020.
- .2 A copy of the noted CCDC document is available from the Consultant upon request from the Bidder.
- .3 By submitting a tender, the Bidder acknowledges that the Bidder and all related Sub-Contractors are fully aware of the proposed CCDC document.
- .4 The balance of the Contract Form will be completed upon acceptance of a Bid.

The Standard Construction Document for a Stipulated Price Contract, English version, consisting of the Agreement between the Owner and the Contractor, Definitions and General Conditions of the Stipulated Price Contract, Parts 1 to 12 inclusive, governing the same is made part of these Contract Documents, with the following amendments, additions, and modifications:

ARTICLE A-5 – PAYMENT

- .1 Amend paragraph 5.1.3, in the first line, by deleting the words "...the issuance of the..." and replacing them with "...receipt of the Consultant's...".
- .2 In paragraph 5.1.1 of Article A-5 add the following words to the end:

"or, where there is no Payment Certifier, jointly by the Owner and Contractor"

ARTICLE A-6 – RECEIPT AND ADDRESSES FOR NOTICES IN WRITING

- .1 Delete paragraph 6.5 of Article A-6 in its entirety and replace it with the following:
 - "6.5 Contact information for a party may be changed by Notice in Writing to the other party setting out the new contact information in accordance with this Article."

DEFINITIONS

Owner Amend Definition by adding the following to the end of that Definition:

"For purposes of the Contract, the terms "*Owner*", and "Town of Marathon" shall be considered synonymous. For the Project, the Owner's representative is "Marc Paris" or other to be Named."

Add Definition, Provide, as follows:

"'Provide' means to supply and install. Provide has this meaning whether or not the first letter is capitalized."

- Add a new Definition, Act, as follows:
 - " 'Act' means the Construction Act (Ontario)."

Add a new Definition, By Others, as follows:

"The words '*By Others*' when used in the Specifications or on the Drawings means a person performing part of the Work, other than the Contractor. For greater certainty, the only means by which work or services shown or specified shall be indicated as not being in the Contract is by use of the initials 'N/C' or the words 'Not In Contract' or the words '*by Owner*'."

Add a new Definition, Construction Schedule, as follows:

"Construction Schedule' means the schedule for the performance of the *Work* provided by the *Contractor* pursuant to GC3.5, including any amendments to the *Construction Schedule* made pursuant to the *Contract Documents*."

Add a new Definition, Environmental Programs, as follows:

"*Environmental Programs*" means the environmental plans, programs, procedures and requirements of the *Owner* found in the manual prepared and maintained by the *Owner* and referred to in the Instructions to Bidders. The *Environmental Programs* include *Owner's* Asbestos Control Program, its mould program and a program for controlling and handling designated substances."

Add a new Definition, Exposed, as follows:

"Exposed means visible by the Owner at the completion of the Work, unless otherwise indicated in the

Contract Documents. Exposed items include all items on roof areas, mechanical and service rooms, inside of cupboards, cabinets and similar items."

Add a new Definition, Force Majeure, as follows:

"'Force Majeure' means any cause, beyond the Contractor's control, other than bankruptcy or insolvency, which prevents the performance by the Contractor of any of its obligations under the Contract and the event of Force Majeure was not caused by the Contractor's default or active commission or omission and could not be avoided or mitigated by the exercise of reasonable effort or foresight by the Contractor. Force Majeure includes Labour Disputes, fire, unusual delay by common carriers or unavoidable casualties, civil disturbance, acts, orders, legislation, regulations or directives of any government or other public authority, acts of a public enemy, war, riot, sabotage, blockage embargo, shortage of materials and supplies, lightning, earthquake, abnormally adverse weather conditions or acts of God."

Add a new Definition, Install, as follows:

"Install means install and connect. Install has this meaning whether or not the first letter is capitalized."

Add a new Definition, Labour Dispute, as follows:

"'Labour Dispute' means any lawful or unlawful labour problems, work stoppage, labour disruption, strike (including lockouts decreed or recommended for its members by a recognized contractor's association of which the *Contractor* is a member or to which the *Contractor* is otherwise bound), job action, slow down, picketing, refusal to work or continue to work, refusal to supply materials, cessation or work or other labour controversy which does, or might, affect the *Work*."

Add a new Definition, OHSA, as follows:

"OHSA' means the Occupational Health and Safety Act (Ontario)"

Add a new Definition, Request for Information, as follows:

"'Request for Information' or 'RFI' means written documentation sent by the Contractor to the Owner or to the Owner's representative or to the Consultant requesting written clarification(s) and/or interpretation(s) of the Drawings and/or Specifications, Contract requirements and/or other pertinent information required to complete the Work of the Contract without applying for a change or changes to the Work."

Add a new Definition, Submittals, as follows:

"'Submittals' means 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,
- Record drawings and manuals to provide instructions to the operation and maintenance of the Work"

Add a new Definition, reviewed, instructed, required, directed, permitted, inspected, ordered, as follows:

"Wherever the words 'reviewed', 'instructed', 'required', 'directed', 'permitted', 'inspected', 'ordered' or similar words are used they shall mean, unless the context provides otherwise, 'reviewed by the *Consultant*, 'instructed by the *Consultant*, 'required by the *Consultant*, 'directed by the *Consultant*, 'permitted by the *Consultant*, 'permitted by the *Consultant*, 'and 'ordered by the *Consultant*."

Add a new Definition, satisfactory, as follows:

"Wherever the word 'satisfactory' or similar words or phrases are used in the Contract Documents, it means, unless the context provides otherwise, 'satisfactory to the Owner and the Consultant'."

Add new Definition, As-Constructed Documents, as follows:

"As-constructed Documents refer to reproductions of the original drawings and specifications which have been marked up to accurately show all changes from the original documents and which are to be provided in clearly marked and legible hard copies. As-Constructed Documents may also be known as As-Built Drawings"

Add new Definition, Constructor, as follows:

"The *Constructor* is as defined in the *Occupational Health and Safety Act*, R.S.O.1990 (latest amendment), referring to the person undertaking the project for the *Owner*, and for the purposes of this project, shall be the *Contractor*."

Add new Definition, Proper Invoice, as follows:

"For purposes of the Contract, the terms "Proper Invoice", "Progress Application", and "Contractor Application for Payment" shall be considered synonymous. Proper Invoice means a "proper invoice" as defined in the Payment Legislation, if any, and as may be modified by written agreement between the parties to the extent permitted by such Payment Legislation.

Add new Definition. Adjudicable Dispute, as follows:

"For purposes of the *Contract*, the term "Adjudicable Dispute", means any dispute or difference between the parties arising out of or in connection with the Contract."

Add new Definition. Payment Period, as follows:

"For purposes of the *Contract*, the term "Payment Period", means monthly period, ending on the last day of the month in connection with the Contract."

1 GENERAL

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

PART 1 GENERAL PROVISIONS

GC1.1 CONTRACT DOCUMENTS

.1 Amend paragraph 1.1.1 by adding the following between the first and second sentences:

"In many cases, the language of the *Contract Documents* is written in the imperative for the sake of brevity. Clauses containing instructions or directions are intended for the *Contractor* and such sentences are deemed to include the words, ..."the *Contractor* shall"."

- .2 Delete paragraphs 1.1.3 and 1.1.4 in their entirety and replace them with the following:
 - "1.1.3 The Contractor shall review the Contract Documents for the purpose of facilitating and coordination and execution of the Work by the Contractor. The Contractor shall report promptly to the Consultant any ambiguities, design issues or other matters requiring clarification made known to the Contractor or that the Contractor may discover from such a review. Such review by the Contractor shall comply with the standard of care described in paragraph 3.9.1 of the Contract.
 - 1.1.4 Except for its obligation to review the Contract Documents and report the result pursuant to

paragraph 1.1.3, the Contractor is not responsible for ambiguities, design issues or other matters requiring clarification in the Contract Documents and does not assume any responsibility to the Owner or to the Consultant for the accuracy of the Contract Documents. Without limiting the foregoing, the Contractor shall not be liable for any damages or costs resulting from any ambiguities, design issues or other matters requiring clarification in the Contract Documents which the Contractor could not reasonably have discovered from such a review in accordance with the standard of care. If the Contractor does discover any ambiguities, design issues or other matters requiring clarification in the Contractor has received modified or additional information from the Consultant. The impacts of any ambiguities, design issues or other Contract Price and Contract Time, shall be addressed by the parties in accordance with Part 6 – CHANGES."

- .3 Amend paragraph 1.1.5 by adding subparagraphs 1.1.5.6, 1.1.5.7, and 1.1.5.8 as follows:
 - ".6 Finishes in the room finish schedules shall govern over those shown on the *Drawings*.
 - .7 Schedules of Division 01 General Requirements of the *Specifications* shall form part of and be read in conjunction with the technical specification section as listed in the table of contents of the *Specifications*.
 - .8 Architectural drawings shall have precedence over structural, plumbing, mechanical, electrical and landscape drawings insofar as outlining, determining and interpreting conflicts over the required design intent of all architectural layouts and architectural elements of construction, it being understood that the integrity and installation of the systems designed by the *Consultant* or its sub-*Consultant*s are to remain with each of the applicable drawing disciplines.

Fixturing drawing provided by the *Owner* shall have precedence over architectural drawings insofar as outlining, determining and interpreting conflicts over the required design intent of all architectural layouts."

.4 Amend paragraph 1.1.6 by adding the following to the end of that paragraph:

"The Specifications are divided into divisions and sections for convenience but shall be read as a whole and neither such division nor anything else contained in the Contract Documents will be construed to place responsibility on the Consultant to settle disputes among the Subcontractors and Suppliers in respect to such divisions. The Drawings are, in part, diagrammatic and are intended to convey the scope of the Work and indicate general and appropriate locations, arrangement and sizes of fixtures, equipment and outlets. The Contractor shall obtain more accurate information about the locations, arrangement and sizes from study and coordination of the Drawings, including Shop Drawings and shall become familiar with conditions and spaces affecting these matters before proceeding with the Work. Where site conditions require reasonable minor changes in indicated locations and arrangements, the Contractor shall make such changes at no additional cost to the Owner. Similarly, where known conditions or existing conditions interfere with new installation and require relocation, the Contractor shall include such relocation in the Work. The Contractor shall arrange and install fixtures and equipment in such a way as to conserve as much headroom and space as possible. The schedules are that portion of the Contract Documents wherever located and whenever issued, compiling information of similar content and may consist of drawings, tables and/or lists." "The Contract Documents are organized by Division for clarity and to identify the expected standard of trade competence in the finished work. No claims will be considered relating to the division of work between the Contractor and/or Subcontractors, including tie in of the work of different trades, spatial interferences, cutting and patching and the like."

.5 Add to the end of subparagraph 1.1.6.2

"Except to the extent the Consultant is indemnified as a third party beneficiary as provided in subparagraphs 9.2.7.4, 9.5.3.4 and in 13.1.3.

.6 Add new paragraph 1.1.12 as follows:

"1.1.12 The Contractor will be issued electronic copies of "Issued for Tender, Permit, and

Construction ". The documents will be issued in PDF format. The production of hardcopies of the document will be at the expense of the Contractor as necessary to facilitate the construction of the building."

- .7 Add a new paragraph 1.1.13 as follows:
 - "1.1.13 One set of signed and sealed *Contract Documents* shall be retained by each of the *Owner* and the *Contractor*."

PART 2 ADMINISTRATION OF THE CONTRACT

GC2.2 ROLE OF THE CONSULTANT

.1 In paragraph 2.2.3 add the following to the end:

"Without limiting the foregoing, the Consultant may appoint one or more authorized representatives in writing who may fulfill the obligations of the Consultant under this Contract."

.2 Under 2.2.5 add new sentence at the end of the paragraph as follows:

"The Consultant will not have control over, charge of or be responsible for the acts or omissions of the Contractor, Subcontractors, Suppliers, or their agents, employees, or any other persons performing portions of the Work."

- .3 Amend paragraph 2.2.6 by deleting the words: "...except with respect toGC5.1 —FINANCING INFORMATION REQUIRED OF THE OWNER".
- .4 In paragraph 2.2.8 add the words ", written statements" after the word "interpretations" in both the first and second sentences; and
 - i. add the following to the end of paragraph 2.2.8:

The *Owner* and the *Contractor* shall waive any claims against the *Consultant* arising out of its making of any interpretations, written statements or findings in accordance with paragraphs 2.2.6, 2.2.7, 2.2.8, and 7.1.2, but only to the extent that any such interpretations, written statements, and findings are made by the *Consultant* in an unbiased manner, and in accordance with the *Consultant*'s professional standard of care at law

.5 Amend paragraph 2.2.12 by adding the following to the end of that paragraph:

"If, in the opinion of the *Contractor*, the Supplemental Instruction involves an adjustment in the *Contract Price* or in the Contract Time, it shall, within ten (10) *Work*ing days of issuance of a Supplemental Instruction provide the *Consultant* with a written notice to that effect. In the event that the *Contractor* needs additional information to determine whether a Supplemental Instruction involves an adjustment of the *Contract Price* or in the Contract Time, it may issue a written request to the *Consultant* seeking such additional information. Following issuance of such information, the *Contractor* shall, within ten (10) *Work*ing days of receipt of such additional information provide the *Consultant* with the written notice described in the first sentence of this paragraph 2.2.13. Failure to provide written notification within the time stipulated in this paragraph 2.2.13 shall be deemed an acceptance of the Supplemental Instruction by the *Contractor* without adjustment in the *Contract Price* or Contract Time

- .6 Add the words "which are provided" before the words "in accordance" in paragraph 2.2.13.
- .7 Under 2.2.14, <u>add</u> new sentence as follows:

"If it is the *Contractor's* opinion that a *Supplemental Instruction*, *Change Order* or *Change Directive*, as issued by the *Consultant*, will affect the *Contract Time*, it shall within Seven (7) days after

issuance of such *Supplemental Instruction* or *Change Order/Change Directive*, notify the *Consultant* in writing, of the nature and extent of the affect on the construction schedule.

GC2.3 REVIEW AND INSPECTION OF THE WORK

- .1 Add to end of paragraph 2.3.2:
 - .1 "Should a designated test or inspection fail, the Contractor shall promptly correct and retest the work using the designated testing/inspection agency and be responsible for all costs associated with retesting. Unless agreed otherwise, the *Contractor* shall give the *Consultant* and the *Owner* at least three (3) *Work*ing days' notice of the date and time fixed for all required tests, and shall supply all labour, material, fuel, etc., and shall carry out such tests (unless otherwise specified)".
 - .2 To paragraph 2.3.3, add new sentence: "Such certificates and reports are to be reviewed by the *Consultant* and one copy is to be forwarded to the *Owner*".

GC2.4 DEFECTIVE WORK

- .1 In paragraph 2.4.1:
 - i. Add after the words "shall promptly correct" the phrase "in a manner acceptable to the *Owner* and the *Consultant*"; and
 - ii. Add after the words "*Contract Documents*" the phrase "or work that the *Contractor* discovers to be defective, whether or not the defective work had been identified by the *Consultant*, and".
- .2 Add new subparagraphs 2.4.1.1, 2.4.1.2 and 2.4.1.3 as follows:
 - "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.
 - 2.4.1.3 The correction of any defective Work that is to take place after the Owner has taken occupancy must be completed after operational hours or on weekends, unless otherwise agreed to between the Owner and Contractor."
- .3 Add new paragraph 2.4.4 as follows:
 - "2.4.4 Where elements of the *Work* have been identified as defective by the *Owner* or *Consultant*, and the *Contractor* fails to make corrections to the *Work* in accordance with this GC 2.4, then without prejudice to any other right or remedy the *Owner* may have, the cost of correcting the *Work* shall be determined by the *Consultant* and the amount may be deducted from any amount otherwise due to the *Contractor*."
- .4 Add paragraph 2.4.5 as follows:
 - "2.4.5 The *Contractor* shall prepare a monthly status report on the deficiency corrections identified by the *Consultant*. Where deficiencies remain on the status report for a period of more than two (2) progress payment applications then without prejudice to the *Owner's* right and remedy under paragraph 2.4.4, the *Owner* may withhold an amount, as determined by the *Consultant*, from the *Contractor*, until such deficiency(ies) is/are corrected to the satisfaction of the *Owner* and *Consultant*."
- .5 Add new paragraph 2.4.6 as follows:
 - "2.4.6 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."

PART 3 EXECUTION OF THE WORK

GC3.4 CONTROL OF THE WORK

- .1 Add a new paragraph 3.1.3 as follows:
 - "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 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*.
- .2 Add new paragraph 3.1.4 as follows:
 - "3.1.4 Once the building is occupied, the *Contractor* may be required by the *Owner*, from time to time, to suspend or alter noisy or otherwise objectionable operations should such operations cause undue interference with the *Owner*'s business or activities."

GC3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

- .1 Revise subparagraph 3.2.2.1 to read "The *Owner* shall provide the co-ordination of the activities of the *Owner*'s forces."
- .2 Delete subparagraph 3.2.3.2 and replace it with the following:
 - "3.2.3.2 Co-ordinate and schedule the activities and work of other contractors and *Owner's* own forces with the Work of the *Contractor* and connect as specified or shown in the *Contract Documents*;"
- .3 Add a new subparagraph 3.2.3.4 as follows:
 - "3.2.3.4 Subject to GC9.4 CONSTRUCTION SAFETY, for the Owner's own forces and for other contractors, assume overall responsibility for compliance with all aspects of the applicable Health and Safety legislation of the *Place of the Work*, including all the responsibilities of the "constructor" under OHSA."
- .1 Add new paragraph 3.2.7 as follows:
 - "3.2.7 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 3.4, that 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."

GC3.4 CONSTRUCTION SCHEDULE

- .1 Delete subparagraph 3.4.1.2 and replace it with the following:
 - "3.4.1.2 Provide the expertise and resources, such resources including manpower and equipment, as are necessary to maintain progress under the construction schedule referred to in paragraph 3.4.1.1 or any successor or revised schedule approved by the *Owner* pursuant to this GC3.4."
- .2 Delete existing subparagraph 3.4.1.3 and replace it with the following:

- "3.4.1.3 Continuously monitor the progress of the *Work* and provide a monthly progress schedule covering all of the baseline activities and including the actual start, actual finish and percentage completion of those activities. Each month, the *Contractor* shall submit, for the Owner's approval, any changes made to the baseline logic and activity durations. The revisions to the schedule shall be graphically shown in reference to the original baseline activities."
- .3 Add a new subparagraph 3.4.1.4 as follows:
 - "3.4.1.4 if after applying the expertise and resources required under subparagraph 3.5.1.2, the *Contractor* forms the opinion that the slippage in schedule reported in subparagraph 3.5.1.3 cannot be recovered by the *Contractor*, it shall, in the same notice provided under subparagraph 3.5.1.3, indicate to the *Consultant* if the *Contractor* intends to apply for an extension of Contract Time as provided in PART 6 —CHANGES IN THE *WORK*."
- .4 Add a new subparagraph 3.4.1.5 as follows:
 - "3.4.1.5 Without limiting the other obligations of the *Contractor* under GC3.5, the *Contractor* shall not amend the baseline schedule described in subparagraph 3.5.1.1 without the prior written consent of the Owner. In addition, at each site construction meeting, the *Contractor* shall provide to the *Owner* and the *Consultant* a two (2) week look-ahead schedule indicating the major activities to be undertaken or constructed in such two (2) week period."

GC3.5 SUPERVISION

.1 Revise 3.5.1 as follows:

"After "valid reason", add "and in consultation with the Consultant and the Owner".

- .2 Delete paragraph 3.5.2 in its entirety and replace it with the following:
 - "3.5.2 The supervisor, and any project manager appointed by the *Contractor*, shall represent the *Contractor* at the Place of *Work* and shall have full authority to act on written instructions given by the *Consultant* and/or the *Owner* and the Owner's representative. Instructions given to the supervisor or the project manager shall be deemed to have been given to the *Contractor* and both the supervisor and any project manager shall have full authority to act on behalf of the *Contractor* and bind the *Contractor* in matters related to this Contract."
- .3 Add new paragraphs 3.5.3, 3.5.4, 3.5.5, 3.5.6 and 3.5.7 as follows:
 - "3.5.3 The Owner, acting reasonably, shall have the right to order the *Contractor* to remove from the *Project* any representative or employee of the *Contractor*, *Subcontractors* or *Suppliers* who, in the opinion of the Owner, are a detriment to the *Project*.
 - 3.5.4 The supervisory staff assigned to the *Project* shall also be fully competent to implement efficiently all requirements for scheduling, coordination, field engineering, reviews, inspections and submittals defined in the specifications, and have a sufficient number of years of documented Superintendent/*Project* Management experience.
 - 3.5.5 The *Consultant* shall reserve the right to review the record of experience and credentials of supervisory staff assigned to the *Project* prior to commencement of *Work*.
 - 3.5.6 The *Contractor's* Supervisor shall remain on the job until the *Contract* is complete.
 - 3.5.7 The *Project* Management staff assigned to the Project shall also be fully competent to implement efficiently all requirements for scheduling, coordination, field engineering,

reviews, inspections and submittals defined in the specifications, and have a sufficient number of years documented Supervisor/*Project* Management experience."

GC3.6 SUBCONTRACTORS AND SUPPLIERS

.1 Add new sentence to paragraph 3.6.2 as follows:

"The *Contractor* shall not change accepted *Subcontractors* without prior written permission of the *Owner*."

- .2 Add a new paragraph 3.6.7 as follows:
 - "3.6.7 Where provided in the Contract, the *Owner* may assign to the *Contractor*, and the *Contractor* agrees to accept, any contract procured by the *Owner* for *Work* or services required on the *Project* that has been pre-tendered or pre-negotiated by the Owner."

GC3.7 LABOUR AND PRODUCTS

- .1 Amend paragraph 3.7.1 by adding the words, "..., agents, Subcontractors and Suppliers. . . " after the "employees" toward the end of line one.
- .2 Also with respect to paragraph 3.7.1, add three new subparagraph which read as follows:
 - "3.7.1.1 The Contractor represents that it has sufficient skilled employees to replace, subject to the Owner's approval, acting reasonably, its designated supervisor and project manager in the event of death, incapacity, removal or resignation.
 - 3.7.1.2 Without in any way limiting the generality of the foregoing, the *Contractor* shall prepare and implement the job site rules more particularly described in the tender documents. Any such job site rules prepared by the *Contractor* shall be consistent with the *Contractors* duties and obligations under the OHSA and shall also include provisions making smoking and the consumption of alcohol or non-prescription drugs on the *Project* site the subject of discipline proceedings and/or termination of employment."
- .3 Delete paragraph 3.7.3 and replace it with the following:

"Products shall conform to all current applicable specifications of the Canadian Standards Association, Canadian Standards Board or General Standards Board, ASTM, National Building Code, Ontario Building Code, National Fire Prevention Association, the Technical Standards and Safety Authority (also known as TSSA) and all governmental authorities having jurisdiction at the *Place of the Work*, unless otherwise specified. *Products* brought on to the *Place of the Work* by the *Contractor* shall be deemed to be the property of the Owner, but the *Owner* shall be under no liability for loss thereof or damage thereto arising from any cause whatsoever. The said Product shall be at the sole risk of the *Contractor*."

- .4 Add new paragraph 3.7.4, 3.7.5, 3.7.6, 3.7.7, 3.7.8, 3.7.9, 3.7.10, 3.7.11, 3.7.12, 3.7.13, 3.7.14, 3.7.15 and 3.7.16 as follows:
 - "3.7.4 The *Contractor* represents and warrants that the *Products* provided for in accordance with the Contract are not subject to any conditional sales contract and are not subject to any security rights obtained by any third party which may subject any of the *Products* to seizure and/or removal from the *Place of the Work*."
 - 3.7.5 Upon receipt of a written notice from the *Consultant*, the *Contractor* shall dismiss from the *Place of the Work* tradesmen and labourers whose *Work* is unsatisfactory to the *Consultant* or who are considered by the *Consultant* to be unskilled or otherwise objectionable.

- 3.7.6 The *Contractor* shall not employ any persons on the *Work* whose labour affiliation, or lack thereof, is incompatible with other labour employed in connection with the *Work*. Any costs arising from Labour Disputes, as a result of the employ of any such person by the *Contractor*, it's Subcontractor or *Suppliers* shall be the sole expense of the *Contractor*.
- 3.7.7 The *Contractor* shall cooperate with the *Owner* and its representatives and shall take all reasonable and necessary actions to maintain stable and harmonious labour relations with respect to the *Work* at the *Place of the Work*, including cooperation to attempt to avoid *Work* stoppages, trade union jurisdictional disputes and other Labour Disputes."
- 3.7.8 Where materials or *Work*manship are specified to comply to a standard such as a Building Code, Canadian Standards Association (CSA), Canadian General Standards Board (CGSB), or American Society for Testing and Materials (ASTM), it shall mean the latest revised edition of the standard.
- 3.7.9 *Products* which are specified by their proprietary names or by part or catalogue number shall form the basis for the specifications and tenders. No substitutes for these may be used without the *Consultant*'s approval in writing. When requesting approval for the use of substitutes, the *Contractor* shall:
 - .1 submit documentation proving, to the *Consultant's* satisfaction, that the substitute is equal to the specified product, and is compatible in every respect with the configuration and design of the *Project*, not requiring any change thereto to accommodate the substitution;
 - .2 provide, with each application, a list of properties of the specified product and the proposed substitute. No application to use substitutes will be considered unless made in this way;
 - .3 include in the submission any effect that the substitute may have on the *Contract Price*, and be prepared to reimburse the *Owner* for all costs that may become evident later as a result of the substitution; and
 - .4 submit requests well in advance of deadlines for ordering specified products. Substitutes will be considered only when submitted in sufficient time to permit proper investigation by the *Consultant*.
- 3.7.10 The *Contractor* shall use all *Product*s in strict accordance with the manufacturers' directions except where specified otherwise. Whenever specific reference to manufacturers' directions or instructions is made in specifications, submit copies of said instructions or directions or both for approval before commencing to use such *Products*. Whenever more than one *Product* is specified for one use, the *Contractor* may select for this use any of the *Product*s so specified.
- 3.7.11 Materials, appliances, equipment and other *Products* are sometimes specified by reference to brand names, proprietary names, trademarks or symbols. In such cases, the name of a manufacturer, distributor, Supplier or dealer is sometimes given to assist the *Contractor* to find a source Supplier. This shall not relieve the *Contractor* from his responsibility from finding his own source of supply even if the source named no longer supplies the *Product* specified. If the *Contractor* is unable to obtain the specified *Product*, he shall supply a substitute *Product* equal to or better than the specified *Product*, as approved by the *Consultant*, with no extra compensation. Should the *Contractor* be unable to obtain a substitute *Product* equal to or superior to the specified *Product* and the *Owner* accepts an inferior *Product*, the *Contract Price* shall be adjusted accordingly, as approved by the *Consultant*.
- 3.7.12 All workmanship shall be of the highest quality performed by persons trained and skilled in accordance with best practices for each particular element of the *Work* and trade. *Provide* special workmanship and performance standards as specified."

- 3.7.13 The Foreperson of each trade engaged on the *Work* must be able to speak and understand the English language well enough to comprehend and carry out all instructions issued and to *Work* in complete co-ordination with other trades."
- 3.7.14 All deficiencies identified by *Owner* and/or *Consultants* shall be corrected promptly, and in any event within fifteen (15) days of being notified of such deficiency."
- 3.7.15 The Owner shall provide the Contractor in a timely manner with all relevant information (including storage, protection, and installation requirements) regarding Products to be supplied by the Owner or other contractors and, prior to delivery of any such Products to the Place of the Work, the Owner shall obtain the Contractor's written approval of the delivery date and proposed storage, protection and installation requirements.
- 3.7.16 Once the Contractor has accepted delivery of Products, the Contractor shall be responsible for the safe storage and protection of Products as required to avoid dangerous conditions or contamination to the Products or other persons or property. Products shall be stored in locations and at the Place of the Work to the satisfaction of the Owner and the Consultant as agreed and approved by the Contractor pursuant to paragraph 3.7.15.

Notwithstanding the foregoing, the Contractor shall not be responsible for any Products supplied by the Owner or other contractors unless:

- the Contract Documents expressly stipulate that such Product is to be the Contractor's responsibility and to be installed by the Contractor as part of the Work;
- the Contractor has or has received from the Owner proof of insurance coverage sufficient, at a minimum, to cover the replacement cost of such Product; and
- (iii) the Owner obtained the Contractor's approval as required by paragraph 3.7.15

GC3.8 SHOP DRAWINGS

- .1 Revise the title of GC 3.8 to read "SHOP DRAWINGS AND OTHER SUBMITTALS".
- .2 Add "and *Submittals*" after the words "*Shop Drawings*" in paragraphs 3.8.1, 3.8.2, 3.8.3, 3.8.3.2, 3.8.5, 3.8.6, and 3.8.7.
- .3 Delete paragraph 3.8.2 in its entirety and replace it with new paragraph 3.8.2 as follows:
 - "3.8.2 Prior to the first application for payment, the Contractor and the Consultant shall jointly prepare a schedule of the dates for submission and return of Shop Drawings and Submittals in an orderly sequence."
- .4 Delete the words "with reasonable promptness so as to cause no delay in the performance of the Work" and replace them with the words "within 10 Working Days or such longer period as may be reasonably required" in paragraph 3.8.7.
- .5 Add new paragraph 3.8.8, 3.8.9, 3.8.10, 3.8.11, 3.8.12, 3.8.13, 3.8.14, 3.8.15, 3.8.16, 3.8.17, 3.8.18, 3.8.19, and 3.8.20 as follows:
 - "3.8.8 Prior to the first application for payment, the *Contractor* shall prepare a schedule of the dates for submission, review, and return of *Shop Drawings* and any *Submittals* as required to meet construction schedule. Schedule shall be acceptable to the *Consultant* and in accordance with paragraph 3.8.12, as amended below.
 - 3.8.9 The *Consultant* will review and return Shop Drawings and Submittals in accordance with a Shop Drawing/Submittal Schedule prepared by the *Contractor* and agreed upon at the commencement of the *Work*. The *Contractor* shall allow the *Consultant* a

minimum 10 *Work*ing days, or such longer period as may be reasonably required, to review shop drawings from the date of receipt to the date that the *Contractor* is notified that the reviewed documents are ready to be picked up. The *Contractor* shall periodically re-submit the Shop Drawing/Submittal Schedule to correspond to changes in the construction schedule and to reflect any required resubmissions. If re-submission of Shop Drawings or Submittals is required a further ten (10) day period is required for the Consultants review.

- 3.8.10 The *Contractor* shall submit *Shop Drawings* in accordance with the Shop Drawing procedures specified by Consultant.
- 3.8.11 The Consultant's review of Shop Drawings and Submittals does not relieve the Contractor of the responsibility to review all information pertaining to:
 - .1 detail design;
 - .2 dimensions;
 - .3 fabrication processes;
 - .4 techniques of construction and installation; and
 - .5 coordination of the *Work* of Sub*contractor*."
- 3.8.12 Only Shop Drawings indicated as "Reviewed" or "Reviewed as noted" and bearing the Consultant's review date and initials, shall be used at the Place of the Work.
- 3.8.13 Reviewed Shop Drawings shall not authorize changes in cost to the Owner nor shall they authorize changes to the construction schedule.
- 3.8.14 The Contractor shall thoroughly review Shop Drawings. Where Shop Drawings are stamped but clearly not reviewed, the Consultant may reject the Shop Drawings and return them to the Contractor at the Contractor's expense.
- 3.8.15 Any fabrication Work done before receiving final reviewed Shop Drawings shall be at the Contractor's and his Subcontractor's and/or Supplier's risk.
- 3.8.16 Reviewed Shop Drawings shall not authorize a change in the Contract Price and/or the Contract Time.
- 3.8.17 The Contractor shall prepare a Shop Drawings schedule acceptable to the Owner and the Consultant prior to the first application for payment. A draft of the proposed Shop Drawings schedule shall be submitted by the Contractor to the Consultant and the Owner for approval. The draft Shop Drawings schedule shall clearly indicate the phasing of Shop Drawings submissions.
- 3.8.18 Except where the parties have agreed to a different Shop Drawings schedule pursuant to paragraph 3.10.3, the Contractor shall comply with the requirements for Shop Drawings submissions stated in the Specifications, Section 01300, Submittals.
- 3.8.19 The Contractor shall not use the term "by others" on Shop Drawings or other Submittals. The related trade, Subcontractor or Supplier shall be stated.
- 3.8.20 Certain Specifications sections require the Shop Drawings to bear the seal and signature of a professional engineer. Such professional engineer must be registered in the jurisdiction of the Place of the Work and shall have expertise in the area of practice reflected in the Shop Drawings."

GC3.9 PERFORMANCE BY CONTRACTOR

.1 Add new General Condition 3.9.
"3.9 PERFORMANCE BY CONTRACTOR

- 3.9.1 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.
- 3.9.2 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
 - .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.
 - .3 There are no pending, threatened or anticipated claims, liabilities or actions involving the *Contractor*, the outcome of which may have a material adverse effect on the financial ability of the *Contractor* to complete the *Work*. "

GC3.10 CONTRACTOR USE OF PERMANENT EQUIPMENT OR SYSTEMS

.1 Add a new General Condition 3.15 as follows:

"3.10 CONTRACTOR USE OF PERMANENT EQUIPMENT OR SYSTEMS

3.10.1 With the prior written approval of the Owner, the *Contractor* may make use of elements of the mechanical and electrical systems or equipment comprising a permanent part of the *Work* for the purpose of providing heat or power to the *Project* during the final stages of construction. In such event, and before the issuance of the certificate of Substantial Performance of the *Work*, the *Contractor* shall clean and make good, to the satisfaction of the *Consultant*, such systems and equipment as it had been permitted to use. The *Contractor* shall pay any and all costs associated with such use, cleaning and making good."

PART 4 ALLOWANCES

GC 4.1 CASH ALLOWANCE

.1 Add the following to 4.1.1:

"Unless notified otherwise, Cash allowances cover the net cost to the Contractor of services, Products, labour, materials, construction machinery and equipment, freight, unloading, handling, storage, installation, and other authorized expenses incurred in performing the Work stipulated under the cash allowances including duties and applicable taxes but not including HST."

.2 Add the following to 4.1.2:

"HST applicable to cash allowances is included in the total amount payable, set out in Article A-4.3."

.3 Add new sentence to end of paragraph 4.1.4 as follows:

"The maximum mark-up on authorized overrun on cash allowances shall be ten per cent (10%)."

- .4 Delete the current text of paragraph 4.1.7 and replace with the following:
 - "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 to be ordered and delivered to the site to avoid delaying the progress of the *Work*."

- .6 Add new paragraph 4.1.8 as follows:
 - "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."

PART 5 PAYMENT

GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

.1 Delete GC5.1 in its entirety and replace it with "Intentionally left blank."

GC5.2 APPLICATIONS FOR PROGRESS PAYMENT

- .1 Amend paragraph 5.2.3 by adding the following to the end of that paragraph: "No amount claimed shall include *Products* delivered to the *Place of the Work* unless the *Products* are free and clear of all security interest, liens, and other claims of third parties."
- .2 Amend paragraph 5.2.4 by adding the following to the end of that paragraph:

"Such statement of values shall subdivide the *Contractor's* allocation for "general conditions" to identify a separate line item labeled "allocation for baseline schedule required by GC3.4." The allocation to such line item shall be calculated as follows:

- .1 where the *Contract Price* is \$2,000,000 or less, the greater of \$5,000 or 5% of the total amount allocated by the *Contractor* to "general conditions;
- .2 where the *Contract Price* is greater than \$2,000,000, the sum of \$12,000.

In addition, the statement of values shall identify a separate line item labeled "allocation for warranty obligations described in GC12.3". The allocation to such line item shall be 0.30% of Stipulated Sum Price"

- .3 Delete the word "first" in paragraph 5.2.7 and replace it with the word "second."
- .4 Amend paragraph 5.2.8 by adding the following new sentence at the end of that paragraph:

"Any *Products* delivered to the *Place of the Work* but not yet incorporated into the *Work* shall remain at the risk of the *Contractor* notwithstanding the title has passed to the *Owner* pursuant to GC13.1 OWNERSHIP OF MATERIALS."

- .5 Add new paragraphs 5.2.9, 5.2.10, 5.2.11, 5.2.12 and 5.2.13 as follows:
 - "5.2.9 The *Contractor* shall submit, with each application for progress payment after the first, a Statutory Declaration, on an original form of CCDC Document 9A-2001, stating that all accounts for labour, subcontracts, *Products*, Construction Equipment and other indebtedness which may have been incurred by the *Contractor* and for which the *Owner* might in any way be held responsible have been paid in full up to the previous invoice, except for amounts properly retained as a holdback or as an identified amount in dispute.
 - 5.2.10 The *Contractor* shall submit *Work*place Safety & Insurance Board Clearance Certificate, and a Statutory Declaration (CCDC 9A-2001) with each application for progress payment.
 - 5.2.11 The Contractor shall prepare and maintain current as-built Drawings which shall consist of the Drawings and Specifications revised by the Contractor during the Work, showing

changes to the *Drawings* and *Specifications*, which current as-built *Drawings* shall be maintained by the *Contractor* and made available to the *Consultant* for review with each application for progress payment. The *Consultant* reserves the right to retain a reasonable amount for the value of the as-built *Drawings* not presented for review."

- 5.2.12 Prior to each application for payment, the *Contractor*, *Consultant* and subconsultants shall jointly check the progress of the *Work* at the site."
- 5.2.13 Seven (7) calendar days prior to issuance of each proper invoice, the contractor shall issue an updated schedule of values for review by the consultant."

GC5.3 PROGRESS PAYMENTS

- .1 Add new paragraphs 5.3.3, and 5.3.4, as follows:
 - "5.3.3 In the event a construction lien is registered against the *Place of the Work* in circumstances where the *Owner* is not in breach of its payment obligations under this *Contract*, then the *Contractor* shall, within seven (7) days of receiving notice of the construction lien, have the lien removed by way of discharge, settlement, or by posting security to vacate the registration of the lien. In the event that the *Contractor* fails to see to the removal of the construction lien, then without prejudice to any other right or remedy it may have, the *Owner* may see to the removal of the construction lien by payment into court or otherwise, and the costs of so doing shall be to the *Contractor*'s account.
 - 5.3.4 All progress payments are not conclusive as to the value or quality of services provided and are subject to further evaluation and readjustment on future and final progress payments. The submission of monthly draw amounts by the *Contractor* and *Subcontractors* must reflect accurate valuations for *Work* completed and installed. The *Contractor* shall review and evaluate all *Subcontractors Work* and be responsible for verifying the monthly draw amounts claimed.

GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 Delete all paragraphs of GC 5.4 in their entirety and replace them with the following paragraphs:
 - "5.4.1 When the Contractor considers that the Work is substantially performed, or if permitted by the lien legislation applicable to the Place of the Work a designated portion thereof which the Owner agrees to accept separately is substantially performed, the Contractor shall, within five (5) Working Days, deliver to the Consultant and to the Owner a comprehensive list of items to be completed or corrected, together with a written application for a review by the Consultant to establish Substantial Performance of the Work or substantial performance of the designated portion of the Work. Failure to include an item on the list does not alter the responsibility of the Contractor to complete the Contract.
 - 5.4.2 The Consultant will review the Work to certify or verify the validity of the application and shall promptly, and in any event, no later than 10 calendar days after receipt of the Contractor's application:
 - .1 advise the Contractor in writing that the Work or the designated portion of the Work is not substantially performed and give reasons why, or
 - .2 state the date of Substantial Performance of the Work or a designated portion of the Work in a certificate and issue a copy of that certificate to each of the Owner and the Contractor.
 - 5.4.3 Where the holdback amount required by the applicable lien legislation has not been placed in a separate lien holdback account, the Owner shall, no later than 10 calendar days prior to the expiry of the holdback period stipulated in the lien legislation applicable to the Place of the Work, place the holdback amount in a bank account in the joint names of the Owner and the Contractor.

- 5.4.4 Subject to the requirements of any Payment Legislation, all holdback amounts prescribed by the applicable lien legislation for the Place of the Work shall become due and payable to the Contractor no later than 10 Working Days following the expiration of the holdback period stipulated in the lien legislation applicable to the Place of the Work, as certified or verified by the Consultant when permitted by any Payment Legislation.
- 5.4.5 The Contractor shall submit an application for release of the lien holdback amount in accordance with the lien legislation applicable to the Place of the Work. Except to the extent required by any Payment Legislation, such application for release of the holdback shall not constitute an application for payment that is subject to Proper Invoice requirements.
- 5.4.6 Where legislation permits progressive release of the holdback for a portion of the Work and the Consultant has certified or verified that the part of the Work has been performed prior to Substantial Performance of the Work, the Owner hereby agrees to release, and shall release the holdback for such portion of the Work to the Contractor in accordance with such legislation.
- 5.4.7 Notwithstanding any progressive release of the holdback, the Contractor shall ensure that such parts of the Work are protected pending the issuance of a final certificate for payment or until the Owner takes early occupancy in accordance with GC12.2, whichever comes first, and shall be responsible for the correction of defects or work not performed regardless of whether or not such was apparent when the holdback was released.
- 5.4.8 Immediately following the issuance of a certificate of Substantial Performance of the Work, the Contractor shall publish the Certificate in the manner provided in the Act failing which publication, the Owner shall be at liberty to publish and back charge the Contractor for its reasonable costs for doing so."
- 5.4.9 The *Contractor* acknowledges that the *Submittals* described in this paragraph 5.4.4 are critical to the Owner's use, occupancy and maintenance of the *Project* and agrees to make such *Submittals* to the Owner, before or after applying for the payment described in paragraph 5.4.1, as follows:
 - .1 submit to the *Consultant*, with its application for payment, all written guarantees, warranties, certificates, testing and balancing reports, distribution system diagrams, *Shop Drawings*, maintenance and operating instructions, spare parts, maintenance manuals and materials and any other materials or documentation required by the *Contractor*, except for record drawings;
 - .2 with respect to as built drawings, the *Contractor* shall submit full and complete as-built drawings to the *Consultant* within forty-five (45) days of the issuance of the certificate of Substantial Performance of the *Work* and the *Owner* shall be at liberty to withhold from amounts otherwise payable to the *Contractor* the sum of \$15,000.00 as security for the obligation of the *Contractor* to deliver such as built drawings."

GC5.5 FINAL PAYMENT

.1 Add to the end of paragraph 5.5.1 the following sentence:

"The application for final payment shall meet the requirements of a Proper Invoice."

.2 Add the following to the end of paragraph 5.5.3:

"Subject to any Payment Legislation, when the Consultant finds the Contractor's application for final payment to be not valid, the Contractor shall revise and resubmit the application when the Contractor has addressed the reasons given by the Consultant.

.3 Amend paragraph 5.5.4, by delete the words "5" with "15". In the same paragraph added the following words to the end of the paragraph, "..and as per the Construction Act".

PART 6 CHANGES IN THE WORK

GC6.1 OWNER'S RIGHT TO MAKE CHANGES

.1 Amend paragraph 6.1.2 by adding the following to the end of that paragraph:

"This requirement is of the essence and it is the express intention of the parties that any claims by the *Contractor* for a change in the *Contract Price* and/or Contract Time shall be barred unless there has been strict compliance with PART VI CHANGES IN THE *WORK*. No course of conduct or dealing between the parties, no express or implied acceptance of alterations or additions to the *Work* and no claims that the *Owner* has been unjustly enriched by any alteration or addition to the *Work*, whether in fact there is any such unjust enrichment or not, shall be the basis of a claim for additional payment under this Contract or a claim for any extension of the Contract Time."

- .2 Add new paragraphs 6.1.3, 6.1.4, 6.1.5 and 6.1.6 as follows:
 - "6.1.3 The Contractor agrees that coordination costs facilitated through Cash Allowance Directives including but not limited to site surface conditions, work by Contractor own forces, site coordination, coordination of sub-contractors and suppliers are included in the Contract Price."
 - 6.1.4 *Change Orders* and *Change Directives* shall be numbered sequentially as issued and independent of the numbering sequence for Notices of Contemplated Change. A group of Notices of Contemplated Change may be appropriately combined for the issuance of *Change Orders* or *Change Directives*.
 - 6.1.5 No extension to *Contract Time* shall be granted for changes in the *Work* unless the *Contractor* provides prior written notice regarding the anticipated delay and can clearly demonstrate that such changes will materially alter the overall construction schedule submitted at the commencement of the *Work*.
 - 6.1.6 The *Contractor* shall keep informed all Insurance or Surety Company or Companies who have issued Performance Bonds, Liability Insurance and Property Insurance for this *Contract*, of all material changes to the *Contract*. If a change to the *Contract* requires an adjustment of the bonds or insurance, the *Contractor* shall, subject to approval by the *Consultant* and the *Owner* and in a timely manner, initiate and pay for such adjustments on behalf of the *Owner* and a *Change Order* will be issued by the *Consultant*, to reimburse the *Contractor*."

GC6.2 CHANGE ORDER

.1 Add new paragraph 6.2.3 as follows:

"6.2.3 The value of a change shall be determined in one or more of the following methods as directed by the Owner:

- .1 by unit prices established in the Contract or subsequently agreed upon. Unit Prices shall include overhead, profit, and other reasonable charges of the *Contractor* and shall be the total cost to the Owner. Adjustment to the *Contract Price* shall be based on a net quantity difference from the original quantity.
- .2 by the amount, net of all credits, of time, materials and *Products* expended:
 - (1) by a Subcontractor applying the labour charge out rates set out in the wage

schedule in the *Contract Documents* together with the actual costs, of materials and *Products* without mark-up utilized in the change, plus the Subcontractor's mark-up disclosed in the table below which applies to material and *Product* costs only;

(2) the *Contractor* shall be entitled to the *Contractor* mark-up in the table below on the value of Subcontractor *Work*

Change in the <i>Contract</i> <i>Price</i>	Subcontractor Mark-Up (%) (includes overhead and profit)	Contractor Mark-Up (%) On Subcontractor <i>Work</i> (includes overhead and profit)
\$0 to no more than \$10,000	10	10
\$10,001 to no more than \$20,000	10	5
\$20,001 or more	5	5

Interpretive Note: The mark-ups disclosed in the above table are flat not graduated.

- .3 where the *Contractor* self performs a change, it shall be entitled to the mark-ups described in the "Subcontractor Mark-Up (%)".
- .4 the mark-ups described in paragraph 6.2.3.2 include all necessary overhead and profit, head office, wages, of site superintendent and project manager, coordination, administrative personnel, site office, telecommunications, insurance, time required to estimate change, extension of schedule, supervision, travel, accommodations, subsistence, general account items, general clean-up, small tools, as-built drawings and job safety necessary to perform the change."
- .5 Labour rates will be negotiated and agreed between the owner and the contractor prior to the submission of the first charge in the work. Labour rates will be evaluated for fair value and will not include profit. Profit is to be applied as per table above. Labour rates include salary, benefits and overhead.
- .2 The signing of a *Change Order* by all parties shall be deemed to be formal acceptance by the *Owner* of the *Contractor's* quotation.

GC 6.3 CHANGE DIRECTIVE

.1 Further amend paragraph 6.3.6.3 by adding the following to the end of that paragraph:

"Such allowance for overhead and profit shall be as described in paragraphs 6.2.3.3 and 6.2.3.4."

- .2 Delete the contents of item 6.3.7 entirely and add new 6.3.7 as follows:
 - "6.3.7 The cost of performing the *Work* attributable to the *Change Directive* shall be valued as specified for valuation of *Change Orders*. Refer to GC6.2, CHANGE ORDERS
- .3 Revise item 6.3.11 to read as follows:
 - "6.3.11 Pending determination of the final amount of a *Change Directive*, the undisputed value of the *Work* performed as a result of the *Change Directive* may be issued as a *Change*

Order, which may then be included in the progress payments."

GC6.4 CONCEALED OR UNKNOWN CONDITIONS

- .1 Delete paragraph 6.4.1.1 and 6.4.1.2 and replace it with the following:
 - "6.4.1.1 The *Contractor* confirms that, prior to tendering the *Project*, it carefully investigated the *Place of the Work* and applied to that investigation the degree of care and skill described in paragraph 3.11.1, given the amount of time provided between the issue of tender documents and the actual closing of tenders.
 - 6.4.1.2 If the *Contractor* has not conducted such careful investigation, it is deemed to assume all risk of conditions or circumstances now existing or arising in the course of the *Work* which could make the *Work* more expensive or more difficult to perform than was contemplated at the time the Contract was executed. No claim by the *Contractor* will be entertained in connection with conditions which could reasonably have been ascertained by such investigation or other due diligence undertaken prior to the execution of the Contract."
- .2 Amend paragraph 6.4.2 by adding a new first sentence which reads as follows:
 - "6.4.2 Having regard to paragraph 6.4.1, if the *Contractor* believes that the conditions of the *Place of the Work* differ materially from those reasonably anticipated, differ materially from those indicated in the *Contract Documents* or were concealed from discovery notwithstanding the conduct of the investigation described in paragraph 6.4.1, it shall notify the *Owner* and *Consultant* in writing no later than five (5) *Work*ing Days after the first observation of such conditions."
- .3. Amend the existing second sentence of paragraph 6.4.2, in the second line, following the word "materially" by adding the words "or were concealed from discovery notwithstanding the conduct of the investigation described in paragraph 6.4.1."
- .4 Delete paragraph 6.4.3 and substitute the following:
 - "6.4.3 If the *Consultant* makes a finding pursuant to paragraph 6.4.2 that no change in the *Contract Price* or the Contract Time is justified, the *Consultant* shall report in writing the reasons for this finding to the *Owner* and the *Contractor*."
- .5 Add new paragraph 6.4.5:
 - 6.4.5 The Contractor confirms that, prior to bidding the Project, it carefully reviewed the Place of the Work and applied to that review the degree of care and skill described in paragraph 3.9.1, given the amount of time provided between the issue of the bid documents and the actual closing of bids, the degree of access provided to the Contractor prior to 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 review undertaken in accordance with this paragraph 6.4.5.

GC 6.5 DELAYS

- .1 Amend paragraph 6.5.1 as follows:
 - .1 In the third line after the words "in consultation with the *Contractor*", add "and as accepted in writing by the *Owner*."
 - .2 Delete the period at the end of paragraph 6.5.1, and add the following words at the end of the sentence: ", but excluding any consequential, indirect or special damages."
- .2 Amend paragraph 6.5.2 as follows:

- .1 by deleting all of the words in the fifth line following the word "for" and substituting the following: "....reasonable direct costs directly flowing from the delay but excluding any consequential, indirect or special damages."
- .2 In the fourth line after the words "in consultation with the *Contractor*", add "and as accepted in writing by the *Owner*."
- .3 Amend paragraph 6.5.3 as follows:

In the ninth line after the words "the *Contractor*", delete the period and add "and as accepted in writing by the *Owner*."

.4 Amend paragraph 6.5.4 as follows:

In the first line after the words "to the Consultant", add "and accepted in writing by Owner".

- .5 Add new paragraphs 6.5.6, 6.5.7 and 6.5.8 as follows:
 - "6.5.6 If the *Contractor* is delayed in the performance of the *Work* by an act or omission of the *Contractor* or anyone employed or engaged by the *Contractor* directly or indirectly, or by any cause within the *Contractor's* control, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may decide in consultation with the *Contractor*. The *Owner* shall be reimbursed by the *Contractor* for all reasonable costs incurred by the *Owner* as the result of such delay, including all services required by the *Owner* from the *Consultant* as a result of such delay by the *Contractor* and, in particular, the cost of the *Consultant's* services during the period between the date of *Substantial Performance of* the *Work* stated in Article A-1 herein as the same may be extended through the provisions of these General Conditions and any later, actual date of *Substantial Performance of* the *Work* achieved by the *Contractor*.
 - 6.5.7 The *Contractor* shall be responsible for the care, maintenance and protection of the *Work* in the event of any suspension of construction as a result of the delay described in paragraph 6.5.1, 6.5.2 or 6.5.3. In the event of such suspension, the *Contractor* shall be reimbursed by the *Owner* for the reasonable costs incurred by the *Contractor* for such protection, but excluding the costs of the *Contractor*'s head office personnel, for such care, maintenance and protection. The *Contractor*'s entitlement to costs pursuant to this paragraph 6.5.6, if any, shall be in addition to amounts, if any, to which the *Contractor* is entitled pursuant to paragraph 6.5.1, 6.5.2 or 6.5.3.
 - 6.5.8 Without limiting the obligations of the *Contractor* described in GC3.2 or GC9.4, the *Owner* may, by notice in writing, direct the *Contractor* to stop the *Work* where the *Owner* determines that there is an imminent risk to the safety of persons or property at the Place of *Work*. In the event that the *Contractor* receives such notice, it shall immediately stop the *Work* and secure the site. The *Contractor* shall not be entitled to an extension of the Contract Time or to an increase in the *Contract Price* unless the resulting delay, if any, would entitle the *Contractor* to an extension of the Contract Time or the reimbursement of the *Contractor*'s costs as provided in paragraph 6.5.1, 6.5.2 or 6.5.3."

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.

PART 7 DEFAULT NOTICE

GC7.1 OWNER'S RIGHT TO PERFORM THE *WORK*, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK OR TERMINATE THE CONTRACT

- .1 Amend paragraph 7.1.2 by adding the words ".....or fails or neglects to maintain the latest schedule provided pursuant to GC3.5...". Immediately following the word "properly" in line one.
- .2 Add the following to paragraph 7.1.1:

"A duplicate of this notice shall be simultaneously sent to the Consultant."

- .3 Add the word "and" at the and of sentence 7.1.5.1, and 7.1.5.2.
- .4 Add the following to paragraph 7.1.6:

"If the *Owner* proceeds to correct a default, as provided in paragraph 7.1.4.1, when the *Contractor* has failed to correct the default within the time period specified or otherwise agreed to in writing, the *Owner* may arrange for correction of such *Work* by other forces without further notice. The cost of such *Work* shall be deducted from the *Contract Price* regardless of whether the *Work* has previously been certified for payment."

GC 7.2 CONTRACTOR'S RIGHT TO STOP THE WORK OR TERMINATE THE CONTRACT

.1 Add the following to paragraph 7.2.1:

"A duplicate of this notice shall be sent simultaneously to the Consultant."

- .2 Amend paragraph 7.2.2, in line 1, by deleting "20 Working Days" and replacing it with "40 Working days".
- .3 Delete paragraph 7.2.3.1 and replace it with "Intentionally left blank".
- .4 Delete paragraph 7.2.3.3 and replace it with the following:
 - "7.2.3.3 The *Owner* fails to pay the *Contractor* when due the amounts certified by the *Consultant* or awarded by arbitration or a Court, except where the *Owner* has a *bona fide* claim for setoff, or..."
- .5 Amend paragraph 7.2.3.4 by deleting the comma toward the end of the first line. Further amend paragraph 7.2.3.4 by deleting the phrase beginning with the word "except" and ending with the word "Owner
- .6 Amend 7.2.4 as follows: In the second line, delete "5 *Work*ing *Days*" and replace with "10 *Work*ing *Days*".
- .7 Add the following to paragraph 7.2.5 as follows:
 - "7.2.5 If the default cannot be corrected within the ten *Work*ing Days specified in paragraph 7.2.4, the *Owner* shall be deemed to have cured the default if it:
 - .1 commences correction of the default within the specified time;
 - .2 provides the Contractor with an acceptable schedule for such correction; and
 - .3 completes the correction in accordance with such schedule."
- .8 Amend paragraph 7.2.5 as follows:

Delete the words "and such other damages as the *Contractor* may have sustained as the result of the termination of the *Contract.*"

- .9 Delete renumbered paragraph 7.2.6 in its entirety and replace it with the following:
 - "7.2.6 If the *Contractor* terminates the Contract under the conditions described in this GC7.2, the *Contractor* shall be entitled to be paid for all *Work* performed to the date of termination. The *Contractor* shall also be entitled to recover the direct costs associated with

termination, including the costs of demobilization, losses sustained on *Products* and construction machinery and equipment. The *Contractor* shall not be entitled to any recovery for any special, indirect or consequential losses."

- .10 Add paragraph 7.2.7 and 7.2.8 as follows:
 - "7.2.7 If the *Contractor* stops the *Work* or terminates the *Contract* in accordance with the paragraphs above, he shall leave the site and the *Work* in a secure condition as required by jurisdictional authorities and the *Contract Documents*.
 - 7.2.8 The provisions of this GC 7.2 shall not apply to the withholding of certificates and/or payments because of the *Contractor's* failure to pay all just claims promptly, or because of the registration of a lien against the *Place of the Work*, nor shall they apply to the *Owner's* withholding and set-off under paragraphs 5.8.2 and 5.8.3 and the deduction of monies to cover costs incurred in correcting deficiencies as provided in GC 7.1 above."

PART 8 DISPUTE RESOLUTION

GC 8.2 ADJUDICATION

.1 Delete the word "prescribed" from paragraph 8.2.1 and substitute the words "provided for".

GC 8.3 NEGOTIATION, MEDIATION AND ARBITRATION

- .1 Add the following new paragraphs 8.3.9 to 8.3.13:
 - "8.3.9 Within five days of receipt of the notice of arbitration by the responding party under paragraph 8.3.6, the Owner and the Contractor shall give the Consultant a written notice containing:
 - .1 a copy of the notice of arbitration;
 - .2 a copy of supplementary conditions 8.3.9 to 8.3.14 of this Contract, and;
 - .3 any claims or issues which the Contractor or the Owner, as the case may be, wishes to raise in relation to the Consultant arising out of the issues in dispute in the arbitration."
 - 8.3.10 The Owner and the Contractor agree that the Consultant may elect, within ten days of receipt of the notice under paragraph 8.3.9, to become a full party to the arbitration under paragraph 8.3.6 if the Consultant:
 - .1 has a vested or contingent financial interest in the outcome of the arbitration;
 - .2 gives the notice of election to the Owner and the Contractor before the arbitrator is appointed;
 - .3 agrees to be a party to the arbitration within the meaning of the rules referred to in paragraph 8.3.6, and,
 - .4 agrees to be bound by the arbitral award made in the arbitration.
 - 8.3.11 Without limiting and subject to the Owner and Contractor's rights under paragraph 8.3.12 to challenge whether the Consultant has satisfied the requirements of paragraph 8.3.10, if an election is made under paragraph 8.3.10:
 - .1 the Owner or Contractor may request particulars and evidence of the Consultant's vested or contingent financial interest in the outcome of the arbitration;
 - .2 the Consultant shall participate in the appointment of the arbitrator; and,
 - .3 notwithstanding the rules referred to in paragraph 8.3.6, the time period for reaching agreement on the appointment of the arbitrator shall begin to run from the date the respondent receives a copy of the notice of arbitration.
 - 8.3.12 The arbitrator in the arbitration in which the Consultant has elected under paragraph 8.3.10 to become a full party may:
 - .1 on application of the Owner or the Contractor, determine whether the Consultant has

- satisfied the requirements of paragraph 8.3.10, and;
- .2 make any procedural order considered necessary to facilitate the addition of the Consultant as a party to the arbitration.
- 8.3.13 The provisions of paragraph 8.3.9 shall apply (with all appropriate changes being made) to written notice to be given by the Consultant to any sub-consultant."

PART 9 PROTECTION OF PERSONS AND PROPERTY

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 exercising the degree of care and skill described in paragraph 3.14.1."
- .3 Add a new paragraph 9.1.5 as follows:
 - "9.1.5 Without in any way limiting the *Contractor*'s obligations under this GC9.1, should the *Contractor* or any Subcontractor or Supplier cause loss or damage to trees or other plantings, whether owned by the *Owner* or third parties, the *Contractor* shall be liable for the replacement cost of the trees or other plantings damaged, including the cost of any arborist or other *Consultant*, and such costs may be deducted by the *Owner* from amounts otherwise owing to the *Contractor*."

GC9.2 TOXIC AND HAZARDOUS SUBSTANCES

- .1 Add a new paragraph 9.2.5.5 as follows:
 - ".5 In addition to the steps described in subparagraph 9.2.5.3, take any further steps it deems necessary to mitigate or stabilize any conditions resulting from encountering toxic or hazardous substances or materials."
- .2 Add the following to paragraph 9.2.6 after the word "responsible" in line two:

"...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,

- .3 Add the words "and the Consultant" after the word "Contractor" in subparagraph 9.2.7.4.
- .4 Amend paragraph 9.2.8 by adding the following after the word "responsible" in line two:

"...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,.."

- .5 Add a new paragraph 9.2.10 as follows:
 - "9.2.10 Without limiting its other obligations under this GC9.2, the *Contractor* acknowledges that its obligations under the Contract include compliance with the Environmental Programs, including, but not limited to, the Asbestos Abatement Program. The *Contractor* acknowledges that the *Owner* may suffer loss and damage should the *Contractor* fail to comply with the Environmental Programs and agrees to indemnify and hold harmless the *Owner* with respect to any loss or damage to which the *Owner* is exposed by the *Contractor*'s failure to comply. The *Contractor* expressly agrees that such loss and damage shall be included within the scope of the *Contractor*'s indemnity described in paragraph 12.1.1 of the General Conditions. The *Contractor* acknowledges that should it fail to comply with the Environmental Program, such failure will constitute a failure to comply with the Contract to a substantial degree within the meaning of paragraph 7.1.2."

GC9.4 CONSTRUCTION SAFETY

- .1 Delete paragraph 9.4.1 in its entirety and replace it with the following:
 - "9.4.1 The *Contractor* shall be solely responsible for construction safety at the *Place of the Work* and for compliance with the rules, regulations and practices required by the applicable construction health and safety legislation and shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the *Work*."
- .2 Add new paragraphs 9.4.6, 9.4.7, 9.4.8, 9.4.9, and 9.4.10 as follows:
 - "9.4.6 Prior to the commencement of the Work, the Contractor shall submit to the Owner:
 - .1 a current WSIB clearance certificate;
 - .2 copies of the *Contractor's* insurance policies having application to the *Project* or certificates of insurance, at the option of the *Owner*,
 - .3 documentation of the *Contractor's* in-house safety-related programs;
 - .4 a copy of the Notice of *Project* filed with the Ministry of Labour naming itself as "constructor" under OHSA.
 - 9.4.7 The *Contractor* shall indemnify and save harmless the *Owner*, its agents, officers, directors, employees, *Consultants*, successors and assigns from and against the consequences of any and all safety infractions committed by the *Contractor* under OHSA, including the payment of legal fees and disbursements on a solicitor and client basis. Such indemnity shall apply to the extent to which the *Owner* is not covered by insurance, provided that the indemnity contained in this paragraph shall be limited to costs and damages resulting directly from such infractions and shall not extend to any consequential, indirect or special damages.
 - 9.4.8 The *Owner* undertakes to include in its contracts with other contractors and/or in its instructions to its own forces the requirement that the other contractor or own forces, as the case may be, will comply with directions and instructions from the *Contractor* with respect to occupational health and safety and related matters. The text of such instruction is attached to these Supplementary Conditions as Appendix 1.
 - 9.4.9 The Contractor shall file a "Notice of Project" with the Ontario Ministry of Labour as Constructor of this project as required under Part III of The Occupational Health and Safety Act, and provide the Owner with a copy of such notice.
 - 9.4.10 The Contractor agrees that its designation as constructor for the Project extends to circumstances where the Owner performs work with its own forces or with other Contractors. The Owner agrees that if it does perform work with its own forces or with other Contractors that the Owner will contractually require its own forces and such other

Contractors to follow the directions, instructions, rules and regulations of the Contractor in respect of all matters relating to health and safety. "

GC9.5 MOULD

- .1 Add "and the Consultant" after "Contractor" in subparagraph 9.5.3.4.
- .2 Delete paragraph 9.5.3.3 in its entirety and replace it with the following:

"9.5.3.3 Extend the *Contract Time* for such reasonable time as the *Consultant* may recommend on consultation with the Contractor and the *Owner*. If, in the opinion of the Consultant, the *Contractor* has been delayed in performing the *Work* and/or has incurred additional costs under paragraph 9.5.1.2, the *Owner* shall reimburse the *Contractor* for the reasonable costs incurred as a result of the delay and as a result of taking those steps, and...".

GC 9.6 OCCUPANCY PRIOR TO SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 Add new General Condition 9.6 OCCUPANCY PRIOR TO SUBSTANTIAL PERFORMANCE OF THE WORK
- .2 Add new paragraphs 9.6.1 through 9.6.4, as follows:
 - "9.6.1 The *Owner*, its agents, and other *Contractors* shall have the right to enter upon, and the *Owner* shall have the right to take possession of, the *Work* in whole or in part for the purpose of placing fittings and equipment or for other use before the substantial completion of the *Contract*, if, in the opinion of the *Consultant*, such entry and taking possession does not prevent or unreasonably interfere with the *Contractor's Work* to complete the *Work* within the time specified. Such entry and taking possession shall not be considered as acceptance of the *Work* nor in any way shall it relieve the *Contractor* of his responsibility to complete the *Contract*.
 - 9.6.2 The *Contractor* shall, as directed by the *Consultant* to give priority to certain parts of the *Work* and bring such parts to a "ready for use" status. Such instructions may require installation of temporary stairs and exits and temporary services, all of which shall be provided and subsequently removed.
 - 9.6.3 The *Contractor* shall maintain full access to the building for the *Owner*'s use, as required. The *Contractor* shall maintain or restore heat and power to the above areas when necessary or as scheduled and keep existing utilities and services functional.
 - 9.6.4 The *Contractor* shall keep informed all Insurance or Surety Company or Companies who have issued Performance Bonds, Liability Insurance and Property Insurance for this *Contract*, of the extent of the occupancy. If the occupancy by the *Owner* requires adjustments of the bonds, or insurances, the *Contractor* shall, subject to the *Owner*'s approval, initiate and pay for such adjustments on behalf of the *Owner* and a *Change Order* will be issued."

PART 10 GOVERNING REGULATIONS

GC10.1 TAXES AND DUTIES

.1 Amend paragraph 10.1.2 by adding the following sentence at the end of the existing paragraph:

"For greater certainty, the *Contractor* shall not be entitled to any mark up for overhead or profit on any increase in such taxes and duties and the *Owner* shall not be entitled to any credit relating to mark up for overhead or profit on any decrease in such taxes."

- .2 Add new paragraphs 10.1.3, 10.1.4, 10.1.5 and 10.1.6 as follows:
 - "10.1.3 Where an exemption or a recovery of sales taxes, customs duties, excise taxes or Value Added Taxes is applicable to the Contract, the *Contractor* shall, at the request of the *Owner* or the Owner's representative, assist, join in, or make application for any exemption, recovery or refund of all such taxes and duties and all amounts recovered or exemptions obtained shall be for the sole benefit of the Owner. The *Contractor* agrees to endorse over the *Owner* any cheques received from the federal or provincial governments, or any other taxing authority, as may be required to give effect to this paragraph 10.1.3.
 - 10.1.4 The *Contractor* shall maintain accurate records tabulating equipment, material and component costs reflecting the taxes, customs duties, excise taxes and Value Added Taxes paid.
 - 10.1.5 Any refund of taxes, including without limitation, any government sales tax, customs duty, excise tax or Value Added Tax, whether or not paid, which is found to be inapplicable or for which exemption may be obtained, is the sole and exclusive property of the Owner. The *Contractor* agrees to cooperate with the *Owner* and to obtain from all *Subcontractors* and *Suppliers* cooperation with the *Owner* in the application for any refund of any taxes, which cooperation shall include, but not be limited to, making or concurring in the making of an application for any such refund or exemption and providing to the *Owner* copies, or where required, originals of records, invoices, purchase orders and other documentation necessary to support such applications or exemptions or refunds. All such refunds shall either be paid to the Owner, or shall be a credit to the *Owner* against the *Contract Price*, in the Owner's discretion.
 - 10.1.6 Customs duties penalties, or any other penalty, fine or assessment levied against the *Contractor* shall not be treated as a tax or customs duty for purposes of this GC 10.1".

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 3.9.1, the".
- .2 Further amend paragraph 10.2.5 by adding the following to the end of the second sentence:

"...and no further *Work* on the affected components of the Contract shall proceed until these changes to the *Contract Documents* have been obtained by the *Contractor* from the *Consultant*."

.3 Further amend paragraph 10.2.5 by adding the following sentence to the end of the paragraph, as amended:

"The *Contractor* shall notify the Chief Building Official or the registered code agency where applicable, of the readiness, substantial completion, and completion of the stages of construction set out in the Ontario Building Code. The *Contractor* shall be present at each site inspection by an inspector or registered code agency as applicable under the Ontario Building Code."

.4 Amend paragraph 10.2.6 by adding the following sentence at the end of that paragraph:

"In the event the *Owner* suffers loss or damage as a result of the *Contractor*'s failure to comply with paragraph 10.2.5, and notwithstanding any limitations described in paragraph 12.1.1, the *Contractor* agrees to indemnify and to hold harmless the *Owner* and the *Consultant* from and against any claims, demands, losses, costs, damages, actions, suits or proceedings resulting from such failure by the *Contractor*."

.5 Add new paragraph 10.2.8 and 10.2.9 as follows:

- "10.2.8 The "Building Permit Copy" of the drawings and specifications as approved by the Chief Building Official and issued as part of the Building Permit shall be reviewed by the *Consultant* for any requirements which could affect the *Contract Documents*. It shall then be kept on the job and maintained in good condition from commencement to completion of the *Work*. On completion of the *Work*, this Building Permit copy shall be delivered in good condition to the *Consultant*."
- 10.2.9 The *Contractor* shall pay any Municipal security deposits required by the Authorities as a condition of the issuance of the Building Permit. The *Contractor* shall be responsible for removing mud and other debris that accumulates on the public street during construction. If the *Contractor* does not comply with notification from the Municipality to clean the affected street within twenty-four (24) hours, then the Municipal Public *Works* Department shall have the right to clean the affected street at the sole expense of the *Contractor*".

GC 10.4 WORKERS' COMPENSATION

.1 Amend paragraph 10.4.1 so that, as amended, it reads as follows:

"Prior to commencing the *Work*, and with each application for payment thereafter, the *Contractor* shall provide a Clearance Certificate from WSIB."

- .2 Add new paragraph as follows:
 - "10.4.2 At any time during the term of the Contract, when requested by the Owner, the Contractor shall provide such evidence of compliance by the Contractor and Subcontractors."

PART 12 OWNER TAKEOVER

GC 12.1 READY-FOR-TAKEOVER

.1 After the second occurrence of the term *"Ready-for-Takeover"* insert before the term *"Ready- for-Takeover"* in paragraph 12.1.3 the words *"determination of"*.

GC 12.2 EARLY OCCUPANCY BY THE OWNER

.1 Delete the word "achieve" in paragraph 12.2.4 and replace it with the words "have achieved".

GC 12.3 WARRANTY

- .1 Revise paragraph 12.3.1 by replacing the words "one year" with "two years".
- .2 Amend paragraph 12.3.1 by adding the following sentence at the end of that paragraph:

"Where the *Contractor* has been permitted to make use of permanent equipment or systems, as provided in GC3.11, prior to the issuance of the certificate of Substantial Performance of the *Work*, such permanent equipment or system shall be subject to the same warranty as described in this GC12.3 and shall be judged, for purposes of assessing compliance with the warranty, as though the equipment or system was new, clean and unused by the *Contractor*, except for normal commissioning and startup activities, prior to the date of Ready for Takeover of the *Work*."

.3 Delete the present text of 12.3.2 and substitute the following:

"The Contractor expressly warrants and guarantees to the Owner that the Work performed by the Contractor and by all Workers, Suppliers and Subcontractors conforms to the requirements of the Contract Documents and is performed in a safe and careful manner."

- .4 Revise paragraph 12.3.3 by replacing the words "one year" with "two years".
- .5 To paragraph 12.3.4 add new sentence:

"Except for extended warranties provided under this contract, the warranty period shall recommence for corrected *Work*".

- .6 Delete the present text of paragraph 12.3.5 and substitute the following:
 - "12.3.5 The *Contractor* shall correct and pay for all damages to the *Work* and/or property, goods or equipment of the *Owner* and/or his tenants and neighbouring properties, resulting from the defects, deficiencies or corrections of the same."
- .7 Add a new paragraphs 12.3.7 and 13.7.8 as follows:
 - "12.3.7 The *Contractor* shall commence to correct any deficiency within five (5) *Work*ing Days after consultant or Owner, issuance a notice from the *Consultant* or Owner and complete the *Work* as expeditiously as possible, except that in the case of urgent repairs, where the deficiency would prevent maintaining security or operating, as designed, of basic systems essential to the ongoing business of the *Owner*, all necessary corrections and/or installations or temporary replacements shall be carried out immediately as an emergency service. Should the *Contractor* fail to provide this emergency service within two (2) hours of a notification, the *Owner* is authorized, irrespective of the conditions of GC 7.1, to carry out all necessary repairs or replacements at the *Contractor*'s expense.
 - 12.3.8 The *Contractor* shall assign to the *Owner* all warranties, guarantees or other obligations for *Work*, services or *Products* performed or supplied by any Subcontractor, Supplier or other person in connection with the *Work* and such assignment shall be with the consent of the assigning party where required by law or by the terms of that party's contract. Such assignment shall be in addition to, and shall in no way limit, the warranty rights of the *Owner* under the *Contract Documents*. Until the expiry of the relevant warranty periods enforceable against the *Contractor*, the *Owner* shall have in its custody all warranties, guarantees and other obligations to third parties respecting the *Work*."

PART 13 INDEMNIFICATION AND WAIVER

GC 13.1 INDEMNIFICATION

- .1 Add new paragraph 13.1.0 as follows:
 - "13.1.0 The Contractor shall indemnify and hold harmless the Consultant, its agents and employees from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings by third parties that arise out of, or are attributable to the Contractor's performance of the Contract, provided such claims are:
 - .1 attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property, and
 - .2 caused by negligent acts or omissions of the Contractor or anyone for whose negligent acts or omissions the Contractor is liable, and
 - .3 made by Notice in Writing within a period of 6 years from the Ready-for Takeover date or within such shorter such period as may be prescribed by any limitation statute or the Province or Territory of the Place of Work.
- .2 Add the words "13.1.0," after the word "paragraphs" in paragraph 13.1.3.

END OF SUPPLEMENTARY CONDITION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 General Description of the Work
- .2 Timing and sequencing of the Work
- .3 Owner occupancy

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this contract comprises of construction services for the construction of a new one storey Public Works Facility and site improvements for the **Town of Marathon**, site located in **Marathon**, **Ontario**.
- .2 The location of the Work is **2 Penn Lake Road, Marathon Ontario**, herein known as the "Site".
- .3 The Owner is as follows:

Corporation of The Town of Marathon

1.3 DIVISION OF WORK

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

1.4 SPECIFICATIONS LANGUAGE AND STYLE

- .1 These specifications are written in the imperative mood and in streamlined form. The imperative language is directed to Contractor, unless stated otherwise.
- .2 Complete sentences by reading "shall", " Contractor shall", "shall be", and similar phrases by inference. Where a colon (:) is used within sentences and phrases, read the words "shall be" by inference.
- .3 Fulfill and perform all indicated requirements whether stated imperatively or otherwise.
- .4 When used in the context of a Product, read the word "provide" to mean "supply and install to result in a complete installation ready for its intended use".

1.5 DOCUMENTS AT THE SITE

- .1 Keep the following documents at Place of the Work, stored securely and in good order and available to Owner and Consultant in hard copy and electronic form:
 - .1 Current Contract Documents, including Drawings, Specifications and addenda.
 - .2 Change Orders, Change Directives, and Supplementary Instructions.
 - .3 Reviewed Shop Drawings, Product data and samples.
 - .5 Construction progress schedule.
 - .4 Field test reports and records.
 - .6 Meeting minutes.
 - .7 Manufacturer's certifications.
 - .8 Permits, inspection certificates, and other documents required by authorities having jurisdiction.
 - .9 Current as-built drawings.
 - .10 Material Safety Data Sheets (MSDS) for all controlled Products.

1.6 CONTRACTOR USE OF PREMISES

- .1 Except as otherwise specified, Contractor has unrestricted use of Place of the Work from time of Contract award until Ready-for-Takeover
- .2 Supply and install temporary signage required to demarcate temporary exit paths as later directed by Consultant and to the satisfaction of the local building and fire departments.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 Assume full responsibility for the protection and safekeeping of products under this Contract and within the limits of fencing/hoarding as defined by the drawings.
- .5 Existing Utilities
 - .1 The Contractor shall take every precaution to prevent or minimize disruption to utilities/services including gas, hydro, bell, cable television, water, sanitary and storm services.
 - .2 Accidental disruptions must be attended to immediately. Provisions and procedures for such instances should be put in place in anticipation of them occurring and is especially for the hydro, bell and water services to the building.
 - .3 Planned disruptions shall be coordinated with the Owner, the Municipal authorities, the Consultant and the respective utility service provider. These disruptions will be scheduled to best suit the Owner's operations and may need to be carried out during the evening hours.
- .6 Confine Construction Equipment, Temporary Work, storage of Products, waste products and debris, and all other construction operations to limits required by laws, ordinances, permits, and Contract Documents, whichever is most restrictive. Do not unreasonably encumber Place of the Work.

1.7 TIMING OF WORK

- .1 Time is of the essence in this contract.
- .2 Start construction immediately following the acceptance of the tender by the Owner.
- .3 Perform work continuously toward completion. Periods of inactivity on site will not be permitted without prior consent of the Owner.

1.8 WORK SEQUENCE

- .1 Coordinate the sequence of the Work with the Owner's representative to minimize disruption and inconvenience.
- .2 Refer to the Instructions For Bidders, section 00 21 13, for any specific sequence of construction work and associated timeframes to complete the work.

1.9 REFERENCE CODES, STANDARDS AND REGULATIONS

- .1 Where relevant documents applicable to this work exist, follow these criterion, recommendations, and requirements as minimum standards.
- .2 In event of conflict between Codes, Regulations, or Standards, or where work shown is in conflict with these documents, obtain interpretation before proceeding. Failure to clarify any ambiguity will result in an interpretation requiring application of most demanding requirements.

END OF SECTION

PART 1 GENERAL

1.1 CONTRACT METHOD

.1 Single Contract: Construct work under single contract for stipulated price CCDC Document 2 2020.

1.2 DIVISION 01 REQUIREMENTS

.1 All Sections of Division 01 apply to all sections of Division 02 to Division 33.

1.3 REGULATORY REQUIREMENTS

- .1 Ontario Building Code: Comply with Ontario Building Code 2012 including all amendments. Maintain one copy at the site.
- .2 Construction Safety: Comply with occupational Health and Safety Act and Ontario Fire Code Ontario Regulation 388/97 and amendments.
- .3 Referenced Standards: Comply with specifications standards produced by various organizations, included in the sections. Use latest edition.
- .4 Comply with local bylaws and regulations.
- .5 Smoking is prohibited on the property.

1.4 EXAMINATION

- .1 Examine the site of the project. Investigate the complete extent of work which is indicated in the contract documents. No allowance will be made for any error or negligence to fully understand the work and conditions. The contractor is to verify that all grades on the site are in conformance with the construction documents prior commencement of the work. The contractor is to notify the Consultant immediately should discrepancies be encountered.
- .2 Examine work of other sections before commencing work of any section. Commencement of new work shall imply acceptance of work by other sections upon which the new work depends.
- .3 Verify dimensions of work prepared by other sections before fabrication of new work.

1.5 **PROJECT COORDINATION**

- .1 Coordinate progress of the work, progress schedules, submittals, use of site, temporary utilities, construction facilities and controls.
- .2 Provide information required for preparation of coordination drawings. Prepare interference drawings to properly coordinate the work.
- .3 Check and verify all dimensions referring to the work.

1.6 UTILITIES EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of work and notify Consultant of findings.

- .2 Where work involves breaking into existing services to remain, protect existing and carry out work at lines approved by owner and with minimum disturbance to user groups and pedestrian/vehicular traffic.
- .3 Where unknown service lines are encountered, immediately advise Consultant and confirm findings in writing.
- .4 Remove abandoned service lines within 2 m of structures unless noted otherwise. Cap or otherwise seal off lines at cut-off points as directed by Consultant.
- .5 Arrange and pay for any connection charges.
- .6 Record locations of maintained, rerouted and abandoned service lines.

1.7 PERMITS

- .1 Refer to CCDC2 2020 GC10.2.2.
- .2 All other permit costs will be the responsibility of the General Contractor including inspections, certification etc. associated with either partial occupancy of the project, as per the summary of work, or full occupancy of the project.

1.8 SERVICE CONNECTIONS

.1 All costs associated with the connections to Municipal Services, hydro services, cable and phone services are the responsibility of the General Contractor unless stated otherwise in the Cash Allowance Section 01 21 00.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Cash allowances

1.2 REFERENCES

- .1 CCDC 2 2020, Stipulated Price Contract.
- .2 Project Supplementary Conditions

1.3 CASH ALLOWANCES

- .1 Refer to CCDC 2, Part 4 Allowances.
- .2 Include in Contract Price, cash allowances stated herein.
- .3 Cash allowances, unless otherwise specified, cover net cost to Contractor of services, products, construction machinery and equipment, freight, handling, unloading, storage installation and other authorized expenses incurred in performing Work.
- .4 The Contract Price **includes** the allowance amount listed below including the Contractors overhead and profit. Expenditures from the cash allowance through the Contractor will be at cost with no markup. Individual subtrade pricing for each allowance item as required will be permitted an allowance for overhead and profit as outlined by the contract.
- .5 Where the actual cost of the Work under any cash allowance exceeds the amount of the allowance, any unexpended amounts from other cash allowances shall be reallocated, at the Consultant's direction, to cover the shortfall, and, in that case, there shall be no additional amount added to the Contract Price for overhead and profit.
- .6 The cash allowance amount will be decreased on a continuous basis by way of a CAD Cash Allowance Directive, issued by the consultant to confirm cash allowance monies are to be spent by the contractor.
- .7 Progress payments on accounts of work authorized under cash allowances shall be included in Consultant's monthly certificate for payment.
- .8 The allowance money as included within the contract can be expended by the consultant as required on any item. Upon total depletion of the allowance amount, any further expenditure will be completed by way of change order, as per CCDC 6.1, 6.2 and 6.3 as required.
- .9 Should the entire contingency amount not be spent during the contract, a credit change order shall be issued by the consultant.
- .10 The contractor shall provide services to call for competitive bids for portions of the work to be paid for by cash allowances, if requested by the Consultant.

1.4 ALLOWANCE AMOUNTS

.1 Included in the Contract Price a cash allowance of \$1,066,500.00 which includes but not limited to the following items.

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- .1 Testing & Inspection (estimate 8,000.00)
- .2 Contingency (estimate \$ 250,000.00)
- .3 Vertical Rise Drive-On Lift Supply, Install part of base bid (estimate \$250,000.00)
- .4 Bell and Shaw Service Connection (estimate \$20,000.00)
- .5 Hydro Service Connection (estimate \$ __TBD_____
- .6 Exterior Building Signage (estimated \$ 15,000.00)
- .7 Wood Storage Racks Supply and Install part of base bid (estimate \$3,500.00)
- .8 Touchless Rollover Wash Bay Equipment Supply & Install. (estimate \$350,000.00)
- .9 Touchless Wash Bay Equipment final electrical connection (estimate \$20,000.00)
- .10 Overhead Travelling Crane Supply and Install (estimate (\$150,000.00)
- .2 Expenditures under allowance will be authorized in accordance with procedures provided in CCDC 2, GC 6.1 Changes, 6.2 Change Order, and Change Directive, and item 1.3.5. above by way of CAD as required and directed by the consultant.

END OF SECTION

PART 1 GENERAL

1.1 SCHEDULE OF LABOUR RATES

- .1 Prior to the first application for payment, submit for the Consultant's review a schedule of labour rates for all trades and classifications of trades, such as journeymen, apprentices, and foremen that will be employed in the Work. Provide a breakdown of payroll burden component of labour rates.
- .2 Labour rates shall reflect the salaries, wages, and benefits paid to personnel in the direct employ of the Contractor, Subcontractors, and sub-Subcontractors, stated as hourly rates, that will be used when:
 - .1 preparing price quotations for Change Orders, and
 - .2 determining the cost of work attributable to Change Directives.
 - .3 Labour rates stated in the schedule of labour rates shall be consistent with rates that will actually be paid, and payroll burden costs that will actually be incurred, in the normal performance of the Work, during regular working hours. Labour rates shall not include any additional overhead and profit component.
 - .4 Where collective agreements apply, the labour rates shall not exceed those established by collective agreement.
 - .5 Obtain the Owner's written acceptance of the schedule of labour rates before submitting the first Change Order quotation.
 - .6 Accepted schedule of labour rates will be used solely for evaluating Change Order quotations and cost of performing work attributable to Change Directives.
 - .7 The Contractor may request amendments to the accepted schedule of labour rates if changes in the labour rates that will actually be paid, or payroll burden cost that will actually be incurred, in the normal performance of the Work can be demonstrated. Obtain the Owner's written acceptance of such changes.

1.2 SCHEDULE OF EQUIPMENT RATES

- .1 Prior to the first application for payment, submit for the Consultant's review a schedule of equipment rates for Contractor owned Construction Equipment.
- .2 Equipment rates shall reflect the rates that will be used when:
 - .1 preparing price quotations for Change Orders, and
 - .2 determining the cost of work attributable to Change Directives.
- .3 Equipment rates stated in the schedule shall be consistent with local equipment rental market rates and shall not include any additional overhead and profit component.
- .4 Obtain the Owner's written acceptance of the schedule of equipment rates before submitting the first Change Order quotation.
- .5 Accepted schedule of equipment rates will be used solely for evaluating Change Order quotations and cost of performing work attributable to Change Directives.

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

1.3 CHANGE ORDER PROCEDURES

- .1 Upon issuance by the Consultant to the Contractor of a proposed change in the Work, and unless otherwise requested in the proposed change or unless otherwise agreed:
 - .1 Submit to the Consultant a fixed price quotation for the proposed change in the Work within 10 days after receipt of the proposed change in the Work.
 - .2 If requested in the proposed change, provide a detailed breakdown of the price quotation including the following to the extent applicable, with appropriate supporting documentation:
 - .1 Estimated labour costs, including hours and applicable hourly rates based on the accepted schedule of labour rates.
 - .2 Estimated Product costs, including Supplier quotations, estimated quantities and unit prices.
 - .3 Estimated Construction Equipment costs.
 - .4 Enumeration of all other estimated costs included in the price quotation.
 - .5 Estimated credit amounts for labour and Products not required on account of the proposed change.
 - .6 Where applicable, Subcontractor quotations, also including a detailed breakdown of all of the above. All Mechanical and electrical subtrades MUST provide detail breakdowns.
 - .3 Include in the quotation the increase or decrease to the Contract Time, if any, for the proposed change, stated in number of days.
 - .4 Include in the quotation the number of days for which the quotation is valid.
 - .5 The quotation will be evaluated by the Consultant and the Owner and, if accepted by the Owner, be documented in the form of a signed Change Order.

1.1 MODIFICATIONS TO CONTRACT

- .1 Unless otherwise agreed, the adjustment of the Contract Price on account of a proposed change in the Work shall be based on a quotation for a fixed price increase or decrease to the Contract Price regardless of the Contractor's actual expenditures and savings.
 - .1 Supplemental Instruction: as issued by the Consultant, consistent with the intent of the Contract Documents, and will not involve an adjustment in Contract Price or Contract Time.
 - .2 Proposed Change: as issued by the Consultant, will notify the Contractor of an impending or proposed change to the Work, and will require submission of a quotation from the Contractor and all affected Subcontractors for each item noted. Submit quotation within the time period stipulated on the form, and indicate separate line items for labour and materials in each case. Work outlined in a Proposed Change must not proceed without the issuance of a Change Order signed by the Owner.
 - .3 Change Directive: will be issued by the Consultant where an immediate response is required to an on-site condition. This form will authorize the

Contractor to proceed with the change, with the stipulation that accurate accounts of costs be recorded, and may contain an upset cost, as agreed upon by the Owner and the Contractor.

- .4 Change Order: will be issued by the Consultant upon review and approval of quotations for a Proposed Change, or a Change Directive, and authorizes the Contractor to proceed with the change(s) proposed. A Change Order will amend the Contract Price, and/or the Contract Time.
- .5 Cash Allowance Directive (CAD): will be issued as necessary and defined by Section 01 21 13 upon review and approval of quotations for a Proposed Change, or a Change Directive, and authorizes the contractor to proceed with the change(s) proposed.

1.2 UNIT PRICES

- .1 Apply Unit Prices quoted in the Bid Form to extras to the Contract. Apply Unit Prices for credits from the Contract at a rate not less than 85% of the quoted Unit Price.
- .2 Work covered by Unit Prices will be executed in accordance with the Contract Documents. Unit Prices include all costs related to materials, labour, equipment, delivery and handling, statutory charges, overhead and profit, other related charges, and inclusive of all applicable duties and taxes (excluded HST), measured in place prior to excavation, or compacted/complete in place.

1.3 FEES FOR CHANGES IN THE WORK

- .1 The following fees will apply to the Contract Price for changes to the Work not covered by Unit Prices listed in Bid Form, and shall include all statutory charges, applicable duties and taxes, charges required by labour agreements in force, charges related to site and/or office overhead, project management and administration, all shop and field supervision, clerical, drafting, bonding costs, permits, associated payroll costs, and other charges incidental to the work including but not limited to handling, equipment warranty, identification, coordination, scheduling, Bill 208 and . Refer to GC 6.2.
- .2 Where the Contractor's price quotation for a Change Order or Change Directive results in a net increase to the Contract Price, the Contractor's entitlement to a fee for overhead and profit in the quotation shall be as follows, as applicable:
 - .1 For work to be performed by the Contractor's own forces: As per Supplementary General Conditions Section 00 54 00, GC6.2
 - .2 For work to be performed by a Subcontractor: As per Supplementary General Conditions Section 00 54 00, GC6.2
- .3 Where a Subcontractor's price quotation for a Change Order or Change Directive results in a net increase to the Subcontractor's contract price, the Subcontractor's entitlement to a fee for overhead and profit in the quotation shall be as follows, as applicable:
 - .1 For work to be performed by the Subcontractor's own forces: As per Supplementary General Conditions Section 00 54 00, GC6.2
 - .2 For work to be performed by a sub-Subcontractor: As per Supplementary General Conditions Section 00 54 00, GC6.2

- .4 Where the Contractor's or a Subcontractor's price quotation for a Change Order results in a net decrease in price before adjustment for fees for overhead and profit, such a price quotation shall be for the net decrease without any adjustment for fees for overhead and profit.
- .5 The Fees for Changes In the Work shall apply only to extras to the Contract. Contractor or Subcontractor mark-up will not be applied to credits.

END OF SECTION

Part 1 General

1.1 APPLICATIONS FOR PAYMENT

.1 Refer to CCDC2 2020 and Section 00 54 00 Supplementary General Conditions for proper invoice requirements of the contract.

1.2 SCHEDULE OF VALUES

- .1 Prior to the first application for payment, submit for Consultant's review an initial schedule of values. Modify the initial schedule of values if and as requested by Consultant. Obtain Consultant's written acceptance of the initial schedule of values prior to the first application for payment.
- .2 Together with the first and all subsequent applications for payment, submit updated versions of the schedule of values to indicate the values, to the date of application for payment, of work performed and Products delivered to Place of the Work.
- .3 Provide the schedule of values in an electronic spreadsheet format that provides for inclusion of the following information:
 - .1 Identifying information including title and location of the Work, name of Contractor, number and date of application for payment, and period covered by the application for payment.
- .4 A work breakdown structure that is sufficiently detailed and comprehensive to facilitate Consultant's evaluation of applications for payment at an appropriate level of detail.
- .5 Provisions for approved Change Orders [allowances,] [unit price work] [and] [assignable contracts] so that the breakdown amounts indicated in the schedule of values aggregate to the current total Contract Price. Also provide for indicating the estimated value of Change Directives within the schedule of values, separately from the current total Contract Price.
- .6 For each item in the work breakdown structure, provide as a minimum the following information, under headings as indicated:
 - .1 <u>Breakdown Amount:</u> A dollar amount, including an appropriate pro rata portion of Contactor's overhead and profit.
 - .1 General Accounts
 - .2 Mobilization
 - .3 Supervision
 - .4 Bonds and Insurance
 - .5 Permits and Licenses
 - .6 Operations and Maintenance Manuals/As-Built Drawings
 - .7 All trades or portions of the Work, generally in chronological order
 - .8 Provision of other Products and/or services
 - .9 Cash Allowance expenditures
 - .10 Changes in the Work
 - .2 <u>Performed to Date</u>: The value of Work performed and Products delivered to Place of the Work up to the date of the application for payment, stated as a percentage of the Contract Price and in dollars.
 - .3 <u>Previously Performed</u>: The value of Work performed and Products delivered to the Place of the Work for which payment has been previously certified, stated in dollars.

- .4 <u>Current Period:</u> The value of Work performed and Products delivered to Place of the Work for which Contractor is currently applying for payment, stated in dollars.
- .5 <u>Balance to Complete</u>: The value of Work not yet performed and Products not yet delivered to Place of the Work, stated in dollars.
- .7 The total Contract amount for each trade or portion of the Work shall be listed beside each item.
- .8 Commissioning:
 - .1 The commissioning process shall be allocated a value equal to 3% of the Contract. The value shall be itemized in the Schedule of Values which forms the basis for progress payments for the various portions of Work. The Contractor may draw from the allocation as the commissioning process is completed.
 - .2 The Contractor shall submit all test and verification forms. The Consultant will use these forms to calculate a percentage complete.
 - .3 The Contractor may claim up to 5% of the Contract, as per Schedule of Values, on a monthly basis, from this allocation leading up to performance testing. The remaining 3% shall not be paid out until the performance testing, O & M manuals and Owner's training have been completed satisfactorily.
 - .4 Commissioning activities are non-compensable and cannot be a cause for delay claims.
- .9 Support claims for products delivered to Place of Work but not yet incorporated into Work by such evidence as Consultant may reasonably require to establish value and delivery of products.

1.3 PROPER INVOICE

.1 Refer to CCDC 2, GC 5.2 and Section 00 54 00 Amendment to CCDC 2-2008.

1.4 STATUTORY DECLARATIONS

.1 Submit a statutory declaration in the form of CCDC 9A – Statutory Declaration of Progress Payment Distribution by Contractor with each application for payment except the first.

1.5 WORKERS' COMPENSATION CLEARANCE

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

1.6 PAYMENT FOR PRODUCTS STORED OFF SITE

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

1.7 SUBSTANTIAL PERFORMANCE OF WORK

- .1 Refer to CCDC 2, GC 5.4 and Section 00 54 00 Amendment to CCDC 2-2020.
- .2 After receipt of list and application, Consultant will review Work to verify validity of application. After completing review, Consultant will notify Contractor if Work or designated portion of Work is substantially performed.
- .3 Consultant shall state date of Substantial Performance of Work or designated portion of Work in certificate.
- .4 Immediately following issuance of certificate of Substantial Performance of Work, in consultation with Consultant, establish reasonable date for finishing Work.

1.8 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF WORK

.1 Refer to CCDC 2, GC 5.4 and Section 00 54 00 Amendment to CCDC 2-2020.

1.9 FINAL PAYMENT

.1 Refer to CCDC 2, GC 5.5 and Section 00 54 00 Amendment to CCDC 2-2020

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Coordination Work with other contractors under administration of Architect.
- .2 Scheduled progress meetings.

1.2 RELATED SECTIONS

- .1 Section 01 11 00 Summary of Work.
- .2 Section 01 91 00, Commissioning.

1.3 DESCRIPTION

.1 Coordination of progress schedules, submittals, use of site, temporary utilities, construction facilities and construction Work, with progress of Work of other contractors, under instructions of Consultant.

1.4 PROJECT MEETINGS

- .1 Attend scheduled weekly project meetings throughout progress of Work as determined by Consultant.
- .2 Agenda to include, but not limited to, the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for affect on construction schedule and on completion date.
 - .12 Other business.
- .3 Distribute minutes and notices of meeting to all related sub trades.
- .4 The Contractor shall provide physical space for meetings.

1.5 CONSTRUCTION ORGANIZATION AND START UP

- .1 Within 5 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Senior representatives of the Owner, Consultant, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include following:
 - .1 Appointment of official representative of participants in Work.

.2 Schedule of Work, progress scheduling in accordance with Section 01320 Construction Progress Documentation.

- .3 Schedule of submission of shop drawings, samples, colour chips in accordance with Section 01330 Submittal Procedures.
- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01510 Temporary Utilities.
- .5 Delivery schedule of specified equipment in accordance with Section 01320 Construction Progress Documentation.
- .6 Site security in accordance with Section 01520 Construction Facilities.
- .7 Proposed changes, change orders, procedures, approvals required, mark up percentages permitted, time extensions, overtime, and administrative requirements (GC).
- .8 Record drawings in accordance with Section 01780 Closeout Submittals.
- .9 Maintenance in accordance with Section 01780 Closeout Submittals.
- .10 Take over procedures, acceptance, and warranties in accordance with Section 01770 Closeout Procedures and 01780 Closeout Submittals.
- .11 Monthly progress claims, administrative procedures, photographs, and holdbacks (GC).
- .12 Appointment of inspection and testing agencies or firms in accordance with Section 01450 Quality Control.
- .13 Insurances and transcript of policies (GC).
- .6 Comply with Consultant's allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.
- .7 During construction coordinate use of site and facilities through Consultant's procedures for intra project communications: Submittals, reports and records, schedules, coordination of drawings, recommendations, and resolution of ambiguities and conflicts.
- .8 Comply with instructions of Consultant for use of temporary utilities and construction facilities.
- .9 Coordinate field engineering and layout work with Consultant.

1.6 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 Change orders.
 - .6 Other modifications to Contract.
 - .7 Copy of approved Work schedule.
 - .8 Manufacturer's installation and application instructions.
 - .9 Labour conditions and wage schedules.
 - .10 Building Permit

1.7 SCHEDULES

- .1 Construction Progress Schedule. Refer to Section 01 32 16 Construction Schedule
- .2 Submittal Schedule

- .1 Provide schedule for submittal of all Shop Drawings, Product Data and Samples, prior to Start-up Meeting as per 1.1.3.
- .2 Provide complete list of all manufactured products to be used in the course of the Work, including those amended by addenda.
- .3 Submission of Schedules
 - .1 Submit one copy of each schedule to the Consultant for review, prior to first progress billing. Amend schedules as required. Submit amended schedules with each subsequent Progress Billing.
 - .2 Submit copies of each subsequent issue of schedules to the Consultant and Owner.
 - .3 Update schedule on a regular basis or as requested by the Consultant.

1.8 SUBMITTALS

- .1 Make submittal to Consultant for review.
- .2 Submit preliminary shop drawings, product data and samples in accordance with Section 01330 for review for compliance with Contract Documents; for field dimensions and clearances, for relation to available space, and for relation to Work of other contracts. After review, revise and resubmit for transmittal to Consultant.
- .3 Submit requests for payment for review, and for transmittal to Consultant.
- .4 Submit requests for interpretation of Contract Documents, and obtain instructions through Consultant.
- .5 Process substitutions through Consultant.
- .6 Process change orders through Consultant.
- .7 Deliver closeout submittals for review and preliminary inspections, for transmittal to Consultant.

1.9 PROGRESS PHOTOGRAPHS

- .1 Arrange for weekly digital photography to document and provide a photographic record of the progress of the Work.
- .2 Identify each photograph by project name and date taken.
- .3 Submission: Submit .jpg format files in standard resolution via project web site weekly and at at completion of excavation, foundation, framing and services before concealment.
- .4 Do not use progress or any other Project photographs for promotional purposes without Owner's written consent.

1.10 RECORDING ACTUAL SITE CONDITIONS ON AS-BUILT DRAWINGS

.1 Obtain from Consultant an electronic copy of the construction Drawings for the purpose of creating asbuilt drawings. Record information in electronic form, clearly identifying as-built deviations from the originally obtained construction Drawings.

- .2 Clearly label each drawing as "AS-BUILT DRAWING". Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Record actual construction including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of pipes, ducts, conduits, outlets, fixtures, access panels, and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by Change Orders, Change Directives and Supplemental Instructions
 - .6 References to Shop Drawings, where Shop Drawings show more detail.
- .4 Do not use as-built drawings for construction purposes.

1.11 CLOSEOUT PROCEDURES

.1 Refer to CCDC2 2020 and Section 01 78 000 – Close-out Submittals

END OF SECTION

1.1 SECTION INCLUDES

- .1 Schedule, form, content.
- .2 Schedule revisions.

1.2 RELATED SECTIONS

- .1 Section 00 54 00 Amendment Supplementary General Conditions
- .2 Section 01 30 00 Administrative Requirements

1.3 SCHEDULE REQUIREMENTS

- .1 The Consultant will establish and maintain a project schedule which will identify the duration and completion dates for each major construction activity.
- .2 Within 15 days of award of the Contract, the Contractor shall prepare and submit a construction schedule for its work within the framework of the project schedule. For each scheduled activity ("Task") within the Contractor's construction schedule, the Contractor shall identify at least the following:
 - Task name
 - Task duration
 - Task start date
 - Task end date
 - Task Value
 - Interdependency with other Tasks (finish-to-start, start-to-finish, start-to-start, finish-to-finish)
 - Resource allocation (if requested by the Consultant)
- .3 For each Task in the Contractor's construction schedule the Contractor shall assign a value ("Task Value") corresponding to the total of the labour, material, equipment, overhead and profit associated with that task within the Contractor's fixed price contract amount. The sum of the Task Values for all of the tasks in the Contractor's construction schedule shall equal the total contract amount.
- .4 The Consultant will review the Contractor's construction schedule and, once approved, it will become part of the project schedule.
- .5 The Contractor shall make whatever revisions to its construction schedule the Consultant may reasonably require and provide supporting information as may be requested to verify compliance with the project schedule.
- .6 The Contractor's construction schedule will include, but shall not be limited to, the following Tasks:
 - a. Shop Drawing schedule including allowance for preparation, review and resubmission

- b. Submittal schedule. Refer to Section 01 31 00 Project management and Coordination.
- c. Fabrication and delivery schedule
- d. Temporary works
- e. Construction activities
- f. Commissioning, testing, start-up and demonstrations
- g. Change Orders
- h. Resource allocation (if requested by the Consultant)
- .7 The schedule software used by the Contractor shall be Primavera or MSProject. The Contractor shall submit to the Consultant one hard copy of the Contractor's construction schedule and one electronic copy prepared using either Primavera or MSProject. Monthly updates of the Contractor's construction schedule shall similarly be submitted as on hard copy and one electronic copy prepared using Primavera or MSProject software.
- .8 The Contractor is required to update the construction schedule and report to the Consultant on a monthly basis. The monthly update of the Contractor's construction schedule shall identify the percentage completion for every Task, including approved changes to the Contract. The product of the percentage complete multiplied by the Task Value, and summed for all Tasks on the Contractor's construction schedule, shall equal the total progress claimed. The submission of the updated Contractor's construction schedule, including the identification of the percentage completion of all Tasks in accordance with the foregoing requirement, shall be a prerequisite to the certification by the Consultant of any progress claim.
- .9 If the Contractor and the Consultant agree to a change in the Contractor's construction schedule then the Contractor shall submit a revised construction schedule that identifies the Task Values for all Tasks within the revised construction schedule and the percentage completion for all Tasks.

1.4 MATERIAL AVAILABILITY

.1 Immediately upon signing the Contract the Contractor and its Trade Subcontractors and Suppliers shall review Product delivery requirements and anticipate foreseeable supply delays for Products. If delays in supply of Products are foreseeable, the Contractor shall notify the Consultant of such, in order that substitutions or other remedial action may be authorized in time to prevent delay in performance of the Work.

1.5 COMPLIANCE WITH THE PROJECT SCHEDULE

- .1 The Contractor is required to comply with the project schedule and is required to coordinate and direct its Trade Subcontractors and Suppliers in accordance with these requirements.
- .2 The Contractor shall provide sufficient number of skilled personnel to maintain the progress of the Work.

.3 If in the opinion of the Consultant, the Contractor is delaying the work of other Contractors then the Contractor will be responsible for costs to regain time lost, including but not necessarily limited to the premium costs for other Contractors to regain lost time.

END OF SECTION
PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Shop drawings and product data.
- .2 Samples.
- .3 Certificates and transcripts.

1.2 RELATED SECTIONS

- .1 Section 01 45 00 Quality Control.
- .2 Section 01 78 00 Closeout Submittals.
- .3 Division 23 Mechanical Identification.

1.3 ADMINISTRATIVE

- .1 Submit to Consultant_submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .3 Where items or information is not produced in SI Metric units converted values are acceptable.
- .4 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-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 shall be considered rejected.
- .5 Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .6 Verify field measurements and affected adjacent Work are coordinated.
- .7 Contractor's responsibility for errors and omissions in submission is not relieved by Consultants review of submittals.
- .8 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
- .9 Keep one reviewed copy of each submission on site.
- .10 Where required by authorities having jurisdiction, provide submittals to such authorities for review and approval.

1.4 SHOP DRAWINGS AND PRODUCT DATA

- .1 Allow 10 Working Days for Consultant's review of each submittal and incorporate in submittals schedule specified in Section 01 33 00 Construction Progress Documentation. Allow additional 5 Working Days where sub-Consultant or commissioning agent review is required.
- .2 If upon Consultant's review no errors or omissions are discovered, or if only minor corrections are required as indicated, submittal will be returned and fabrication or installation of Work may proceed.

- .3 If upon Consultant's review significant errors or omissions are discovered, a copy will be returned for correction and resubmission. Do not commence fabrication or installation.
- Consultant's notations on submittals are intended to ensure compliance with Contract .4 Documents and are not intended to constitute a change in the Work requiring change to the Contract Price or Contract Time. If Contractor considers any Consultant's notation to be a change in the Work, promptly notify Consultant in writing before proceeding with the Work.
- .5 Resubmit corrected submittals through same procedure indicated above, before any fabrication or installation of the Work proceeds. When resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.
- .6 The word "stamps" in phrase (leave room on drawings for stamps) means drawing review stamp. Allow space on shop drawings minimum 150mm x 150mm clear for stamp and notations.
- .7 Review of shop drawings by the Consultant and all other Consultants is a precaution against oversight or error and solely to review conformance with general design intent. It is not a detailed check and must not be construed as relieving the Contractor of responsibility for making the Work accurate and in conformity with the Contract Documents. Design for which the Contractor is responsible under the Contract will not be reviewed. Work done prior to the receipt of the reviewed drawings will be at the risk of the Contractor. Review comments are not authorization for changes to the Contract price.
- .8 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data, which are to be provided by Contractor to illustrate details of a portion of Work.
- .9 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.
- .10 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - Project title and number.
 - .2 .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:
 - Date and revision dates. .1
 - .2 Project title and number.
 - .3 Name and address of: Subcontractor, Supplier, and Manufacturer.
 - .4 Contractor's stamp, signed by Contractors authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - Fabrication. .1
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - Capacities. .4
 - .5 .6 Performance characteristics.
 - Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.

- .10 Relationship to adjacent work.
- .11 Relationship to interference drawings
- .12 After Consultants review, distribute copies.
- .13 Shop Drawing
 - .1 Architectural Shop Drawings submissions may be sent electronically via email in PDF format .
- .14 Submit electronic copies 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 in electronic format acceptable to Consultant.
- .15 Submit MSDS sheets to Consultant for requirements in specification Sections and as requested by Consultant.
- .16 Delete information not applicable to project.
- .17 Supplement standard information to provide details applicable to project.
- .18 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 re-submission of corrected shop drawings, through same procedure indicated above, and must be performed before fabrication and installation of Work may proceed.
- .19 Submit revised as built record hard and electronic copy of drawings and supporting data quarterly.
- .20 Shop Drawings: After review, all shop drawings will be returned to the Contractor stamped to show one of the following:

Reviewed	Reviewed with no comments.	0
Reviewed as Noted	Reviewed with comments noted on drawing.	Correct and
	resubmit for review.	
Revise & Resubmit	Resubmit for review.	

The contractor must conform to each request as above and as indicated. Revisions, re-submissions and amendments as required will not constitute an increase to project schedule. Take all necessary actions to revise and resubmit to coordinate and meet the project schedule. Include all necessary coordination of any and all shop drawings, of all disciplines, with interference drawings, and ensure cross over of all trades are integrated as well as coordinated. Cross reference shop drawings with interference drawings, submittals and quality assurance manuals.

1.5 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Consultant. Electronic submissions will not be accepted unless approved by the consultant in advance.
- .3 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by 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.

- Make changes in samples, which Consultant may require, consistent with Contract Documents. .6
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified. Add accepted samples to Quality Control manuals as schedule.
- PRODUCTS Not Used EXECUTION Not Used 2 3

1.1 REQUIREMENTS INCLUDED

- .1 Field engineering survey services to measure and stake the site.
- .2 Survey services to establish and confirm invert measurements for the Work.
- .3 Submit name and address of registered land surveyor performing survey work.
- .4 Submit to Consultant the survey of the Work prepared and issued by a registered land surveyor on completion of the building footings and foundations as required by authorities having jurisdiction and on completion of the Work.

1.2 RELATED REQUIREMENTS

- .1 All Sections of Division 01
- .2 Owner's identification of existing survey control points and property limits.

1.3 QUALIFICATION OF SURVEYOR

.1 Qualified registered land surveyor, acceptable to Owner.

1.4 SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical 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 a 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.

1.5 SURVEY REQUIREMENTS

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

1.6 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses. Record locations with horizontal and vertical data in project record documents.
- .2 On completion of foundations and major site improvements, prepare a certified survey drawing showing dimensions, locations, angles and elevations of Work.
- .3 Prior to any site activity or disturbances of existing grades, a signed acceptance of the existing grades within the Extent of Contract and their corresponding elevations shall be provided to the Owner. The signed acceptance shall be on a form provided shortly following the award of contract."
- .4 The format of the existing grade acceptance form is attached to this section of the specifications."

1.7 EXISTING UTILITIES AND STRUCTURES

- .1 Before commencing excavation, drilling or other earthwork, establish or confirm location and extent of all existing underground utilities and structures in work area.
- .2 Promptly notify Consultant if underground utilities, structures, or their locations differ from those indicated in Contract Documents or in available project information. Consultant will provide appropriate direction.
- .3 Record locations of maintained, re-routed and abandoned utility lines.

1.8 VERIFICATION OF EXISTING CONDITIONS

- .1 Where work specified in any Section is dependent on the work of another Section or Sections having been properly completed, verify that work is complete and in a condition suitable to receive the subsequent work. Commencement of work of a Section that is dependent on the work of another Section or Sections having been properly completed, means acceptance of the existing conditions.
- .2 Verify that ambient conditions are suitable before commencing the work of any Section and will remain suitable for as long as required for proper setting, curing, or drying of Products used.
- .3 Ensure that substrate surfaces are clean, dimensionally stable, cured and free of contaminants.
- .4 Notify Consultant in writing of unacceptable conditions.

PART 1 GENERAL

1.1 **REFERENCES**

- .1 Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .2 Canadian Standards Association (CSA) .1 CSA S350-M1980, Code of Practice for Safety in Demolition of Structures.
- .3 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990.

1.2 CONSTRUCTION SAFETY MEASURES

- .1 Comply with:
 - .1 National Building Code, Part 8 Safety Measures at Construction and Demolition Sites.
 - .2 Workers Safety and Insurance Board.
 - .3 Municipal Authorities

1.3 FILING OF NOTICE

.1 File Notice with Provincial authorities prior to commencement of Work.

1.4 WORK PERMIT

.1 Obtain Ministry of Labour Notification of Project Permit prior to commencement of work.

1.5 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.6 MEETINGS

.1 Pre-construction meetings: attend health and safety pre-construction meeting.

1.7 REGULATORY REQUIREMENTS

.1 Comply with specified standards and regulations to ensure safe operations at site containing hazardous or toxic materials.

1.8 WHMIS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, labeling and disposal of hazardous materials. Provide Material Safety Data Sheets.
- .2 Maintain copies of WHMIS data sheets on file at site; turn over to Owner on completion of project, under Section 01780.

1.9 FIRE SAFETY REQUIREMENTS

- .1 Comply with requirements of Fire Commission of Canada, Labour Canada.
- .2 Inform Municipal Fire Department of progress of work. Advise representatives of any potential hazardous operations or shut down of safety systems or devices.
- .3 Provide any details required by Fire Department.

1.10 OVERLOADING

.1 Ensure that no part of the work is subjected to loading that will endanger safety or will cause permanent deformation.

1.11 FALSEWORK

.1 Design and construct falsework to CSA S269.1.

1.12 SCAFFOLDING

.1 Design and construct scaffolding to CSA S269.2.

1.13 **RESPONSIBILITY**

- 1. Be responsible for safety of persons and property on site and for protection of persons off site and environment to extent that they may be affected by conduct of Work.
- 2. Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- 3. Comply with Ontario Health and Safety Act.

1.14 UNFORESEEN HAZARDS

.1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Consultant verbally and in writing.

1.15 CORRECTION OF NON-COMPLIANCE

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

1.16 POWDER ACTUATED DEVICES

1. Use powder actuated devices only after receipt written permission from Consultant.

1.17 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
- .2 Assign responsibility and obligation to Health and Safety Officer to stop or start Work when, at Health and Safety Officer's discretion, it is necessary or advisable for reasons of health or safety. Consultant may also stop Work for health and safety considerations.

PART 1 GENERAL

1.1 FIRES

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

1.2 DISPOSAL OF WASTES

- .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.3 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties where indicated.
- .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. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated or designated by Engineer/Architect.

1.5 WORK ADJACENT TO WATERWAYS

- .1 Do not operate construction equipment in waterways.
- .2 Do not use waterway beds for borrow material.
- .3 Do not dump excavated fill, waste material or debris in waterways.
- .4 Design and construct temporary crossings to minimize erosion to waterways.
- .5 Do not skid logs or construction materials across waterways.
- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .7 Do not blast under water or within 100 m of indicated spawning beds.

1.6 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this contract.

- .2 Control emissions from equipment and plant to local authority's emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1 G0ENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 Submittal Procedures.

1.2 REFERENCES

- .1 Export and Import of Hazardous Waste Regulations (EIHW Regulations), SOR/92 637.
- .2 National Fire Code of Canada 2010.
- .3 Transportation of Dangerous Goods Act (TDG Act) 1992, (T 19.01).
- .4 Transportation of Dangerous Goods Regulations (TDGR), (SOR/85 77, SOR/85 585, SOR/85 609, SOR/86 526).

1.3 DEFINITIONS

- .1 Dangerous Goods: Product, substance, or organism that is specifically listed or meets the hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .3 Hazardous Waste: Any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .4 Workplace Hazardous Materials Information System (WHMIS): A Canada wide system designed to give employers and workers information about hazardous materials used in the workplace. Under WHMIS, information on hazardous materials is to be provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by a combination of federal and provincial laws.

1.4 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit to Consultant current Material Safety Data Sheet (MSDS) for each hazardous material required prior to bringing hazardous material on site.
- .3 Submit hazardous materials management plan to Consultant that identifies all hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.

1.5 STORAGE AND HANDLING

- .1 Coordinate storage of hazardous materials with Consultant and abide by internal requirements for labelling and storage of materials and wastes.
- .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
- .3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.
- .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use. Store all flammable and combustible liquids in approved safety cans bearing the Underwriter=s Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Consultant.
- .5 Transfer of flammable and combustible liquids is prohibited within buildings.
- .6 Transfer of flammable and combustible liquids will not be carried out in the vicinity of open flames or any type of heat producing devices.

- .7 Flammable liquids having a flash point below 38°C, such as naptha or gasoline, will not be used as solvents or cleaning agents.
- .8 Store flammable and combustible waste liquids for disposal in approved containers located in a safe, ventilated area. Keep quantities to a minimum.
- .9 Observe smoking regulations at all times. Smoking is prohibited in any area where hazardous materials are stored, used, or handled.
- .10 Abide by the following storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers which are in good condition.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are not mixed.
 - .6 Store hazardous materials and wastes in a secure storage area with controlled access.
 - .7 Maintain a clear egress from storage area.
 - .8 Store hazardous materials and wastes in a manner and location which will prevent them from spilling into the environment.
 - .9 Have appropriate emergency spill response equipment available near the storage area, including personal protective equipment.
 - .10 Maintain an inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
- .11 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .12 Report spills or accidents immediately to Consultant. Submit a written spill report to Consultant within 24 hours of incident.

1.6 TRANSPORTATION

- .1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .2 If exporting hazardous waste to another country, ensure compliance with federal Export and Import of Hazardous Waste Regulations.
- .3 If hazardous waste is generated on site:
 - .1 Coordinate transportation and disposal with Generals Contractor.
 - .2 Ensure compliance with applicable provincial laws and regulations for generators of hazardous waste.
 - .3 Use only a licensed carrier authorized by provincial authorities to accept subject material.
 - .4 Prior to shipping material, obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept this material.
 - .5 Label container[s] with legible, visible safety marks as prescribed by federal and provincial regulations.
 - .6 Ensure that only trained personnel handle, offer for transport, or transport dangerous goods.
 - .7 Provide a photocopy of all shipping documents and waste manifests to Consultant.
 - .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Consultant.
 - .9 Report any discharge, emission, or escape of hazardous materials immediately to Consultant and appropriate provincial authority. Take reasonable measures to control release.

2 PRODUCTS

2.1 MATERIALS

- .1 Only bring on site the quantity of hazardous materials required to perform work.
- .2 Maintain MSDSs in proximity to where the materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

3 EXECUTION

3.1 DISPOSAL

- .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .2 Recycle hazardous wastes for which there is an approved, cost effective recycling process available.
- .3 Send hazardous wastes only to authorized hazardous waste disposal or treatment facilities.
- .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
- .6 Dispose of hazardous wastes in a timely fashion in accordance with applicable provincial regulations.

PART 1) GENERAL

1.1 SECTION INCLUDES

- Requirements for Construction IAQ Management: During Construction Operations. 1. 2.
 - Requirements for Construction IAQ Management: Before Occupancy which include either:
 - a) Option 1: Baseline IAQ Testing Procedures, Baseline IAQ requirements specify maximum indoor pollutant concentrations for acceptance of the facility; or

1.2 **RELATED SECTIONS:**

.1 All Sections of Division 01

1.3 **QUALITY ASSURANCE (NOT USED)**

1.4 REFERENCES

- 1. Sheet Metal and Air Conditioning Contractors National Association Inc. (SMACNA) IAQ Guidelines for Occupied Buildings under Construction (available from www.smacna.org/bookstore).
- 2.
- ASHRAE Standard 52.2 ASHRAE Standard 62 3.
- EPA Protocol for Environmental Requirements, Baseline IAQ and Materials, for the 4 Research Triangle Park Campus, Section 01445 (available at http://www.epa.gov/rtp/new-bldg/environmental/s 01445.htm)
- ASTM D6245 5.
- **ASTM D6345** 6.

PRE-CONSTRUCTION MEETING 1.5

After award of Contract and prior to the commencement of the Work, schedule and 1. conduct a meeting with General Contractor to discuss the proposed IAQ Management Plan and to develop mutual understanding relative to details of the plan.

1.6 SUBMITTALS

- Indoor Air Quality (IAQ) Management Plan: The Plan shall include, but not be limited to, 1. the following:
 - Describe any strategies for: 1
 - a) containing the work area;
 - b) modifying HVAC operation;
 - c) reducing emissions; and
 - d) intensifying housekeeping.
 - 2. Identify sources of indoor pollutants and describe how their impact will be minimized.
 - 3. Confirm which pre-Occupancy compliance method will be employed (Baseline Testing or Building Flush-out)
- 2. Product Data:
 - Submit product data for filtration media used during construction and during 1 operation. Include Minimum Efficiency Reporting Value (MERV).
- 3. Material Safety Data Sheets: Submit MSDSs for inclusion in Operation and Maintenance Manual for the following products.
 - Adhesives. 1.
 - Floor and wall patching/levelling materials.
 - 2. 3. Caulking and sealants.
 - 4. Insulating materials.
 - 5. Fireproofing and firestopping.

- 6. Carpet.
- Paint.
 Clear finish for wood surfaces.
- Clear finish for woo
 Lubricants.
- 10. Cleaning products.

PART 2 - PRODUCTS (NOT USED)

PART 3- EXECUTION

3.1 CONSTRUCTION IAQ MANAGEMENT DURING CONSTRUCTION

1. Contractor to read section 01 45 00 Quality.

During construction, comply with SMACNA IAQ Guidelines for Occupied Buildings under Construction.

This includes:

- 1. HVAC Protection: To the greatest extent possible, isolate and/or shut down the return side of the HVAC system during construction. When ventilation system must be operational during construction activities, provide temporary filters.
- 2. Source Control: Provide low and zero VOC materials as specified.
- 3. Pathway Interruption: Isolate areas of work as necessary to prevent contamination of clean or occupied spaces. Provide pressure differentials and/or physical barriers to protect clean or occupied spaces.
- 4. Housekeeping: During construction, maintain project and building products and systems to prevent contamination of building spaces.
- 5. Protect stored on-site and installed absorptive materials from moisture damage.
- 6. Provide adequate ventilation during and after installation of interior wet products and interior final finishes.
- 7. Provide filtration media with a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2 during construction and during Owner occupancy. Coordinate with work of Division 15.
- 8. Scheduling: Schedule construction operations involving wet products prior to packaged dry products to the greatest extent possible.

3.2 CONSTRUCTION IAQ MANAGEMENT BEFORE OCCUPANCY (OPTION 1): INDOOR AIR QUALITY (IAQ) BASELINE TESTING

- 1. Following a request by the Contractor, prior to Substantial Performance but following commissioning and verification of the HVAC system operation, The Owner will carry out IAQ Baseline testing. Coordinate with commissioning as specified in Section 01 91 00. Testing shall include:
 - 1. Perform testing for minimum 3 locations in each air handling zone. Perform in the breathing zone; between 1.2m (4') and 2.1m (7') from the floor.
 - 2. Collect air samples on three consecutive days during normal business hours (between the hours of 8:00 am and 5:00 pm) with building operating at normal HVAC. rates. Average the results of each three-day test cycle to determine compliance or non-compliance of indoor air quality for each handling zone tested.
 - 3. Sample and record outside air levels of formaldehyde and TVOC contaminants at outside air intake of each respective air handling unit simultaneously with indoor tests to establish basis of comparison for these contaminant levels.
- 2. Baseline IAQ. shall conform to the following standards and limits:
 - 1. Carbon Monoxide: Not to exceed 9 ppm.

- 2. Carbon Dioxide: Set points not to exceed 530 ppm higher than outdoor ambient levels Assess indoor Carbon Dioxide concentrations in accordance with ASTM D6245.
- 3. Airborne Mould and Mildew: Simultaneous indoor and outdoor readings.
- 4. VOCs and particulates: Monitor VOCs (volatile organic compounds) in indoor air in accordance with ASTM D6345. Indoor room air concentration levels, emission rates, and qualities of the listed contaminants shall not exceed the following limits. The levels do not account for contributions from office furniture, occupants, and occupant activities.

MAXIMUM INDOOR AIR CONCENTRATION STANDARDS Indoor Contaminants Allowable Air Concentration Levels

<20 micrograms per cubic metre above outside air concentrations.
<200 micrograms per cubic metre above
outside air concentrations
<3 micrograms per cubic metre
<20 micrograms per cubic metre
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3. If any test fails the standard, the Contractor is responsible to ventilate the building with 100 percent outside air until the building passes both air quality tests and duct inspections. Retesting shall be performed at no additional expense to the Owner.

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Inspection and testing, administrative and enforcement requirements.
- .2 Equipment and system adjust and balance.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures.
- .2 Section 01 78 00 Closeout Submittals.

1.3 INSPECTION

- .1 Allow 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.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.
- .3 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.
- .4 Consultant may order any 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, Consultant shall pay cost of examination and replacement.

1.4 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be coordinated by Consultant for purpose of inspecting and/or testing portions of Work.
- .2 Allocated costs: by Owner, not in contract.
- .3 Provide equipment required for executing inspection and testing by appointed agencies.
- .4 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .5 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 Consultant. Pay costs for retesting and reinspection.

1.5 ACCESS TO WORK

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

1.6 PROCEDURES

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

1.7 REJECTED WORK

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

1.8 REPORTS

- .1 Consultant will distribute copies of inspection and test reports.
- .2 Provide copies to Subcontractor of work being inspected or tested manufacturer or fabricator of material being inspected or tested.

1.9 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as may be requested.
- .2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Consultant and may be authorized as recoverable.

PART 1GENERAL

1.1 REQUIREMENTS INCLUDED

- .1 Barriers
- .2 Environmental Controls
- .3 Construction Aids
- .4 Use of the work
- .5 Traffic controls
- .6 Utilities
- .7 Protection
- .8 Office and sheds
- .9 Project identification
- .10 Progressive cleaning

1.2 INSTALLATION/REMOVAL

- .1 Provide construction facilities and temporary controls in order to execute the work expeditiously and as may be required by health and safety legislation.
- .2 Remove from site all such work after use.

1.3 HOARDING

- .1 Provide hoarding, protecting public and private property from injury or damage. Provide lockable gates within hoarding for access to site by workers and vehicles.
- .2 Erect fencing around perimeter of site to protect the public, workers, public and private property from injury or damage as required.
- .3 Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to building.
- .4 Provide barriers around trees and plants designated to remain. Protect from damage.

1.4 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard railings and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.
- .2 Provide a protection as required by governing authorities.

1.5 WEATHER ENCLOSURES

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

1.6 WEATHER PROTECTION OF BUILDING AFTER BUILDING ENVELOPE IS FINISHED

- .1 Conduct the Work at all times in such a manner as to prevent the ingress of precipitation into the building space or building elements, and repair promptly any damage which results from any ingress of precipitation in areas adjacent to the Work.
- .2 Ensure that NEW roof drains are functional and not obstructed during the course of the Work and make temporary provision for harmless drainage of water from the roof, should the flow to roof drains be unavoidably obstructed.

- .3 Ensure that materials installed to protect against water infiltration are installed to withstand the effects of high winds and other foreseeable weather conditions.
- .4 Monitor weather protection installations periodically, in response to weather conditions, and not less than once per day including during periods of inactivity on site such as weekends and holidays, and repair any damage to weather protection immediately.
- .5 Provide the Owner with contact names and phone numbers of one person and one alternate person who will, upon notification by a representative of the Owner of the ingress of water into the building, at any time, take immediate and appropriate action to stop any such ingress.

1.7 DUST, SOUND AND ACCESS BARRIERS

- .1 Construct temporary barriers complete with sound attenuating batt insulation in stud wall cavity to protect adjacent areas from dust, sound and access between occupied portions of the building and all construction activity, which provide for the security and safety of residents, staff and visitors at all times. Install lockable doors c/w required hardware as required to keep areas secure.
- .2 In addition to the above, provide dust tight screens or partitions to localize dust generating activities, and for the protection of workers, finished areas of work, residents, staff and visitors.
- .3 Maintain and relocate barriers and screens until such work is complete.

1.8 SCAFFOLDING

.1 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, temporary stairs and other such equipment as may be required in a manner which meets the requirements of governing authorities.

1.9 HOISTING

- .1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Hoists and cranes shall be operated by qualified operator.

1.10 DEWATERING

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

1.11 SITE STORAGE/LOADING

- .1 Confine the Work and the operations of employees to limits indicated by the Contract Documents. Do not unreasonably encumber the premises with products.
- .2 Do not load or permit to be loaded any part of the Work with a weight or force that will endanger the Work.
- .3 During Phase One, deliveries to and waste removal from the building, required for the operation of the facility, must pass through the area designated for Contractor's use during this Phase. Facilitate safe passage of such vehicles and personnel through the zone of construction activity, and do not unreasonably restrict deliveries or pick-ups.

1.12 ACCESS TO SITE

- .1 Provide, maintain and repair existing parking lots, roads, sidewalk crossings.
- .2 Provide and maintain temporary ramps and construction runways as may be required for access to the Work, and for use by Owner and public.

1.13 STREETS AND TRAFFIC CONTROL

- .1 The Contractor shall provide all necessary flagmen, detour signs, warning lights, signs and barricades necessary to notify, direct and protect pedestrian and vehicular traffic en route to and from and within the project limits, and shall conduct his operations to ensure the safety and avoid inconvenience to the travelling public and nearby residents and facility users.
- .2 The Contractor shall maintain access streets to the site clean of dust, mud and debris. The Consultant may request that the Contractor sweep such access streets, if in the opinion of the Consultant the Contractor's operations have created the need. No payment to the Contractor for such demands will be made.

1.14 CONSTRUCTION PARKING

- .1 Parking will be not be permitted on school property during school operating hours.
- .2 Provide and maintain adequate access to project site.
- .3 If authorized to use existing roads for access to project site, make good damage resulting from Contractors' use of roads.
- .4 The existing paved parking lot is not to be used at anytime.

1.15 SANITARY FACILITIES

- .1 Provide sufficient sanitary facilities for workers in accordance with local health authorities. Use of the existing building facilities is prohibited.
- .2 Maintain in clean condition.

1.16 WATER SUPPLY

.1 Owner will permit Contractor access to Owner's water.

1.17 TEMPORARY HEATING & VENTILATION

- .1 Provide temporary heating and ventilation during construction period, including attendance, maintenance, and fuel, 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.
 - .6 Protect the concrete footings from frost or freezing.
- .2 Construction heaters used inside the building must be vented to the outside or be non-flameless type. Solid fuel salamanders not permitted.
- .3 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.

- .4 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .5 Maintain strict supervision of operation of temporary ventilating equipment to:
 - .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct fired combustion units to outside.
- .6 On completion of Work for which the permanent heating system is used, replace filters, and turn over equipment in new condition.
- .7 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 so certified by Consultant.
- .8 Pay costs for maintaining temporary heat, when using permanent heating system.
- .9 The new permanent heating and ventilating systems of the building or portions thereof, may be used when available and when approved by the Consultant and the Owner. Be responsible for damage to permanent heating system.
- .10 Be responsible for damage to the Work due to failure in providing adequate heat and protection during construction.

1.18 TEMPORARY POWER AND LIGHT

- .1 Contractor will provide temporary power required during construction for temporary lighting and the operating of power tools.
- .2 Pay all costs for the installation, and distribution of temporary power and lighting.
- .3 Arrange for connection with appropriate utility company. Pay all costs for installation, maintenance and removal.
- .4 Interruption of electrical power supply to the building, for purpose of service upgrading and transformer installation must be minimized and under no circumstances may power to the building be interrupted for more that 12 consecutive hours.
- .5 Provide and maintain temporary lighting throughout the project. The level of illumination on all floors and stairs shall not be less than 15 foot candles.

1.19 TEMPORARY TELEPHONE

.1 Provide Site Superintendent with cellular telephone to be carried on his person during normal working hours complete with message recording service.

1.20 UTILITIES, FENCES AND PRIVATE PROPERTY

.1 The Contractor shall be responsible for the protection of all utilities, fences and private property at the job site during the time of construction.

.2 Utilities

- .1 General
 - .1 The Contractor shall pay all costs deemed necessary by the Utility authorities to provide all protective measures within the limits of the Contract. The Contractor shall remain responsible for any unauthorized disruptions of service and any damage to utilities arising out of the Contractor's work, notwithstanding such protection. The Utility authorities will carry out all the work of temporary rearranging and shielding of lines deemed necessary. The cost of all such protective measures, together with the cost of restoring the lines to their original state and location, will be at the expense of the Contractor, and will be billed to the Contractor by the Utility authority.
 - .2 Whenever, in the opinion of the Utility authority, standby crews are necessary during blasting operations, the Contractor shall make the necessary arrangements with the Utility authority and the cost of such crews and equipment shall be billed to the Contractor by the Utility authority. These measures will apply to those utilities located within all blasting areas.
 - .3 The Contractor shall notify in writing the appropriate Utility Companies of construction commencement, with a copy submitted to the Contract Administrator within 3 business days of being granted permission to start work.
 - .4 The Contractor shall notify the appropriate Utility Companies one week in advance of any rock blasting, with a copy submitted to the Contract Administrator within 3 business days.
- .2 Adjacent Structures and Utilities
 - .1 Perform temporary and permanent support and temporary relocation and replacement of underground or overhead utilities.
 - .2 Permanent relocation of underground or overhead utilities will be carried out by others, if necessitated by coincidence of lines or grades.
- .3 Existing Drainage and Water Supply
 - .1 Maintain temporary and permanent flow in all sewers, water mains, drains, gutters, ditches, watercourses, house and inlet connections.
 - .2 Maintain the flow in and from the existing utility mains and services by whatever means or material that is necessary until the Consultant permits the use of the constructed main. Include all cost for maintaining flow in the tender prices for sewer and water pipe construction related items.
- .4 Support of Permanent Underground Utilities
 - .1 Where permanent pipes are uncovered or during the construction of new systems, it is found that the pipes cross each other, the Consultant may direct that concrete be placed to provide support for the pipes. The concrete shall be placed as directed and in locations as determined by the Consultant. The concrete shall be measured in place and payment made in accordance with the allowances of the contract.
 - .2 Where permanent existing services have been uncovered during excavation of trenches for installation of utility mains the Consultant may require a 50 mm x 150 mm creosote wood plank be placed under each pipe on a thoroughly compacted bed throughout the entire width of excavation so that this pipe is fully supported by the timber. Sand cushion material shall be

surrounding each pipe and be of no less than 150 mm thickness from the outside diameter of the pipe, hand compacted and backfilled as directed by the Contract Administrator. Wooden planks to be provided by the Town.

- .3 Place concrete in accordance with the direction of the Consultant. Supply and place concrete in accordance with OPSS 904.
- .5 Support Of Gas Pipelines
 - .1 General
 - .1 This following applies to all excavations of gas company underground plant.
 - .2 Gas pipelines shall be supported at all times to prevent damage to the pipeline from
 - deflection due to its own weight plus any other load that may be imposed on it.
 - .2 Temporary Support
 - .1 A suitable method of supporting gas pipelines shall be used when an excavation will result in unsupported pipe spans exceeding the maximum spans permitted by the gas company. Provide suitable, temporary support acceptable to the gas company.
 - .2 Temporary support shall remain in place until permanent support is provided and shall be inspected at least every three weeks by personnel from the gas company.
 - .3 Permanent Support
 - .1 Permanent support of a gas pipeline shall be provided by either a properly compacted backfill method or a structural method. A properly compacted backfill method is preferred.
 - .2 Where proper support cannot be provided with backfill material, permanent structural supports shall be installed. The appropriate gas authority shall provide some typical designs. Where these designs are not suitable, the Engineer shall be consulted for a custom design.
- .6 Protection and Locations
 - .1 Prior to commencing any excavation work, notify applicable utility authorities, establish location and state of use of buried services. Clearly mark such locations to prevent disturbances during work.
 - .2 Maintain and protect from damage, water, sewer, gas electric or other utilities encountered.
 - .3 Obtain direction of Owner of utility and Consultant before moving or otherwise disturbing utility.
 - .4 Utilities that require permanent relocation will be the responsibility of the utility company concerned at no expense to the Contractor. Co operate with the utility companies who shall have free access to their plant at all times.
 - .5 Where existing pipes, ducts, or other underground services intersect the pipe trench, support the pipe trench to the approval of the Consultant and the utility company.
 - .6 Where existing overhead poles are adjacent to the excavation, temporarily support them to the approval of the Consultant and the utility company concerned.
 - .7 Notify Fire Department of any planned or accidental interruption of water supply to hydrants.
 - .8 The position of all pole lines, conduits, watermains, sewers and other underground and overground utilities and structures is not necessarily shown on the contract drawings, and, where shown, the accuracy of the position of such utilities and structures is not guaranteed and the Owner disclaims, on behalf of himself and those responsible for such drawings, all liability with respect to same. Before starting work, the Contractor shall inform himself of the exact locations of such utilities and structures, and shall be liable for damages to them as a result of any act or omission, whether or not the result of negligence, by those for whom he is responsible. The Contractor waives any claim and releases the Owner and the agents of the Owner from all liability for damages suffered as a result of such contract drawings. Size,

depth and location of existing utilities as shown is for guidance only; completeness and accuracy of information is not guaranteed.

- .9 Protect existing buildings, trees and other plants, lawns, fencing, service poles, wires or paving located within right of way or adjoining properties from damage while work is in progress and repair damage resulting from work.
- .10 Where excavation necessitates root or branch cutting, do so only under direct control of the Consultant.
- .11 Whenever shoring, sheeting, timbering and bracing of excavations is required, engage services of a Professional Engineer to design and assume the responsibility for adequacy of shoring and bracing. Professional Engineer to be registered in province of territory in which work is to be carried out.
- .12 When requested, submit for review, drawings and calculations signed and stamped by Professional Engineer responsible for their preparation. Close sheeting, when required, to be designated and constructed to prevent adjacent soil or water from entering excavation.
- .13 Maintain unobstructed access to fire and police appurtenances, telephone, electric, water, sewer, gas, or other public utilities and private properties.
- .14 Immediately take all necessary action for the repair of damaged utilities and pay all cost for the repair work.
- .15 Refer to existing utility information that may be contained in this Contract.
- .7 Private Lands
 - .1 The Contractor shall not enter upon or occupy with men, equipment or materials of any nature or store any materials on any private property unless he has obtained a consent from the property owner and a copy of such consent has been furnished to the Consultant.
 - .2 Any resulting costs for occupying private lands shall be at the Contractor's expense.

1.21 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2 Open fires and burning of rubbish are not permitted on the site.
- .3 Fire Routes
 - .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.22 FIRST AID

- .1 The Contractor shall provide and maintain on the site where construction is being carried out, completely equipped first aid facilities in a clean orderly condition, which shall be readily accessible at all times to all his employees and the Consultant and his staff.
- .2 The Contractor shall designate certain employees who are properly instructed to be in charge of first aid. At least one such employee shall always be available on the site while work is being carried on.
- .3 A telephone call list for summoning aid such as doctors, ambulances, and rescue squads from outside sources shall be conspicuously posted.

1.23 PROTECTION OF BUILDING FINISHES & EQUIPMENT

.1 Provide protection for the new finished and partially finished building components and equipment during performance of Work.

- .2 Provide necessary screens, covers, hoardings as required.
- .3 Be responsible for damage incurred due to lack of or improper protection.
- .4 Make good all damaged existing work required to be damaged to facilitate new work covered under this contract.

1.24 SECURITY

.1 Decision to provide security personnel resides solely with the Contractor.

1.25 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 Engineer. Such spills or discharges and their adverse effects shall be as defined in the Environmental Protection Act R.S.O. 1980.
- .2 All spills or discharge 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.

1.26 PROTECTION OF WATER QUALITY

- .1 At all times, the Contractor shall maintain existing stream flows and shall control all construction work so as not to allow sediment or other deleterious materials to enter streams.
- .2 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 but shall be diffused onto vegetative areas a minimum of 30 metres from the watercourse. Where this measure is not sufficient or feasible to control sediment entering the watercourses, sedimentation traps or geotextile coverage will be required.
- .3 If dewatering is required, the water shall be pumped into a sedimentation pond or diffused onto vegetated areas a minimum of 30 metres from the watercourses and not pumped directly into the watercourses.
- .4 No machinery shall enter the creek bed of any watercourse. Movement of construction equipment in the vicinity of any creek shall be limited to the minimum required for construction.
- .5 The Contractor shall not carry out equipment maintenance or refueling or store fuel containers within 100 metres of any watercourse. The Contractor shall not stockpile construction debris or empty fuel/pesticide containers within the Contract limits.

1.27 SITE OFFICES

.1 Provide a temperature controlled and ventilated office, with suitable lighting, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

- .2 Provide and maintain in clean condition during progress of Work, adequately lighted, heated and ventilated Contractor's office with space for filing and layout of Contract Documents and contractors normal site office staff, and site meetings.
- .3 Provide adequate required first aid facilities.
- .4 Subcontractors may provide their own offices as necessary. Direct the location of these offices.

1.28 EQUIPMENT/TOOL/MATERIALS 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 the least interference with work activities.

1.29 CONSTRUCTION SIGN

- .1 Erect Owner, Consultant and Ministry of Education project signs, in location(s) as designated by the Consultant.
- .2 Provide lumber framing as required to provide secure, wind resistant installation. Brace as required.
- .3 Maintain sign in good condition for the duration of Work. Clean periodically.

1.30 PROJECT CLEANLINESS

- .1 Maintain the Work in tidy condition, free from the accumulation of waste products and debris.
- .2 Remove waste material and debris from the site and deposit in waste container at the end of each working day.
- .3 Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

1.31 WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM (WHIMS)

.1 Reporting

- .1 Prior to the commencement of work, the Contractor shall provide, to the Consultant, a list of those products controlled under the WHMIS, which he expects to use on the contract. Related Material Safety Data Sheets shall accompany the submission. All containers used in the application of products controlled under WHMIS shall be labeled.
- .2 The Contractor shall notify the Consultant of changes to the list in writing and provide relevant material Safety Data Sheets.

PART 1 GENERAL

1.1 REFERENCES

- .1 National Building Code of Canada (2010)
- .2 National Fire Code of Canada (2007)
- .3 Ontario Fire Code (2007)
- .4 Guidelines for Maintaining Fire Safety during Construction in Existing Buildings, (10/31/88) Ontario Ministry of the Solicitor General, Office of the Fire Marshal.
- .5 Ontario Building Code (Regulation 350/06)

1.2 FIRE SAFETY

- .1 Fire Fighting Equipment
 - .1 Provide and maintain in working order, ULC labeled, 9kg 4A 60BC type fire extinguishers, and locate in prominent positions to approval of authorities having jurisdiction.
- .2 Fire Department Access
 - .1 Provide and maintain fire access routes as designed, as soon as construction sequence will allow. Access routes must have compacted granular sub base, in place before superstructure of building may proceed.
 - .2 Construction activities must not obstruct access routes designated for fire department equipment. If necessary that existing access be obstructed or deleted, alternative access, acceptable to the fire department, must be provided prior to commencement of construction, in accordance with Ontario Building Code location and design criteria for required access routes.
- .3 Control of Combustible Materials
 - .1 The stockpiling of construction materials adjacent to the existing building must be carefully controlled in accordance with the Ontario Fire Code. Materials stored, and their proximity to, equipment used in construction may create a fire hazard. Control of combustibles on a construction site is regulated under the Occupational Health and Safety Act.
- .4 Hot Work
 - .1 Conform to the requirements of the Occupational Health and Safety Act – Regulations for Construction Projects.
 - .2 Provide all necessary guards and barriers to protect workers, property, and the public when performing hot work such as torching, cutting or coring. Protect all adjacent combustible materials.
 - .3 Provide a "Fire Watch" for a minimum of 3 hours after each instance of discontinuing hot work.

PART 1) GENERAL

1.1 SECTION INCLUDES

- .1 Barriers.
- .2 Environmental Controls.
- .3 Traffic Controls.
- .4 Fire Routes.

1.2 RELATED SECTIONS

.1 Section 01 35 46 Indoor Air Quality (IAQ) Management

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB) .1 CGSB 1.189M-84, Primer, Alkyd, Wood, Exterior.
- .2 Canadian Standards Association (CSA) .1 CSA-O121-M1978, Douglas Fir Plywood.
- .3 CAS Standard 2317:13:03 as amended latest CSA for renovations.

1.4 INSTALLATION AND REMOVAL

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

1.5 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around open stair wells and all hazardous locations.
- .2 Provide as required by governing authorities.

1.6 WEATHER ENCLOSURES

- .1 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
- .2 Design enclosures to withstand wind pressure and snow loading.

1.7 DUST TIGHT SCREENS

- .1 Provide dust tight screens or insulated 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 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.9 SITE WARNING SIGNAGE

.1 Provide and maintain warning signs at all points of access. Identify site access and safety requirements.

1.10 FIRE ROUTES

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

1.11 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.

1.12 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 five (5) days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

1.13 PROTECTION OF BUILDING MECHANICAL VENTILATION SYSTEM

- .1 Refer to Division 1 Section 01 35 46 Indoor Air Quality (IAQ) Management
- 2.0 PRODUCTS Not Used.
- 3.0 EXECUTION Not Used.

Part 1 General

1.1 SECTION INCLUDES

- .1 Product quality, availability, storage, handling, protection, and transportation.
- .2 Manufacturer's instructions.
- .3 Quality of Work, coordination and fastenings.

1.2 RELATED SECTIONS

.1 Section 01 45 00 Quality Control.

1.3 **REFERENCE STANDARDS**

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2 2008, Stipulated Price Contract.
- .2 Within the text of the specifications, reference may be made to the following standards:

ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASTM	American Society of Testing and Materials
CEC	Canadian Electrical Code including Ontario Supplement (published by CSA)
EEMAC	Electrical and Electronic Manufacturers Association of Canada
CGSB	Canadian General Standards Board
CISC	Canadian Institute of Steel Construction
CLA	Canadian Lumberman's Association
CPCA	Canadian Painting Contractors' Association
CPCI	Canadian Prestressed Concrete Institute
CRCA	Canadian Roofing Construction Association
CSA	Canadian Standards Association
FM	Factory Mutual Engineering Corporation
IEEE	Institute of Electrical and Electronic Engineers
IPCEA	Insulated Power Cable Engineers Association
NAAMM	National Association of Architectural Metal Manufacturers
NBC	National Building Code
NEMA	National Electrical Manufacturers Association
OPSD	Ontario Provincial Standards for Roads & Municipal Services
TTMAC	Terrazzo, Tile and Marble Association of Canada
ULC	Underwriters' Laboratories of Canada

- .3 Conform to these standards, in whole or in part as specifically requested in specifications.
- .4 If there is question as to whether any product or system is in conformance with applicable standards, Consultant reserves right to have such products or systems tested to prove or disprove conformance.
- .5 The cost for such testing will be born by Owner in event of conformance with Contract Documents or by Contractor in event of non conformance.
- .6 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.

1.4 QUALITY

- .1 Refer to CCDC 2, GC 3.8.
- .2 Products, materials, equipment and articles (referred to as products throughout specifications) 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.

- .3 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.
- .4 Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 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.
- .7 Wherever a Product or manufacturer is specified by a single proprietary name, provide the named Product only.
- .8 Wherever more than one Product or manufacturer is specified by proprietary name for a single application, provide any one of the named Products.

1.5 AVAILABILITY

- .1 Immediately upon signing Contract, 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.
- .3 If a specified Product is no longer available, promptly notify Consultant. Consultant will take action as required.

1.6 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.

1.7 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

1.8 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.

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

1.10 CO ORDINATION

- .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.

1.11 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.

1.12 REMEDIAL WORK

- .1 Refer to CCDC 2, GC 3.13 and Section 01 70 00 Execution.
- .2 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .3 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.13 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.

1.14 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 non-corrosive 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.

1.15 FASTENINGS AND 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.

1.16 PROTECTION OF WORK IN PROGRESS

.1 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.

1.17 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.

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Requirements and limitations for cutting and patching the Work.
- .2 Except where otherwise specified in technical Specifications or otherwise indicated on Drawings, comply with requirements of this Section.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures.
- .2 Individual product Sections: cutting and patching incidental to work of section. Advance notification to other sections required.

1.3 SUBMITTALS

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

1.4 GENERAL

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete the Work.
- .2 Fit the several parts together, to integrate with other work.
- .3 Uncover work to install ill-timed work.
- .4 Remove and replace defective and non-conforming work.
- .5 Remove samples of installed work for testing.
- .6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical work.

1.5 MANUFACTURER'S INSTRUCTIONS

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

- .2 Notify Consultant, in writing, of conflicts between Contract Documents and manufacturer's instructions where, in Contractor's opinion, conformance with Contract Documents instead of the manufacturer's instructions may be detrimental to the Work or may jeopardize the manufacturer's warranty.
- .3 Do not rely on labels or enclosures provided with Products. Obtain written instructions directly from manufacturers.
- .4 Provide manufacturer's representatives with access to the Work at all times. Render assistance and facilities for such access so that manufacturer's representatives may properly perform their responsibilities.

1.6 CONCEALMENT

- .1 Conceal pipes, ducts, and wiring in floors, walls and ceilings in finished areas:
 - .1 after review by Consultant and authority having jurisdiction, and
 - .2 where locations differ from those shown on Drawings, after recording actual locations on asbuilt drawings.
- .2 Provide incidental furring or other enclosures as required.
- .3 Notify Consultant in writing of interferences before installation.

1.7 FASTENINGS - GENERAL

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials.
- .2 Prevent electrolytic action and corrosion between dissimilar metals and materials by using suitable non-metallic strips, washers, sleeves, or other permanent separators to avoid direct contact.
- .3 Use non-corrosive fasteners and anchors for securing exterior work [and in spaces where high humidity levels are anticipated].
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Do not use fastenings or fastening methods that may cause spalling or cracking of material to which anchorage is made.

1.8 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Bolts shall not project more than one diameter beyond nuts.

1.9 FIRE RATED ASSEMBLIES

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

1.10 LOCATION OF FIXTURES, OUTLETS AND DEVICES

.1 Consider location of fixtures, outlets, and devices indicated on Drawings as approximate.
- .2 Locate fixtures, outlets, and devices to provide minimum interference, maximum usable space, and as required to meet safety, access, maintenance, acoustic, and regulatory, including barrier free, requirements.
- .3 Promptly notify Consultant in writing of conflicting installation requirements for fixtures, outlets, and devices. If requested, indicate proposed locations and obtain approval for actual locations.

1.11 PROTECTION OF COMPLETED WORK AND WORK IN PROGRESS

- .1 Adequately protect parts of the Work completed and in progress from any kind of damage.
- .2 Promptly remove, replace, clean, or repair, as directed by Consultant, work damaged as a result of inadequate protection.
- .3 Do not load or permit to be loaded any part of the Work with a weight or force that will endanger the safety or integrity of the Work.

1.12 REMEDIAL WORK

.1 Notify Consultant of, and perform remedial work required to, repair or replace defective or unacceptable work. Ensure that properly qualified workers perform remedial work. Coordinate adjacent affected work as required.

1.13 EXECUTION

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

1.14 MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 Submittal Procedures.

1.1 SECTION INCLUDES

- .1 Field survey services to measure and stake site.
- .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 QUALIFICATIONS OF SURVEYOR

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

1.4 SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical 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.

1.5 EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings.
- .2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by Consultant.

1.6 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate
- .2 Relocate electrical outlets up to 1.5m from location indicated at no extra cost.
- .3 Relocate diffusers up to 600mm from location indicated at no extra cost.
- .4 Relocate any suspended ceiling up or down by 150mm from elevations indicated to suit site conditions at no extra cost.
- .5 Relocate roof hoppers up to 3000mm from location indicated at no extra cost.
- .6 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.

- .7 Inform Consultant of impending installation and obtain approval for actual location.
- .8 Prepare Submit field interference drawings to indicate relative position of various services and equipment to ensure proper coordination of all mechanical and electrical services at no additional cost.

1.7 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
- .3 Record locations of maintained, re-routed and abandoned service lines.

1.8 SUBMITTALS

- .1 Submit name and address of Surveyor to Consultant.
- .2 On request of Consultant, submit documentation to verify accuracy of fielding work.
- .3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform to Contract Documents.

1.9 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.

1.1 GENERAL

- .1 Conduct cleaning and disposal operations to comply with local ordinances and environmental protection legislation.
- .2 Store volatile wastes in covered metal containers and remove from premises at end of each working day.
- .3 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

1.2 CLEANING DURING CONSTRUCTION

- .1 Maintain the Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste material and debris from the work areas and deposit in waste container at the end of each working day.
- .3 Vacuum clean interior areas prior to start of finishing work. Maintain areas free of dust and other contaminants during finishing operations.
- .4 Individual Subcontractors are responsible for the daily clean-up and removal of debris related to, or generated by, their own work. The overall responsibility for project cleanliness rests with the Contractor.

1.3 WASTE MANAGEMENT

- .1 Audit, separate and dispose of construction waste generated by new construction or by demolition of existing structures in whole or in part, in accordance with Ontario Regulations 102/94 and 103/94 made under the Environmental Protection Act.
- .2 Fires and burning of rubbish or waste on site is prohibited.
- .3 Burying of rubbish or waste materials, except as specified herein, is prohibited.
- .4 Disposal of waste or volatile materials such as mineral spirits, oil, gasoline or paint thinner into ground, waterways, or sewer systems is prohibited.
- .5 Empty waste containers on a regular basis to prevent contamination of site and adjacent properties by wind-blown dust or debris.

1.4 FINAL CLEANING OPERATIONS

- .1 Immediately following Date of Substantial Performance, and prior to Owner occupancy of the building or portion of the building affected by the Work, conduct full and complete final cleaning operations.
- .2 Final cleaning operations shall be performed by an experienced professional cleaning company, possessing equipment and personnel sufficient to perform full building cleaning operations.
- .3 Remove all surplus products, tools, construction machinery and equipment not required for the performance of remaining work, and thereafter remove any

remaining materials, equipment, waste and debris.

- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .6 Cleaning operations shall include the removal of all stains, spots, scuff marks, dirt, dust, remaining labels, adhesives or other surface imperfections.
- .7 Remove all paint spots or overspray from all affected surfaces.
- .8 Clean and polish all glass and mirrors. Replace broken, scratched or disfigured glazing. Remove remaining manufacturer's and safety "X" labels.
- .9 Clean and polish all finished metal surfaces such as enamelled or stainless steel, chrome, aluminum, brass, and bronze.
- .10 Clean and polish all vitreous surfaces such as plumbing fixtures, ceramic tile, porcelain enamel, or other such materials.
- .11 Clean all ceramic tile surfaces in accordance with the manufacturer's instructions and apply final coat of sealer where specified.
- .12 Clean inside of all millwork and cabinetry.
- .13 Vacuum, clean and dust behind grilles, louvres and screens.
- .14 Seal and wax all resilient floor surfaces as specified, and as recommended by the manufacturer.
- .15 Steam clean all carpets immediately prior occupancy by Owner.
- .16 Broom clean and spray wash all exterior paved surfaces.
- .17 Remove dirt and other disfiguration from exterior surfaces.
- .18 Clean all roofs, gutters, downspouts, areaways, drywells, and drainage systems.
- .19 Clean all equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment.

1.1 RELATED SECTIONS

.1 Closeout Submittals Section 01 78 00

1.2 INSPECTION AND DECLARATION PROCEDURES

.1 Arrange for, conduct and document final inspections, close-out and commissioning at the completion of the Work in accordance with procedures described in these documents.

1.3 SUBSTANTIAL PERFORMANCE

- .1 Contractor's Inspection
 - .1 Refer to OAA/OGCA Document 100 STAGE 2.
 - .2 The Contractor and all Subcontractors shall conduct an inspection of the work, identify deficiencies and defects, and make corrections as required to conform with the Contract Documents. Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made. Request a Consultant's Inspection.
- .2 Contractor's Application for Substantial Performance of the Work
 - .1 Refer to OAA/OGCA Document 100 STAGE 3.
 - .2 When the Contractor has carried out the steps in Stage 2 of OAA/OGCA Document 100 and has determined that the requirements of the Contract have been substantially performed as defined by local Lien legislation, the Contractor shall make application for Substantial Performance of the Work.
 - .3 In addition to the requirements of OAA/OGCA Document 100, the following items shall accompany the Contractor's application for Substantial Performance. These items must be complete in all respects, and all verification certificates and reports having been submitted and approved by the Consultants:
 - .1 Completed Maintenance Manuals for all disciplines (No. of copies as specified),
 - .2 As-Built Drawings for all disciplines (No. of copies as specified),
 - .3 Mechanical, and Electrical as-built CAD drawings,
 - .4 Occupancy Permit (where required by Municipality),
 - .6 Gas fired appliances inspection,
 - .7 Plumbing Inspection,
 - .8 Domestic Water Quality Test Report,
 - .10 Mechanical start-up reports
 - .11 Electrical distribution system inspection,
 - .12 ESA Hydro Certificate,
 - .13 Commissioning, except for functional testing and controls training, unless approved in writing by the Owner's Project Manager.
- .3 Consultant's Inspection
 - .1 The Consultants shall perform an inspection of the Work to assess the validity of the Contractors application, and shall identify in separate lists, unfinished work and deficiencies. Contractor shall correct work accordingly.

- .4 Certificate of Substantial Performance .1 Refer to OAA/OGCA Document 100 – STAGE 4.
 - .2 Should the Consultant concur with the Contractor's application for Substantial Performance, the Consultant shall notify the Contractor of approval of the application for Substantial Performance and issue a Certificate of Substantial Performance.
 - .3 The Contractor shall publish a copy of the Certificate of Substantial Performance in a construction trade newspaper and shall provide the Consultant with proof of the date of publication.

1.4 LIEN PERIOD AND RELEASE OF ASIC HOLDBACK

- .1 Refer to OAA/OGCA Document 100 STAGE 5.
- .2 Commencement of Lien and Warranty Periods
 - .1 The day following the date of publication of Certificate of Substantial Performance shall be the date of commencement of the Warranty Period, and of the 60 day Lien Period prior to release of basic holdback, unless required otherwise by lien statute of the Place of the Work.
 - .2 When the Contractor has carried out the required steps in Stages 3 and 4 of OAA/OGCA Document 100, the Contractor shall make application for Release of Basic Holdback.
 - .3 The Consultant shall prepare the Certificate for Payment for release of basic holdback, and promptly upon receipt of the necessary documentation, issue the Certificate for Payment to the Owner.

1.5 FINAL INSPECTION AND PAYMENT

.1

- .1 Refer to OAA/OGCA Document 100 STAGE 6.
- .2 Submit a signed statement stating following have been performed:
 - .1 Work has been reviewed for compliance with Contract Documents,
 - .2 All deficiencies have been corrected,
 - .3 All unfinished work has been completed, and
 - .4 Work is complete and ready for Final Inspection.
- .3 Commissioning Prerequisites To Final Completion
 - All TAB work and the commissioning must be complete prior to Functional Completion, unless approved in writing by the Owner's Project Manager. Exceptions to this are the planned control system training performed after occupancy and any required seasonal or approved deferred testing. This includes for all systems, but is not limited to:
 - .1 Completed and signed start-up and pre-functional checklist documentation
 - .2 Requested trend log data
 - .3 Submission of final approved TAB report
 - .4 Completion of all functional testing
 - .5 Required training of Owner personnel completed and approved
 - .6 Submission of the approved O&M manuals
 - .7 All identified deficiencies have been corrected or are approved by the Owner to be excepted from this milestone
- .4 When items noted above are completed, a final inspection of the Work will be

performed by the Owner, the Consultants, and the Contractor.

- .5 If the Work is deemed to be incomplete, complete outstanding items and request a reinspection.
- .6 If the Work is deemed to be complete, the Consultant will issue a Final Certificate for Payment.

1.5 INSPECTION AND REVIEW BEFORE READY-FOR-TAKEOVER

- .1 Contractor's Inspection: Before applying for the Consultant's review to establish Ready-for-Takeover of the Work:
 - .1 Ensure that the specified prerequisites to Ready-for-Takeover of the Work are completed.
 - .2 Conduct an inspection of the Work to identify defective, deficient, or incomplete work.
 - .3 Prepare a comprehensive and detailed list of items to be completed or corrected.
 - .4 Provide an anticipated schedule and costs for items to be completed or corrected.
- .2 Consultant's Review: Upon receipt of the Contractor's application for review, together with the Contractor's list of items to be completed or corrected, the Consultant and the Contractor shall arrange a mutually satisfactory agreed date and time to jointly review the Work. The Consultant will advise the Contractor whether or not the Work is Ready-for-Takeover. Add additional items, if any, to the Contractor's list of items to be completed or corrected. Provide the Consultant with a copy of the revised list.
- .3 Maintain the list of items to be completed or corrected and promptly correct or complete defective, deficient and incomplete work. The Contractor's inspection and Consultant's review procedures specified above shall be repeated until the Work is Ready-for-Takeover and no items remain on the Contractor's list of items to be completed or corrected.
- .4 When the Consultant determines that the Work is Ready-for-Takeover, the Consultant will notify the Contractor and the Owner in writing to that effect.
- .5 The first review will be undertaken only if the Contractor has inspected the Work, and states in writing that the unfinished work noted in their application for Substantial Performance has been completed, and at least 50% of all deficiencies have been corrected.
- .6 The second review will be undertaken only if the Contractor has inspected the Work, and states in writing that 90% of the deficiencies have been corrected.
- .7 If the Consultants determine during either review that the above noted criteria for progress have not been met, they may terminate the deficiency review.

1.6 PREREQUISITES TO FINAL PAYMENT

- .1 After Ready-for-Takeover of the Work and before submitting an application for final payment in accordance with the General Conditions of Contract:
 - .1 Correct or complete all remaining defective, deficient, and incomplete work.

- .2 Remove from the Place of the Work all remaining surplus Products, Construction Equipment, and Temporary Work.
- .3 Perform final cleaning and waste removal necessitated by the Contractor's work performed after Ready-for-Takeover, as specified in Section 01 74 00 – Cleaning and Waste Management.

1.7 SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 The prerequisites to, and the procedures for, attaining substantial performance of the Work, or similar such milestone as provided for in the lien legislation applicable to the Place of the Work, shall be:
 - .1 independent of those for attaining Ready-for-Takeover of the Work, and
 - .2 in accordance with the lien legislation applicable to the Place of the Work.

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 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures.
- .2 Section 01 45 00 Quality Control.
- .4 Section 01 77 00 Closeout Procedures.

1.3 SUBMISSION

- .1 Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- .2 Copy will be returned, with Consultant comments.
- .3 Revise content of documents as required prior to final submittal.
- .4 Two weeks prior to Substantial Performance of the Work, submit to the Consultant, (3) final copies of operating and maintenance manuals in English.
- .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.
- .8 Pay costs of transportation.

1.4 FORMAT

- .1 Organize data in the form of an 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 systems, under 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 A copy of all data to be submitted in format copied on to a CD or USB key.

1.5 CONTENTS, EACH VOLUME

- .1 Table of Contents: provide title of project.
 - .1 date of submission; names,
 - .2 addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .3 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 clearly 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 AS BUILTS AND SAMPLES

- .1 In addition to requirements in General Conditions, maintain at the site for Consultant and Owner, one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to the 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.

1.7 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of opaque drawings, provided by Consultant.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly 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.
- .5 Specifications: legibly mark each item to record actual construction, including:
 - .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.

1.8 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 data and tests, and complete nomenclature and commercial number of replaceable parts.
- .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 Contractor's coordination drawings, with installed colour coded piping diagrams.
- .11 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .12 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .13 Include test and balancing reports as specified in Section 01 45 00 Quality Control.
- .14 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. Provide information for re ordering custom manufactured products.
- .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 Deliver to site; place and store.
- .4 Receive and catalogue all 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 Deliver to site location as directed; place and store.
- .4 Receive and catalogue all 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 Deliver to site; place and store.
- .4 Receive and catalogue all 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 BONDS

- .1 Separate each warranty or bond 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 bonds, 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 bonds until time specified for submittal.

1.1 SECTION INCLUDES

.1 Includes general requirements for commissioning facilities and facility systems.

1.2 QUALITY ASSURANCE

- .1 Co operate with testing organization services under provisions specified in Section 01 45 00 Quality Control.
- .2 Comply with applicable procedures and standards of the certification sponsoring association.
- .3 Perform services under direction of supervisor qualified under certification requirements of sponsoring association.

1.3 REFERENCES

.1 Associated Air Balance Council (AABC): National Standards For Field Measurements and Instrumentation, Total Systems Balance, Air Distribution Hydronics Systems.

1.4 SUBMITTALS

- .1 Prior to start of Work, submit name of Contractor personnel proposed to perform services. Designate who has managerial responsibilities for coordination of entire testing, adjusting and balancing.
- .2 Submit documentation to confirm organization, personnel compliance with quality assurance provision.
- .3 Submit 3 preliminary specimen copies of each of report forms proposed for use.
- .4 Fifteen days prior to Substantial Performance, submit 3 copies of final reports on applicable forms.
- .5 Submit reports of testing, adjusting, and balancing postponed due to seasonal, climatic, occupancy, or other reasons beyond Contractor's control, promptly after execution of those services.

1.5 PROCEDURES - GENERAL

- .1 Comply with procedural standards of certifying association under whose standard services will be performed.
- .2 Notify Consultant 3 days prior to beginning of operations.
- .3 Accurately record data for each step.
- .4 Report to Consultant any deficiencies or defects noted during performance of services.

1.6 FINAL REPORTS

- .1 Organization having managerial responsibility shall make reports.
- .2 Ensure each form bears signature of recorder, and that of supervisor of reporting organization.
- .3 Identify each instrument used, and latest date of calibration of each.

1.7 CONTRACTOR RESPONSIBILITIES

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

.11 Ensure that commissioning agency participates in demonstration and training as specified in Section 01 79 00 – Demonstration and Training.

1.8 COMMISSIONING AGENCY RESPONSIBILITIES

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

1.9 CONSULTANT RESPONSIBILITIES

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

1.10 OWNER RESPONSIBILITIES

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

1.11 PREPARATION

- .1 Provide instruments required for testing, adjusting, and balancing operations.
- .2 Make instruments available to Consultant to facilitate spot checks during testing.
- .3 Retain possession of instruments and remove at completion of services.
- .4 Verify systems installation is complete and in continuous operation.
- .5 Verify lighting is turned on when lighting is included in cooling load.
- .6 Verify equipment such as computers, laboratory and electronic equipment are in full operation.

1.12 EXECUTION

- .1 Test equipment, balance distribution systems, and adjust devices for HVAC systems.
- .2 Test hydronic systems, adjust and record liquid flow at each piece of equipment.

1.1 SECTION INCLUDES

.1 Procedures for demonstration and instruction of equipment and systems to Owner's personnel.

1.2 RELATED SECTIONS

- .1 Section 01 78 00 Closeout Submittals.
- .2 Section 01 91 00 Commissioning.

1.3 DESCRIPTION

- .1 Demonstrate operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of substantial performance.
- .2 Owner will provide list of personnel to receive instructions and will coordinate their attendance at agreed upon times.
- .3 Coordinate and schedule demonstration and training provided by Subcontractors and Suppliers.

1.4 QUALITY CONTROL

.1 When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

1.5 SUBMITTALS

- .1 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Consultant's approval.
- .2 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .3 Give time and date of each demonstration, with list of persons present.

1.6 CONDITIONS FOR DEMONSTRATIONS

- .1 Equipment has been inspected and put into operation in accordance with Mechanical Electrical drawings and specifications.
- .2 Testing, adjusting, and balancing has been performed in accordance Mechanical Electrical drawings and specifications and equipment and systems are fully operational.
- .3 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.7 PREPARATION

- .1 Verify that conditions for demonstration and instructions comply with requirements.
- .2 Verify that designated personnel are present.

1.8 DEMONSTRATION AND INSTRUCTIONS

- .1 Demonstrate start up, operation, control, adjustment, trouble shooting, servicing, and maintenance of each item of equipment at scheduled agreed upon times, at the equipment, designated location.
- .2 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.
- .3 Review contents of manual in detail to explain all aspects of operation and maintenance.
- .4 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.

1.9 TIME ALLOCATED FOR INSTRUCTIONS

.1 Ensure amount of time required for instruction of each item of equipment or system is adequate for owner's understanding.

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section, and all related sections.
- .2 The work of this section, and related work specified in other sections shall comply with all requirements of Division 1 General Requirements.

1.2 SECTION INCLUDES

- .1 Requirements for building demolition of existing buildings in preparation. Demolition work shall include the draining and capping and/or re-routing of existing building services, protection of remaining structure and other building elements, and removal of debris.
 - .1 Visit and examine the site and note all characteristics and irregularities that may affect the work of this Section.
 - .2 Take over structures to be demolished based on their condition at date and time of bid closing.
 - .3 Dust control during the operations of the work of this Section.
 - .4 Removal shall mean removal from site and safe disposal in a legal manner.
 - .5 When unidentified subsurface foundations, tanks or services are encountered during the work, immediately cease operations, notify the Province, and await for instruction.

1.3 RELATED SECTIONS

- .1 Temporary Facilities & Construction Controls, Section 01 56 00
- .2 Environmental Protection, Section 01 33 43

1.4 REFERENCES

- .1 CSA S350-M1980(R1998), Code of Practice for Safety in Demolition of Structures.
- .2 Occupation Health and Safety Act and Regulations for Construction Projects; Ontario Reg.213/91, as amended by Reg. 145/00.

1.5 SUBMITTALS

- .1 Demolition Drawings
 - .1 Where required by authorities having jurisdiction, submit drawings, diagrams, and/or details for approval, clearly indicating sequence of demolition work, support of existing structures, shoring, and underpinning.
 - .2 Where required by authorities having jurisdiction, such drawings to bear stamp of qualified professional engineer registered or licensed in the Province of Ontario.
 - .3 Review structural engineering documents for further submittal requirements.

1.6 QUALITY ASSURANCE

- .1 Perform the work of this section in accordance with the 'Environmental Protection Act' including Ontario Regulation 102 and the 'Environmental Assessment Act' including Ontario Regulation 103.
- .2 Conform to Fire Code, Regulation under the Fire Marshals Act.

1.7 HAZARDOUS MATERIALS

- .1 Conform to applicable code and environmental regulations for demolition of hazardous materials abatement, handling and disposal.
- .2 Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.

1.6 PROTECTION

- .1 Provide required bracing, shoring and underpinning to prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, and adjacent grades.
- .2 Take appropriate precautions to support the structure. When the safety of building being demolished, adjacent structures or services appear to be endangered, cease operations and inform the Province immediately.
- .3 Cease operations and notify the Province immediately for special protective and disposal instructions when asbestos materials, lead or other hazardous materials, other than those identified, are uncovered during the work of this project.
- .4 Do not proceed with demolition work when prevailing weather forecasts indicate, or weather conditions constitute, a hazard to the workers and site.
- .5 Temporarily suspended work that is without continuous supervision and take appropriate measures to prevent entry of unauthorized persons to the work site.

1.7 SALVAGEABLE AND RECYCLABLE MATERIALS

.1 Except where otherwise specified, all materials indicated or specified to be permanently removed from the Place of the Work shall become the Contractor's property. Maximize to the fullest extent possible, salvage and recycling of such materials, consistent with proper economy and expeditious performance of the Work.

2 PRODUCTS

NOT APPLICABLE. OR

2.1 MATERIALS

- .1 All Materials requiring removal shall become the Contractor's property and shall be removed and disposed of from the site, as the work progresses, unless indicated otherwise.
- .2 Provide materials and equipment as required to perform the work of this section.

3 EXECUTION

3.1 GENERAL

- .1 Remove, handle and transport Products indicated to be salvaged and stored for future use. Transport Products to storage area(s) designated by Consultant. Perform work to prevent any damage to Products during removal and in storage. Products damaged during removal, will be inspected by Consultant. Consultant will determine extent of damage and accept or refuse Products.
- .2 Tag and log all items to be salvaged to the satisfaction of the Consultant. Ensure identification tags do not damage items to be salvaged and are non-permanent, removable and durable

3.2 PROTECTION

- .1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades, and other parts of existing building to remain. Provide all bracing, shoring, and/or underpinning required. Make good damage caused by demolition.
- .2 Take precautions to support affected structures and if safety of building being demolished, or adjacent structures or services appears to be endangered, cease operations and notify Consultant.
- .3 Prevent dust and debris from blocking surface drainage systems, or affecting elevators, mechanical, and/or electrical systems which must remain in operation.
- .4 Adhere strictly to requirements of Sections 01 50 00 and 01 56 10 during demolition and removal process. Provide all temporary safety controls, as required by The Occupational Health & Safety Act, and Section 01 50 00.
- .5 Ensure that secure site hoarding and/or fencing is in place and complete, prior to commencement of demolition operations. Maintain hoarding during demolition operations. Replace or repair sections of hoarding damaged or removed, as a result of demolition operations.

3.2 PREPARATION

- .1 Do not disrupt active or energized utilities traversing premises, designated to remain undisturbed.
- .2 Pay particular attention to prevention of fire and elimination of fire hazards which would endanger Work or adjacent structures and premises.
- .3 Supply and install adequate protection for materials to be re-used, set on ground and prevent moisture pick-up. Cover stockpiles of materials with tarpaulins.
- .4 Close off access to areas where demolition is proceeding by barricades and post warning signs.
- .5 Supply, install and maintain legal and necessary barricades, guards, railings, lights, warning signs, security personnel and other safety measures, and fully protect persons and property.
- .6 Dust/weather partitions:
 - .1 Prior to demolition work proceeding in existing structures, temporarily enclose Work areas, access and supply and install dustproof and weatherproof partitions. Design partitions to prevent dust and dirt infiltration into adjoining areas, prevent ingress of water, and to resist loads due to wind.
 - .2 Prevent dust, dirt and water from demolition operations entering operational areas.
 - .3 Adjust and relocate partitions as required for various operations of work.
 - .4 Upon completion of work, remove and dispose of partitions from Site.
- .7 Dust protection:
 - .1 Clean water to be applied to hard and soft surfaces and on open excavation faces on Site daily to eliminate dust.
 - .2 Roadways and sidewalks to be cleaned daily or as required.

- .3 A designated truck loading area on granular material or existing asphalt to be used to mitigate tracking of potentially contaminated soil and demolition debris off Site. Contaminated loading points to be cleaned or re-established.
- .4 Loaded vehicles leaving Site to be cleaned of loose soil and debris with power washing or alternative method.
- .5 Trucks loaded with indigenous soil or demolition debris to be covered by tarps or attached screens.
- .8 Blasting is not permitted.

3.2 PREPARATION

- .1 Locate and mark all enclosed or hidden services within the structure, and on the site.
- .2 Disconnect and re-route electrical and telephone service lines entering areas to be demolished, in accordance with authorities having jurisdiction. Post warning signs on electrical lines and equipment which must remain energized during period of demolition.
- .3 Disconnect and cap, designated mechanical services in accordance with authorities having jurisdiction;
 - .1 Natural gas supply lines to be removed by local gas authority where required, or by qualified tradesman in accordance with gas authority instructions.
 - .2 Disconnect, and cap remove sewer and water lines to point indicated on drawings.
 - .3 Remove and dispose of other underground services as indicated on drawings, and as directed by Consultant.

3.3 SAFETY CODE

.1 Unless otherwise specified, carry out demolition work in accordance with CSA S350.

3.4 DEMOLITION

- .1 Demolish parts of building to permit construction of addition and/or remedial work as indicated.
- .2 Demolish foundation walls, footings and concrete floors at or below grade entirely within areas designated for new construction.
- .3 All concrete and masonry broken from demolition work to be removed from open basements or excavations.
- .4 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace same as work progresses.
- .5 At end of each day's work, leave work in safe condition so that no part is in danger of toppling or falling. Protect interiors of parts not to be demolished from exterior elements at all times.
- .6 Demolish to minimize dusting. Keep dusty materials wetted as directed by Consultant.
- .7 Demolish masonry and concrete walls in small sections to prevent damage to existing structure or surfaces to remain.

- .8 Remove contaminated or dangerous materials, as defined by authorities having jurisdiction, from site, and dispose of in strict accordance with by-laws, regulations and/or guidelines applicable to such material.
- .9 Demolish parts of structure to permit construction of addition and remedial work as indicated.
- .10 Do not overload floor, roof or wall with accumulations of material or debris or by other loads.
- .11 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces and replace as Work progresses.
- .12 At end of day's work, leave Work in safe condition with no part in danger of toppling or falling. Protect interiors of parts not to be demolished from exterior elements.
- .13 Drainage and sewer system protection:
 - .1 Ensure that no dust, debris or slurry enters drainage and sewer system on Site.
 - .2 Remove and dispose of debris and slurry promptly from Site.
- .14 Concrete:
 - .1 Demolish concrete by methods which avoid impact loads on items which are not to be demolished.
 - .2 Where only part or parts of a concrete floor, wall, roof, foundation or other items are to be demolished, use saw cuts to isolate areas which are to be demolished except where existing reinforcing steel is to be left in place. Prior to such isolating, install suitable support to prevent premature movement of area(s) being isolated and undesirable transfer of loads as cutting progresses. If necessary remove area(s) to be demolished by successively isolating small sections.
 - .3 Where reinforcing steel is to be left in place, use saw cuts from surface of concrete around perimeter(s) of area(s) to be demolished, chip concrete without damaging reinforcing steel. Retouch damaged epoxy coating of existing reinforcing steel.
- .15 Masonry:
 - .1 Demolish block or brick walls in small sections of not more than 2 m 2. Do not permit masonry to fall in mass from one level to another.
 - .2 Where only part(s) of a wall is to be demolished, install adequate support for adjacent part(s).
 - .3 Clean and stack blocks and bricks to be reused.
 - .4 After removal of masonry walls, grind smooth floors ready for new floor finish.
- .16 Steel: Where only part or parts of structure is to be demolished, dismantle and maintain structure stable. Do not place excessive loads on components. Install adequate temporary guys and supports to ensure stability and to prevent excessive loading. Support each component being disconnected from structure, and lower, do not drop, component after it is disconnected.
- .17 Cut openings through existing walls, partitions, roofs and floors. Establish exact location of steel reinforcing in existing concrete slabs or walls before cutting. Be responsible for damage to existing steel reinforcing and be liable for structural failure. Make good surfaces disturbed with materials to match existing.
- .18 Roofs:

- .1 Power sweep or wet vacuum roof surface to remove roof ballast and loose matter. Remove ballast and loose refuse and dispose off site.
- .2 Remove complete roofing system as shown on Contract Drawings for new construction.
- .19 Where doors are scheduled to be removed, include:
 - 1. Removal in re-usable condition of doors, and store at the Place of the work.
 - 2. Removal of door hardware and frames.
- .20 Remove interior partitions, fittings, fixtures and accessories as indicated on drawings. Partitions and walls shall be removed full height to structure above.
- .21. Remove interior finishes, such as ceiling and floor finishes, where new finishes are indicated on Contract Drawings.
 - 1. Removal of existing ceilings shall include complete removal including bulkheads and suspension system.
 - 2. Removal of adhesive applied finishes shall include complete removal to substrate including adhesive. Take adequate care to prevent damage to substrate.
 - 3. Remove existing floor finishes, include mortar bed, underlayment or other cleavage membranes, underpad, base, floor moulding and transition strips

3.5 SITE CLEANING

- .1 Promptly remove and dispose of demolished materials except where noted otherwise, in accordance with authorities having jurisdiction.
- .2 Do not sell, bury or burn materials on site.
- .3 Leave interior areas in a "swept clean" condition after demolition in preparation for remedial work.
- .4 If affected by demolition, leave exterior soft areas in a "raked clean" condition, and clear of all debris. Leave paved areas in a "swept clean" condition, and clear of all dirt, debris, and other contamination.

1.1 RELATED SECTIONS

- .1 Section 01 60 00 Basic Product Requirements
- .2 Section 03 20 00 Concrete Reinforcement
- .3 Section 04 05 13 Mortar and Masonry Grout
- .4 Section 04 05 19 Masonry Reinforcing and Connectors
- .5 Section 04 05 23 Masonry Accessories.
- .6 Section 04 73 00 Stone Masonry Units
- .7 Section 05 50 00 Metal Fabrications
- .8 Section 07 21 13 Board Insulation.
- .9 Section 07 92 00 Joint Sealers.

1.2 **REFERENCES**

- .1 CSA-A165 Series, Standards on Concrete Masonry Units.
- .2 CSA A179, Mortar and Grout for Unit Masonry.
- .3 CAN3 A371, Masonry Construction for Buildings.
- .4 CSA-A370 Connectors for Masonry

1.3 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00
- .2 Submit samples:
 - .1 Two of each type of masonry unit and concrete stone specified.
 - .2 One of each type of masonry accessory specified.
 - .3 One of each type of masonry reinforcement, tie and connector proposed for use.
 - .4 As required for testing purposes.

1.4 TEST REPORTS

- .1 Submit laboratory test reports in accordance Section 01 33 00
- .2 Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.
- .3 For clay units, in addition to requirements set out in referenced CSA and ASTM Standards include data indicating initial rate of absorption.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to job site in dry condition.
- .2 Keep materials dry until use except where wetting of bricks is specified.
- .3 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

1.6 ENVIRONMENTAL REQUIREMENTS

.1

- .1 Cold weather requirements
 - Supplement Clause 5.15.2 of CSA-A371 with following requirements:
 - .1 Maintain temperature of mortar between 5°C and 50°C until batch is used.

- .2 Hot weather requirements
 - .1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.
 - .2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.
- .3 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .4 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

2 PRODUCTS

2.1 MATERIALS

.1 Masonry materials are specified in related Sections indicated in 1.1.

3 EXECUTION

3.1 INSTALLATION

- .1 Do masonry work in accordance with CSA-A371 except where specified otherwise.
- .2 Build masonry plumb, level, and true to line, with vertical joints in alignment.
- .3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.1 CONSTRUCTION

- .1 Exposed masonry
 - .1 Remove chipped, cracked, and otherwise damaged units in exposed masonry and replace with undamaged units.
- .2 Jointing
 - .1 Allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, joints true to line, compressed, uniformly concave joints where concave joints are indicated.
 - .2 Strike flush all joints concealed in walls and joints in walls to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating.
- .3 Cutting
 - .1 Cut out for electrical switches, outlet boxes, and other recessed or built-in objects.
 - .2 Make cuts straight, clean, and free from uneven edges.
- .4 Building-In
 - .1 Build in items required to be built into masonry.
 - .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 spaces between jambs and masonry with mortar.
 - .4 Provide interference drawings of all build in items and document as per Section 01450 Quality Control / Quality Assurance.

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- .1 Use concrete to Section 03300 Cast-in-Place Concrete, where concrete fill is used in lieu of solid units use 35 Mpa
- .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 faces of units.
- .6 Provision for movement
 - .1 Leave 20 mm space below shelf angles.
 - .2 Leave 20 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
 - .3 Built masonry to tie in with stabilizers, with provision for vertical movement.
- .7 Loose steel lintels
 - .1 Install loose steel lintels. Centre over opening width.
 - .2 Provide 200mm minimum bearing where concrete block lintels are indicated. Provide concrete fill and reinforcing as indicated.
- .8 Control joints
 - .1 Construct continuous control joints: Max. 10 m exterior masonry, Max. 10 m interior partitions, and as indicated.
- .9 Expansion joints
 - .1 Build-in continuous expansion joints as indicated.
- .10 Cavity Compartmentalization
 - .1 Provide cavity compartmentalization tight to back of outer wythe as indicated.
- .11 Lateral Support:

1

- Provide lateral support at horizontal and vertical intervals of no more than: 20 times wall thickness for walls of solid units. 18 times wall thickness for walls of hollow units.
 - 36 times wall thickness for partitions.

3.2 SITE TOLERANCES

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

3.3 RE-INSTALLATION

- .1 Cut openings in existing work as indicated.
- .2 Openings in walls to be approved by Consultant.

3.4 FIELD QUALITY CONTROL

.1 Inspection and testing will be carried out by Testing Laboratory designated by Consultant.

1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 60 00 Basic Product Requirements
- .2 Section 04 00 00 Masonry Procedures.

1.2 REFERENCES

.1 CSA A179, Mortar and Grout for Unit Masonry.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00- Submittal Procedures.
- .2 Submit 75 x 10mm thick samples of grey mortar.

2 PRODUCTS

2.1 MATERIALS

- .1 Use same brands of materials and source of aggregate for entire project.
- .2 Mortar and grout: CSA A179.
 - .1 Mortar as per masonry manufacturers recommendations
- .3 Use aggregate passing 1.18 mm sieve where 6 mm thick joints are indicated.
- .4 Colour: Premeasured units of pure metallic oxide pigments to ASTM C979 "Interstart" or approved equal. Colour to consultants selection post tender.
- .5 Mortar for exterior masonry above grade:
 - .1 Loadbearing: Type S
 - .2 Non-loadbearing: Type N
 - .3 Parapet walls, chimneys, unprotected walls: Type N
- .6 Mortar for foundation walls, manholes, sewers, pavements, walks, patios and other exterior masonry at or below grade: Type M.
- .7 Mortar for interior masonry:
 - .1 Loadbearing: Type S.
 - .2 Non-loadbearing: Type N.
- .8 Following applies regardless of mortar types and uses specified above:
 - .1 Mortar for calcium silicate brick and concrete brick: Type O
 - .2 Mortar for stonework: Type N.
 - .3 Mortar for grouted reinforced masonry: Type S. .4 Mortar for glass block: 1 part Portland cemer
 - .4 Mortar for glass block: 1 part Portland cement, 1 part hydrated lime, 4 parts aggregate by volume.
- .9 Non-staining mortar: use non-staining masonry cement for cementitious portion of specified mortar type.
- .10 Parging mortar: Type N to CSA A179.

2.2 MIXES

- .1 Mix grout to semi-fluid consistency.
- .2 Pointing mortar: Prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour nor more than 2 hours then remix with sufficient water to produce mortar of proper consistency for pointing.

3 EXECUTION

3.1 CONSTRUCTION

- .1 Do masonry mortar and grout work in accordance with CSA A179 except where specified otherwise. Application to follow masonry manufacturers guidelines.
- .2 Apply parging in uniform coating not less than 10 mm thick to all exposed exterior concrete and concrete unit masonry to minimum 150mm below finished grade.

1.1 RELATED SECTIONS

- .1 Section 01 60 00- Basic Product Requirements
- .2 Section 04 00 00 Masonry Procedures.
- .3 Section 04 05 19 Masonry Reinforcing and Connectors.

1.2 **REFERENCES**

.1 ASTM D 2240-97e1, Standard Test Method for Rubber Property - Durometer Hardness. .2 CAN3-A371-04, Masonry Construction for Buildings.

1.3 SHOP DRAWINGS

.1 Provide shop drawings for sills indicating all sizes profiles, finish material type and strength and any reinforcement.

2 PRODUCTS

2.1 MATERIALS

- .1 Sealing Products for Control Joints: Refer to Section 04 22 00.
- .2 Backer for Control Joints: Refer to Section 04 22 00.
- .3 Lap adhesive: recommended by masonry flashing manufacturer.
- .4 Masonry Flashing: Per Section 07 65 26 Self-Adhered Sheeting Flashing

3 EXECUTION

3.1 INSTALLATION

- .1 Install continuous control joint fillers in control joints at locations indicated.
- .2 Install soft joint at underside of beams and lintels and as indicated.

3.2 CONSTRUCTION

- .1 Rigid supports for flexible flashing:
 .1 Install rigid steel plates to support the flexible flashing that covers the exterior veneer.
- .2 Forming the flexible flashing:
 - .1 Width of the seamless strip equal to the depth of the veneer and the air cavity and the rise of at least 150 mm vertically.
 - .2 Length: as long as possible.
- .3 Installation of the flexible flashing:
 - .1 Location: on foundation walls, slabs, steel lintels, under supports for openings made in the exterior envelope (doors, windows, ventilating louvers); under architectural concrete wall and parapet copings; on wood and steel furring placed above openings and in other

locations where the water-tightness of the cavity must be ensured;

- .4 Prepare the surfaces intended for the application of wall flashing.
- .5 General:
 - .1 Overlap the tape seams by a minimum width of 100 mm and seal them with a product recommended by the manufacturer.

1.1 RELATED SECTIONS

- .1 Section 04 00 00 Masonry procedures
- .2 Section 04 05 13 Mortar and Grout
- .3 Section 04 05 23 Masonry Accessories
- .4 Section 04 05 19 Masonry reinforcing and connectors
- .5 Section 07 84 00- Firestopping and Smoke Seals

1.2 REFERENCES

- .1 Ontario Building Code.
- .2 Canadian Concrete Masonry Producers Association (CCMPA) Quality Assurance Program.
- .3 ASTM International, (ASTM)
 - .1 ASTM C90-12 Standard Specification for Loadbearing Concrete Masonry Units.
 - .2 ASTM C129-11 Standard Specification for Nonloadbearing Concrete Masonry Units.
 - .3 ASTM C150/C150M-12, Standard Specification for Portland Cement
 - .4 ASTM C207-06 (2011) Standard Specification for Hydrated Lime for Masonry Purposes.
 - .5 ASTM D2240-05(2010) Standard Test Method for Rubber Property—Durometer Hardness.
 - .6 ASTM D5249-10 Standard Specification for Backer Material for Use with Cold and Hot Applied Joint Sealants in Portland Cement Concrete and Asphalt Joints.
- .4 Canadian Standards Association
 - .1 CSA A23.1-09, Concrete Materials and Methods of Concrete Construction.
 - .2 CAN/CSA A165 Series-04 (R2009), CSA Standards on Concrete Masonry Units.
 - .3 CAN/CSA A179-04 (R2009), Mortar and Grout for Unit Masonry,
 - .4 CAN3-A370-04 (2009) Connectors for Masonry.
 - .5 CAN/CSA A371-04 (R2009), Masonry Construction for Buildings.
 - .6 CSA S304.1-04 (R2010), Masonry Design for Buildings.

1.3 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 Acoustic Block: Submit product literature, certifications and test reports.
- .4 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.
- .5 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.
- .6 Test reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

- .7 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .8 Inspection Reports: Inspection and Testing Company shall submit reports of inspections and tests.

1.4 COLD WEATHER REQUIREMENTS

- .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.

1.5 HOT WEATHER REQUIREMENTS

.1 Protect freshly laid masonry from drying too rapidly by means of waterproof, non-staining coverings.

1.6 **PROTECTION**

- .1 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.
- .2 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Concrete Block: Modular, conforming to CAN3-A165-M Series-M85, Concrete Masonry units and per the following characteristics:
 - 1. S/12.5/A/M for block walls exposed on exterior.
 - 2. S/20/A/M, 100% solid for top course of partitions and walls, for all locations where structural members bear on concrete block, and where shown on Drawings.
 - 3. H/7.5/C/M for all other locations.
 - 4. Where concrete block walls are required to act as fire separations or barriers, they shall conform to Ontario Building Code with respect to equivalent thickness and type of concrete.
- .2 Provide special shapes and sizes shown or specified such as halves, jambs, lintels, solids, corners, bullnose and double bullnose, semi solids, etc.
- .3 All exposed interior standard smooth face concrete masonry units shall have bullnose or double bullnose corners. Refer to general notes on drawings. All outside corner conditions must be bullnosed. All jambs and heads in wall opening must be bullnosed.
- .4 Sizes as indicated on drawings. Architectural drawings generally show extent and size of all concrete masonry units. Structural drawings generally show extent of all load bearing masonry units or otherwise. Structural drawings will govern over architectural drawings in regards to concrete masonry unit sizes in case of any discrepancies between drawings. Report discrepancies to consultant prior to proceeding with the work.
- .5 See partition notes on drawings for all other information.

.6 Refer to structural drawings fort all load bearing.

PART 3 - EXECUTION

3.1 STANDARD PLAIN FACE

- .1 Refer to structural drawings for locations of all load bearing masonry walls. Reinforced masonry construction (Engineered Masonry) as directed by Structural Engineer for these locations.
- .2 Lay block to align plumb over each other with thick ends of webs up. Leave no cells open in exposed work. Reinforce block work as hereinafter specified.
- .3 Minimize cutting block. Cut exposed block with power driven abrasive cutting disc or diamond cutting wheel where cutting is required and for flush mounted electrical outlet, grilles, pipes, conduit, leaving 1/8" (3 mm) maximum clearance.
- .4 Do not wet concrete masonry before or during laying in wall.
- .5 Locate corners accurately.
- .6 Use full bed of mortar for first course. For remaining courses bed face shells and cross and end webs and vertical end joints fully in mortar. Compress end joint mortar.
- .7 Stagger end joints in every course. Align joints plumb over each other in every other course.
- .8 Bond intersecting block walls in alternate courses. Where block work abuts concrete, bond each block course into reglets cast in concrete wall.
- .9 Where exterior wall backup block coursing cannot line up with masonry veneer, bond each block course to such veneer with adjustable reinforcement.
- .10 Do not break bond of corridor walls or other walls of exposed units where partitions intersect and if bonding would show through on exposed face of walls. Bond these partitions to walls they intersect with prefabricated intersection masonry reinforcement in each course.
- .11 Joints:
 - .1 Exposed block: compressed and tooled concave.
 - .2 Concealed block surfaces: compressed and struck flush with face of masonry.
 - .3 Coursing height: 200 mm nominal for one block and one joint. Carefully establish vertical and horizontal coursing before laying units to ensure correct opening heights and locations, proper elevations, proper elevation for elements bearing on masonry and to prevent undue cutting.
 - .4 Where block is exposed or painted lay blockwork with all joints uniform and carefully pointed. Carefully lay block behind scheduled ceramic wall tile to minimize thickness of parging plaster required to true up surface.

3.2 CONCRETE MASONRY LINTELS

- .1 Install reinforced concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated.
- .2 End bearing: not less than 200 mm or as indicated on drawings.

3.3 PARTITIONS

- .1 Carry partitions up through ceiling to structure above, unless noted or specified otherwise.
- .2 Except around staircases, elevator shafts and duct shafts, terminate through partitions within 19 mm of structure above, i.e., floor or roof decking depending under which partitions occur, and where such partitions occur directly under and parallel to structural framing carry these partitions up to within 19 mm of bottom of such structural framing.
- .3 Where walls and partitions are pierced by structural members, duct, pipes, fill voids with mortar to within 19 mm of such members flush with wall finish.
- .4 Fill spaces between partitions and structure, ducts and pipes in accordance with the requirements of Section 07 84 00, Firestopping and Smoke Seals at rated partitions fill spaces at non-rated partitions with acoustic batt insulation including voids at top of partition and metal deck.
- .5 Wedge and grout loadbearing partitions and walls to underside of structure.

3.4 CLEANING

.1 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.

1.1 SECTION INCLUDES

- 3 Surface preparation.
- 3 Application of clear, colourless, liquid concrete hardener and densifier.
- 3 .Grind and polish of floor to desired finish.
- 3 Application of water-based concrete enhancer.

1.2 RELATED SECTIONS

- 3 Section 01 33 00 Submittal Procedures.
- 3 Section 03 30 00 Cast-in-Place Concrete.
- 3 Section 07 92 00 Joint Sealants.

1.3 REFERENCES

- 3 ANSI B 101.0 Walkway Surface Auditing Procedure for Measurement of Walkway Slip Resistance.
- 3 ANSI B 101.3 Test Method for Measuring Wet DCOF of Common Hard-Surface Floor Materials.
- .3 ASTM C779 Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
- .4 ASTM D523 Standard Test Method for Specular Gloss.
- .5 ASTM E1155 Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers.

1.4 **PERFORMANCE REQUIREMENTS**

- 3 Improve performance of floor by installation of polished concrete floor system as measured by the following criteria:
 - .1 Static Coefficient of Friction, ANSI B 101.0 and ANSI B 101.3:
 - .1 Dry Surface: [0.50].
 - .2 Wet Surface: [0.60].
 - .2 Abrasion Resistance, ASTM C779
 - .1 50 % minimum increase.
 - Specular Gloss/Reflectance, ASTM D523, 60 degree:
 - .1 Satin Finish, 45-50.
 - .4 Floor Surface Profile, ASTM E1155:
 - .1 Floor Flatness Number (F_F): [XX].
 - .2 Floor Levelness Number (F_L): [XX].

1.5 SUBMITTALS

.3
- .1 Comply with Section 01 33 00 Submittal Procedures.
- .2 Submit manufacturer's product data and application instructions.
- .3 Provide documentation showing finisher is certified by the polishing and densifier manufacturer.
- .4 Contact manufacturer or supplier for a list of certified applicators.

1.6 QUALITY ASSURANCE

- .1 Installer Qualifications
 - .1 Use an experienced installer and adequate number of skilled personnel who are thoroughly trained and experienced in the floor treatment.
 - .2 The applicator shall either:
 - .1 An INDUROSHINE approved applicator as certified by W. R. MEADOWS, having a minimum of 10 projects performed within three years of similar type, size and complexity as this contract.
 - .2 Be a Level 2 INDUROSHINE approved applicator by W. R. MEADOWS.
- .2 Mock-Ups
 - 1. Apply mock-up of required finish to demonstrate surface finish, colour variations and to determine a level of workmanship.
 - 2. Build mock-up in the location and dimensions as directed by the architect or owner's representative.
 - 3. Prior to proceeding, ensure that mock-up meets all requirements of the architect or owner's representative.
 - 4. Maintain mock-up during construction in an undisturbed condition as a standard for judging the work.
- .3 Provide name of technically qualified concrete polishing field representative.
- .4 Provide name of technically qualified densifier manufacturer's field representative.
- .5 Ensure that correct amount of densifier is onsite.

1.7 PRE-INSTALLATION MEETING

- .1 Convene one week prior to construction of mock-up sample.
- .2 Require attendance of all parties directly affecting work of this section, including architect, engineer, general contractor, approved polishing contractor, concrete supplier, polishing equipment and tooling field representative, and chemical manufacturer's representative.
- .3 Review examination, surface preparation, installation, field quality control, protection, and coordination with other work.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

- .2 Store materials in a clean dry area in accordance with manufacturer's instructions.
- .3 Keep products from freezing.
- .4 Avoid direct contact with this product as it may cause mild to moderate irritation of the eyes and/or skin.
- .5 Protect materials during handling and application to prevent damage or contamination.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Do not apply product when air, surface, or material temperatures are expected to fall below 4° C (40° F) within four hours of expected application.
- .2 Do not apply to frozen concrete.
- .3 Do not use on highly dense or non-porous surfaces.
- .4 Limit and control damage from excessive dust caused by grinding/polishing procedure.
- .5 Properly dispose of collected dry dust from polishing.

2 Products

2.1 MANUFACTURER

.1 W. R. MEADOWS OF CANADA, 70 Hannant Court, Milton, Ontario, Canada L9T 5C1. (800) 563-3618. Fax (905) 878-4125. Web Site <u>www.wrmeadows.com</u>.

2.2 MATERIALS

- .1 Concrete Curing Aid and Hardener shall be a ready to use, water-base colorless liquid formulated with chemically reactive raw materials that meets the maximum VOC content limits of 100 g/L.
 - .1 Med-cure or approved equal.
- .2 Concrete densifier:

.1

- Liquid hardener/densifier shall be
 - .1 LIQUI-HARD or approved equal.
- .3 Concrete Enhancer:
 - .1 Water-based, synthetic polymer concrete floor enhancer shall be BELLATRIX or approved equal.

3 EXECUTION

3.1 EXAMINATION

.1 Examine surfaces to receive treatment. Notify architect if surfaces are not acceptable. Do not begin application until unacceptable conditions have been corrected.

.2 Final sheen shall be equivalent to that as accepted on the mock-up.

3.2 GENERAL POLISHING REQUIREMENTS

- .1 Coordinate polishing operations with other associated work and trades.
- .2 Do not use stain or scuff removing agents.
- .3 Begin and complete polishing within two weeks prior to possession date.
- .4 Utilize machines to the maximum extent practical to achieve optimum efficiency.

3.3 SURFACE PREPARATION

- .1 Protect adjacent surfaces not designated to receive treatment.
- .2 Clean and prepare surfaces to receive treatment in accordance with manufacturer's instructions, ensuring that all stains, oil, grease, form release agents, dust and dirt are removed prior to application.
- .3 Ensure concrete is a minimum of 28 days old.

3.4 APPLICATION

- .1 Apply concrete curing aid and hardener in accordance with manufacturer's instructions.
 - .1 Fresh Concrete:Apply concrete curing aid and hardener as soon as surface water has disappeared and the surface is dry to the touch or hard enough to walk on.
- .2 Do not dilute concrete curing aid and hardener.
- .3 To obtain satin finish, ensure applicator follows the applicable procedures incorporating grinding plates in the following order.
 - .1 Verify that the floor is clean and dry prior to polishing procedure.
 - .2 Inspect and verify that the floor does not have curled joints, large cracks, spalling or lippage. If lippage or curled joints are present, refer to Section 03 01 00 Maintenance of Concrete for corrective procedures.
 - .3 Using the 80-grit metal bond grinding segment, grind the floor surface at a rate of 500 ft.2/hr. Vacuum the surface to remove loose particulates.
 - .4 Using the 150-grit metal bond grinding segment, grind the floor surface at a rate of 600 ft.2/hr. Vacuum the surface to remove loose particulates.
 - .5 Apply concrete densifier according to manufacturer's instructions.
 - .6 Squeegee off excess material.
 - .7 Wait 24 hours.
 - .8 Verify that the floor is dry and clear of debris prior to continuation of polishing procedure.

3.5 CONCRETE ENHANCER

.1 Allow 24 hours before proceeding with concrete enhancer application.

- .2 Spray concrete enhancer full strength from container using an industrial sprayer delivering 1/10th of a gallon per minute.
- .3 Pre-wet prior to use.
- .4 Uniformly spread concrete enhancer with a micro-fiber applicator creating a monolithic, thin, even film, ensuring that the product is not allowed to dry before spreading is complete.
- .5 Do not over apply concrete enhancer.
- .6 For optimum performance, apply a second coat at a 90° (right) angle to the first coat, after the first coat is thoroughly dry.
- .7 Allow 24 hours for concrete enhancer to dry.
- .8 Burnish with a hogs hair pad at 2000 rpm or substitute a diamond pad if necessary.

3.6 FIELD QUALITY CONTROL

- .1 Review procedures with installer to correct unacceptable areas of completed polished concrete floor system.
- .2 Testing: Contact a Certified Walkway Specialist to test the completed polished concrete floor system for the following:
 - .1 Static Coefficient of Friction, ANSI B 101.0 and ANSI B 101.3:
 - .1 Dry surface.
 - .2 Wet surface.
 - .2 Specular Gloss/Reflectance, ASTM D 523:
 - .1 60 degrees.

1 **GENERAL**

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements
- .2 Section 09 21 16 - Gypsum Board
- .3 Section 09 22 16 Non-Load Bearing Wall Framing

1.2 REFERENCES

- The National Building Code of Canada. .1
- .2 The Ontario Building Code.
- .3 ASTM International (ASTM)
 - ASTM A591/A591M 89 Standard Specification for Steel Sheet, Electrolytic Zinc .1 Coated, for Light Coating Mass Applications ASTM A653/A653M-13 Standard Specification for Steel Sheet, Zinc-Coated
 - .2
 - (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process ASTM A792/A792M-10 Standard Specification for Steel Sheet, 55 % Aluminum-.3
 - Zinc Alloy- Coated by the Hot-Dip Process
- .4 American National Standards Institute (ANSI)
 - ANSI/AWSD1.3, Structural Welding Code-Sheet Steel. 1
- .5 Canadian Standards Association (CSA)
 - CAN/CSA G164-M Hot Dip Galvanizing of Irregularly Shaped Articles. .1
 - CAN/CSA-S16.1-M Limit States Design of Steel Structures. CSA S136-12 Cold Formed Steel Structural Members.

 - .2 .3 .4 CSA W47.1 Certification of Companies for Fusion Welding of Steel Structures.
 - CSA W59 Welded Steel Construction (Metal-Arc Welding). .5
 - CSA W178.1 Certification of Welding Inspection Organizations .6
 - CSA W178.2 Certification of Welding Inspectors .7
- .6 Canadian General Services Board (CGSB)
 - CGSB 1-GP-181M Standard for Coating, Zinc Rich, Organic Ready Mix. 1
- Canadian Sheet Steel Building Institute (CSSBI) .7
 - CSSBI 51-06. Lightweight Steel Framing Design Manual. .1
 - .2 CSSBI S6-90 Guide Specification for Lightweight Steel Framing.

1.3 **DESIGN CRITERIA**

- .1 Retain a professional Engineer registered in the Province of Ontario to design steel stud wall assemblies, including masonry ties.
- .2 Design connections to meet seismic restraint to meet requirements of OBC paragraph 4.1.9.1 (15).
- .3 Design shall be based on limit states design principles using factored loads and resistance in accordance with National Building Code of Canada.
- .4 Limit lateral deflection of stud walls to at least L/720 for masonry veneer and L/360 for other exterior finishes.

- .5 Design components and assemblies to accommodate specified erection tolerances of the structure.
- .6 Design wind bearing stud connections to accommodate floor and roof deflections. Ensure studs are not axially loaded.
- .7 Design steel studs to accommodate anchorage of other materials being supported.

1.4 SUBMITTALS

- .1 Provide shop drawings in accordance with Section 01 33 00 Submittal Procedures
- .2 Indicate on drawings, design loads, member sizes, materials, design thickness exclusive of coatings, coating specifications, connection and bracing details, screw sizes and spacing, and anchors.
- .3 Indicate locations, dimensions, openings and requirements of related work.
- .4 Indicate welds by welding symbols as defined in CSAW59.
- .5 Each sheet shall bear the stamp and signature of a Professional Engineer registered in the Province of Ontario.
- .6 After completion of the work, submit written certification, signed and stamped by the design engineer responsible for shop drawings that all items have been installed in accordance with shop drawings.

1.5 **PROTECTION**

.1 Provide and maintain adequate temporary bracing for all work of this Section until permanent lateral support is in place.

1.6 SHIPPING, HANDLING AND STORAGE

- .1 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .2 Use all means necessary to protect all materials before, during and after installation and to protect the installed work and materials of other trades affected by this work.
- .3 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.
- .3 Store lightweight steel framing members on site, flat. Protect from contact with ground.

1.7 WARRANTY

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two (2) 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 PRODUCTS

2.1 MATERIALS

- .1 Steel: to CAN/CSA-S136, fabricated from ASTMA446M, GradeA to D steel.
- .2 Zinc coated steel sheet: commercial quality to ASTMA526, with Z275 designation zinc coating.

- .3 Electrolytic zinc coated, chromate treated, steel sheet: to ASTMA591, commercial quality, copper bearing with proprietary coating comprised of 48 g/m²zinc total mass both sides, unpainted finish.
- .4 Welding materials: to CSAW59 and certified by Canadian Welding Bureau.
- .5 Screws: pan head, self-drilling, self-tapping sheet metal screws, corrosion protected to minimum requirements of CSSBI.
- .6 Anchors: concrete expansion anchors or other suitable drilled type fasteners.
- .7 Bolts, nuts, washers: hot dipped galvanized to CAN/CSA-G164, 380 600g/m²zinc coating.
- .8 Touch up primer: zinc rich, to CGSB1-GP-181M.

2.2 STEEL STUD DESIGNATIONS

.1 Colour code steel studs in accordance with CSSBI50M.

2.3 METAL FRAMING

- .1 Steel studs: to CAN/CSAS-136, fabricated from zinc coated steel, depth as indicated. Minimum steel thickness of 0.91mm. Use thicker material and reinforcing as required to meet load conditions and structural requirements.
- .2 Stud tracks: fabricated from same material and finish as steel studs, depth to suit. Bottom track: single piece. Top track: two piece telescoping. Separator: neoprene, sized to suit.
- .3 Bridging: fabricated from same material and finish as studs, 38 x 12 x 1.52mm minimum thickness.
- .4 Angle clips: fabricated from same material and finish as studs, 38 x 38mm x depth of steel stud, 1.52mm minimum thickness.
- .5 Tension straps and accessories: as recommended by manufacturer.
- .6 Insulating strips: Rubberized moisture resistant 3mm thick x 19mm wide foam strip, adhesive one side. To be installed continuous below bottom track.

2.4 SOURCE QUALITY CONTROL

.1 Prior to commencement of work, submit: 2 certified copies of mill reports covering material properties.

3 EXECUTION

3.1 GENERAL

- .1 Do welding in accordance with CSAW59.
- .2 Companies to be certified under Division1 or 2.1 of CSAW47.1 for fusion welding of steel structures and/or CSAW55.3 for resistance welding of structural components.
- .3 Do work in accordance with CSSBI50M.

3.2 ERECTION

.1 Erect components to requirements of reviewed shop drawings.

- .2 Anchor tracks securely to structure at 600mm oc maximum, unless lesser spacing prescribed on shop drawings.
- .3 Install damp proof course under stud shoe of walls on slabs on grade or below.
- .4 Erect studs plumb, aligned and securely attached with 2screws minimum, or welded in accordance with manufacturer's recommendations.
- .5 Seat studs into bottom tracks and two piece telescoping top track.
- .6 Install 50.0mm minimum telescoping track at top of walls where required to accommodate vertical deflection. Nest top track into deflection channel a minimum of 30.0mm and a maximum of 40.0mm. Do not fasten tracks together. Stagger joints and install neoprene separator.
- .7 Install studs at not more than 50.0mm from abutting walls, openings, and each side of corners and terminations with dissimilar materials.
- .8 Brace steel studs with horizontal internal bridging at 1220mm maximum. Fasten bridging to steel clips fastened to steel studs with screws or by welding.
- .9 Frame openings in stud walls to adequately carry loads by use of additional framing members and bracing as detailed on shop drawings.
- .10 Touch up welds with coat of zinc rich primer.

3.3 ERECTION TOLERANCES

- .1 Plumb: not to exceed 1/500th of member length.
- .2 Camber: not to exceed 1/1000th of member length.
- .3 Spacing: not more than 3.0mm from design spacing.
- .4 Gap between end of stud and track web: not more than 4.0mm.

3.4 CUTOUTS

.1 Maximum size of cutouts for services as follows:

Member Depth	Max Across Member Depth	Max Along Member Length	Min. Centre to Centre Spacing (mm)	Min. from End
92	40	105	009	300
102	40	105	600	300
152	65	115	600	300
203	65	115	600	400

.2 Limit distance from centerline of last unreinforced cutout to end of member to less than 300mm.

3.5 FIELD QUALITY CONTROL

- .1 The steel stud design engineer shall perform regular field reviews during construction and submit report to Consultant.
- .2 Include cost of field review in this Section.

PART 1GENERAL

1.1 **RELATED SECTIONS**

- Section 03 30 00 Cast-in-Place Concrete: Installation of anchors. .1
- .2 Section 04 05 19 - Masonry Reinforcement and Connectors: Installation of anchors.
- .3 Section 05 12 23 - Structural Steel for Buildings.
- .4 Section 05 51 00 - Metal Stairs and Ladders.
- .5 Section 09 91 00 - Painting

1.2 REFERENCES

- .1 The Ontario Building Code.
 - MMAH Supplementary Standard SB-8, September 14, 2012. Design, .1 Construction and Installation of Anchorage Systems for Fixed Access Ladders.
- .2 ASTM International, (ASTM)
 - ASTM A53/A53M-12 Standard Specification for Pipe, Steel, Black and Hot .1 Dipped, Zinc Coated, Welded and Seamless.
 - ASTM A123/A123M-12 Standard Specification for Zinc (Hot Dip Galvanized) .2 Coatings on Iron and Steel Products.
 - ASTM A153/A153M-09 Standard Specification for Zinc Coating (Hot Dip) on Iron .3 and Steel Hardware.
 - .4 ASTM A307-10 Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strenath.
 - .5 ASTM A325-10 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - ASTM A385/A385M-11 Standard Practice for Providing High Quality Zinc .6 Coatings (Hot Dip).
 - ASTM A570, Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality. .7
 - .8 ASTM A1008/A1008M-12 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
 - .9 ASTM A1011/A1011M-12a 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
 - .10 ASTM D6386-10 Standard Practice for Preparation of Zinc (Hot Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting
- .3 Canadian Standards Association (CSA International)
 - CSA G40.20-04/G40.21-04 (R2009), General Requirements for Rolled or Welded .1 Structural Quality Steel/Structural Quality Steel
 - .2 CSA-S16-09, Design of Steel Structures
 - CAN/CSA G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles. .3
 - CSA-W47.1-09, Certification of Companies for Fusion Welding of Steel .4 Structures.
 - .5 CSA W48-06 (R2011). Filler Metals and Allied Materials for Metal Arc Welding
 - CSA W59-03 (R2008) Welded Steel Construction (Metal-Arc Welding) .6
- Canadian General Standards Board (CGSB) .4
 - CAN/CGSB 1.40-97. Anticorrosive Structural Steel Alkvd Primer .1
 - .2 CAN/CGSB 1.108-M89, Bituminous Solvent Type Paint
 - CAN/CGSB 1.181-99, Ready Mixed, Organic Zinc Rich Coating. .3
- Canadian Sheet Steel Building Institute (CSSBI) .5 .6
 - Steel Structures Painting Council, Systems and Specifications Manual.
 - CISC/CPMA 1-73a, A Quick drying One-coat Paint for Use on Structural Steel. .1

.2 CISC/CPMA 2-75, A Quick drying Primer for Use on Structural Steel.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 Submittal Procedures.
- .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
- .3 Drawings shall bear the stamp and signature of a professional engineer registered in the Province of Ontario.

1.4 DESIGN REQUIREMENTS

- .1 Design metal stair, handrail, guardrail, landing and ladder construction and connections to OBC vertical and horizontal live load requirements.
- .2 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.
- .3 Design service access ladders, stairs and guards to Ministry of Labour requirements.
- .4 All access ladders shall be designed with the minimum requirements from the drawings and Ontario Building Code Supplementary Standard SB-8, whichever is more stringent. This shall include through-bolting anchors at masonry walls.

1.5 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.

1.6 SHIPPING, HANDLING AND STORAGE

- .1 Label, tag or otherwise mark work supplied for installation by other Sections to indicate its function, location and shop drawing description.
- .2 Protect work from damage and deliver to a location at the site in order to meet the scheduling requirements.
- .3 Protect architecturally exposed materials during fabrication, delivery, handling, storage and erection to prevent marring of surfaces exposed to view, by marking, bending, enting or coarse grinding.

2 PRODUCTS

2.1 MATERIALS

- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade300W 350W.
- .2 Steel pipe: to ASTM A53/A53M standard weight, black or galvanized finish as indicated.
- .3 Welding materials: to CSA W59.
- .4 Bolts and anchor bolts: to ASTM A307.

.5 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.1 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m2to CAN/CSA-G164.
- .2 Shop coat primer: to CAN/CGSB-1.40.
- .3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .4 Bituminous paint: to CAN/CGSB-1.108.

2.2 ISOLATION COATING

- .1 Isolate aluminum from following components, by means of bituminous paint:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

2.3 SHOP PAINTING

- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .2 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.
- .3 Clean surfaces to be field welded; do not paint.

3 EXECUTION

3.1 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Provide components for building by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CAN/CSA-S16.1, or weld.
- .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

PART 1GENERAL

1.1 RELATED SECTIONS

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 05 12 23 Structural Steel for buildings
- .3 Section 05 50 00 Metal Fabrications
- .4 Section 09 91 00 Painting.

1.2 **REFERENCES**

- .1 ANSI/NAAMM MBG531-93, Metal Bar Grating Manual.
- .2 CAN/CGSB-1.181-92, Ready-Mixed Organic Zinc-Rich Coating.
- .3 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel.
- .4 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .5 CSA W59-M1998, Welded Steel Construction (Metal Arc Welding).
- .6 National Association of Architectural Metal Manufactures NAAMM, Metal Stair Manual (AWP 510-92).

1.3 DESIGN REQUIREMENTS

- .1 Design metal stair, balustrade and landing construction and connections to OBC vertical and horizontal live load requirements.
- .2 Detail and fabricate stairs to NAAMM Metal Stairs Manual to commercial class requirements.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 Submittal Procedures.
- .2 Indicate construction details, sizes of steel sections and thickness of steel sheet.
- .3 Submit shop drawing bearing stamp of a qualified professional engineer registered in Canada Province of Ontario.
- .4 Indicate requirements for location and type of back up support and anchors.

2 PRODUCTS

2.1 MATERIALS

- .1 Steel sections: to CAN/CSA-G40.20/G40.21 Grade300 W.
- .2 Steel plate: to CAN/CSA-G40.20/G40.21, Grade260 W, pattern.
- .3 Floor plate: to CAN/CSA-G40.20/G40.21, Grade 260 W.
- .4 Steel pipe: to ASTM A 53/A 53M, standard weight, schedule 40.

- .5 Metal bar grating: to ANSI/NAAMM MBG 531, steel, checkered plate.
- .6 Welding materials: to CSA W59.
- .7 Bolts: to ASTM A 307.
- .8 High strength bolts: to ASTM A 325M.

2.2 FABRICATION

- .1 Verify field dimensions prior to fabrications
- .2 Fabricate to NAAMM, Metal Stair Manual.
- .3 Weld connections where possible, otherwise bolt connections. Countersink exposed fastenings, cut off bolts flush with nuts. Make exposed connections of same material, colour and finish as base material on which they occur.
- .4 Accurately form connections with exposed faces flush; mitres and joints tight. Make risers of equal height.
- .5 Grind or file exposed welds and steel sections smooth.
- .6 Shop fabricate stairs in sections as large and complete as practicable.

2.3 STEEL PAN STAIRS

- .1 Fabricate stairs with closed or open riser steel pan construction as indicated on drawings.
- .2 Form treads and risers from 3 mm thick steel plate. Secure treads and risers to L 35 x 35 x 5 horizontal and vertical welded to stringers.
- .3 Form stringers from MC 310 x 15.8 ADP 5 mm thick plate fascia welded on to outer stringers and as detailed on drawings.
- .4 Form landings from 3 mm thick steel plate, reinforced by L 55 x 55 x 6 mm spaced at 400 mm oc.
- .5 Provide clip angles for fastening of furring channels, where applied finish is indicated for underside of stairs and landings.
- .6 Extend stringers around mid landings to form steel base.
- .7 Close ends of stringers where exposed.
- .8 Galvanized exterior conditions.

2.4 PIPE/TUBING BALUSTRADES

- .1 Construct balusters and handrails from steel pipe or tubing as indicated.
- .2 Cap and weld exposed ends of balusters and handrails.
- .3 Terminate at abutting wall with end flange.
- .4 Galvanize exterior conditions

2.5 **FINISHES**

- Galvanizing: hot dipped galvanizing with zinc coating 600 g/m²to CAN/CSA-G164. .1
- Shop coat primer: to CAN/CGSB-1.40. .2
- Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181. .3

2.6 SHOP PAINTING

- Clean surfaces in accordance with Steel Structures Painting Council Manual Volume 2. .1
- .2 .3 Apply one coat of shop primer except interior surfaces of pans.
- Apply two coats of primer of different colours to parts inaccessible after final assembly.
- .4 Use primer as prepared by manufacturer without thinning or adding admixtures. Paint on dry surfaces, free from rust, scale, grease, do not paint when temperature is below 7°C.
- .5 Do not paint surfaces to be field welded.

3 **EXECUTION**

3.1 **INSTALLATION OF STAIRS**

- .1 Install in accordance with NAAMM, Metal Stair Manual.
- .2 Install plumb and true in exact locations, using welded connections wherever possible to provide rigid structure. Provide anchor bolts, bolts and plates for connecting stairs to structure.
- .3 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .4 Do welding work in accordance with CSA W59 unless specified otherwise.
- .5 Touch up shop primer to bolts, welds, and burned or scratched surfaces at completion of erection.

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 60 00 Basic Product Requirements
- .2 Section 05 41 00 Wind Load Bearing Steel Stud System
- .3 Section 06 20 00 Finish carpentry
- .4 Section 06 40 00 Architectural Woodwork
- .5 Section 07 21 00 Loose, Batt, and Blanket Insulation

1.2 REFERENCES

- .1 ANSI A208.1-1999, Particleboard, Mat Formed Wood.
- .2 CAN/CGSB-11.3-M87, Hardboard.
- .3 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .4 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .5 CSA-B111-1974, Wire Nails, Spikes and Staples.
- .6 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .7 CSA O121-M1978, Douglas Fir Plywood.
- .8 CAN/CSA-O141-91, Softwood Lumber.
- .9 CSA-O151-M1978, Canadian Softwood Plywood.
- .10 CSA-O153-M1980, Poplar Plywood.
- .11 CAN/CSA-O325.0-92, Construction Sheathing.
- .12 CAN3-O437 Series-93, Standards on OSB and Waferboard.
- .13 National Lumber Grades Authority (NLGA) .1 Standard Grading Rules for Canadian Lumber1991.

1.3 QUALITY ASSURANCE

- .1 Lumber identification: 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.

2 PRODUCTS

2.1 FRAMING AND STRUCTURAL MATERIALS

.1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:

- .1 CAN/CSA-O141.
- .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Glued end-jointed (finger-jointed) lumber NLGA Special Products Standard
- .3 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
 - .1 S2S is acceptable.
 - .2 Board sizes: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade.

2.2 PANEL MATERIALS

.1 Canadian softwood plywood (CSP): to CSA-O151, standard construction.

2.3 ACCESSORIES

- .1 Nails, spikes and staples: to CSA-B111.
- .2 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .3 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer. Explosive activated fasteners are not approved.

2.4 FASTENER FINISHES

- .1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for exterior work interior highly humid areas pressure-preservative fire-retardant treated lumber.
- .2 Stainless steel: use stainless steel 304 alloy for exposed work.

2.5 WOOD PRESERVATIVE

- .1 Treat lumber and plywood to CSA 080.
- .2 Dry material to maximum moisture content of 19%.
- .3 Surface apply coloured preservative to manufacturers directions on all cut surfaces.

3 EXECUTION

3.1 INSTALLATION

- .1 Comply with requirements of OBC supplemented by following paragraphs.
- .2 Install members true to line, levels and elevations, square and plumb.
- .3 Construct continuous members from pieces of longest practical length.
- .4 Install sheathing in accordance with manufacturer's printed instructions.
- .5 Install furring and blocking as required to space-out and support casework, wall and ceiling finishes, facings, fascia, soffit, siding electrical equipment mounting boards, and other work as required.
- .7 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

- .8 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.
- .9 Install sleepers as indicated.

3.2 ERECTION

- .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .2 Countersink bolts where necessary to provide clearance for other work.
- .3 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures
- .2 Section 01 45 00 Quality Control
- .3 Section 01 60 00 Basic Product Requirements
- .4 Section 05 50 00 Metal Fabrication
- .5 Section 06 10 00 Rough Carpentry
- .6 Section 07 90 00 Joint Sealers.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A208.2 1994, Density 640-800kg/m;, Medium Density Fiberboard for Interior Use.
 - .2 ANSI A208.1-1993, Density 640-800kg/m;, Grade M2, Particleboard for Interior Use.
- .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
 - .1 AWMAC Quality Standards for Architectural Woodwork 1998.
- .3 Canadian Standards Association (CSA)
 - .1 CAN3 A172 M79, High Pressure Paper Base, Decorative Laminates.
 - .2 CSA B111 1974, Wire Nails, Spikes and Staples.
 - .3 CSA O115 M82 , Hardwood and Decorative Plywood.
 - .4 CSA O121 M1978 , Douglas Fir Plywood.
 - .5 CAN/CSA O141 91, Softwood Lumber.
 - .6 CSA O151 M78 , Canadian Softwood Plywood.
 - .7 CSA O153 M80 , Poplar Plywood.
 - .8 CAN3 O188.1 M78 , Interior Mat Formed Wood Particleboard.
 - .9 CAN/CGSB 11.3 M87 , Hardboard.
- .4 National Hardwood Lumber Association (NHLA)
 - .1 Rules for the Measurement and Inspection of Hardwood and Cypress January 1998.
- .5 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 1991.

1.3 QUALITY CONTROL

- .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 Work that does not meet standards, as specified, shall be replaced or made good to the satisfaction of AWMAC and the consultant. Additional work required replacing, rendering and/or refinish work not meeting the standards of these specifications shall be done at no additional cost to the owner including any additional inspections to satisfy AWMAC approvals.
- .3 All work shall comply with AWMAC Custom Grade Quality. AWMAC standard specified shall be considered a minimum standard. If greater quality of any components is specified in these documents that that of AWMAC specified quality, the architectural woodworker shall perform work to the greater of the AWMAC standard or specified standard.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 Submittal Procedures.
- .2 Indicate details of construction materials, profiles, jointing, fastening finishes and other related details.
- .3 Indicate locations of all service outlets in casework, and all connections, attachments, anchorage and location of exposed fastenings. Indicate as-built site measurements.

1.5 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit duplicate samples: sample size 300 x 300 mm.
- .3 Submit duplicate colour samples all cabinet and counter finish materials for consultant colour selection.
- .4 Submit duplicate samples of laminated plastic joints, edging, cutouts nosing's, and postformed profiles.
- .5 Submit duplicate samples of all finished wood of stain or paint colour as selected by Architect.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Protect millwork against dampness and damage during and after delivery.
- .2 Store millwork in ventilated areas, protected from extreme changes of temperature or humidity.

1.7 WARRANTY

.1 Provide to the owner a two (2) year certificate. The certificate shall cover replacement, reworking and/or refinishing to make good defects in architectural woodwork due to faulty workmanship, which appear during a two (2) year period following the date of substantial performance.

2 PRODUCTS

2.1 MATERIALS

- .1 Thermofused Melamine (MCP):
 - .1 To NEMA LD-3-95 Grade VGL consisting of a decorative paper impregnated and saturated with melamine resin, thermally fused under heat and pressure to thickness indicated. Always overlay bonded to both faces to prevent warping.
 - .2 Particleboard core panels to ANSI A208.1 1993 to ASTM E1333-1990, grade M2, density 640 800 kg/m3 to indicated thickness. Colour-matched edging to be 3mm PVC, rounded.
 - .3 Melamine colour to be later selected by consultant from manufacturers full range of colours in price group D (Panolam) or price group 4 (Uniboard) "Assume 2 MCP colours for casework.
 - .4 Supply Panolam, Uniboard, Tafisa or approved alternate.
- .3 Particleboard Core: to CAN3-0188.1 M78; Grade R, sanded faces, 19 mm thick.
- .4 Plastic Laminate: to CAN3-A172-M79, General Purpose Standard Grade (GP-S) for all flat applications and edge banding. Postforming Standard Grade (PF-S) for postformed work. Colours and textures to be selected by Consultant from manufacturers' full range, from "Nevamar", "Formica", or "Wilsonart" and "Arborite" at the Consultants discretion.
- .5 Fasteners and Sealants

- .1 Nails and staples: to CSA B111.
- .2 Wood screws: Type and size to suit application.
- .3 Splines: wood, plastic, or metal.
- .4 Sealant: to Section 07900 CAN 3.
- .5 Adhesives: to CSA 0112-M as applicable.
- .6 Stainless Steel: 16 guage, type 304 with #4 finish on 19mm marine grade plywood.

2.2 CABINET FABRICATION:

- .1 Cabinet Style: Flush overlay doors and drawers on gable end "European" style construction.
- .2 Case Construction:
 - .1 All joints shall be glued rebate, or glued and dowelled or glued and screwed with appropriate screw connectors. Plain or nailed butt joints are not acceptable.
 - .2 Case Bodies: 19mm Melamine Component Panels with 3mm matching edge-banding or as otherwise indicated.
 - .3 Backs: 19mm Melamine Component Panels.
 - .4 Doors: 19mm Melamine Component Panels with 3mm matching edge-banding.
 - .5 Toe Kick: 19mm fir plywood unless otherwise noted on drawings.
- .3 Shelves:
 - .1 Shelving: 19mm Melamine Component Panels with 3mm matching edge-banding.
 - .2 Shelving shall be full depth of cabinets.
- .4 Drawer Construction:
 - .1 All joints to be glued rebate, or glued and dowelled or glued and screwed with appropriate screw connectors approved by Consultant.
 - .2 Drawers to be maximum practical depth.
 - .3 Drawer Interiors (Sides, Backs, Bottoms and False Fronts): 13mm Melamine Components Panels
 - .4 Drawer Fronts: 19mm Melamine Component Panels with 3mm matching edge-banding.
- .5 Refer to drawings for extent all cabinet fabrication and use of brich plywood core.
- .6 Furring, blocking, nailing strips, grounds and rough bucks and sleepers: Softwood lumber.
- .7 Wood trims and nosing's: Select Grade Hardwood, Birch unless otherwise indicated on drawings. Factory stained or painted to consultants later selection.
- .8 Counters:
 - .1 Plastic laminate on particleboard core or as noted on drawings, post formed where indicated, with or without nosing's and to profiles as detailed. 180° wrap post formed nosing profile unless otherwise noted on drawings.
 - .2 Solid Surface: Refer to drawings for locations.
- .9 Supply and install cabinet hardware, in quantity required for doors, shelves, and drawers.
- .10 No exposed fasteners allowed in exposed gable ends or exposed back panels. Provide colour matching plugs in melamine over construction fasteners.

2.3 CABINET HARDWARE

- .1 Door hinges: "European" style, concealed, hinges, self-closing, press formed hinge links, zinc die cast screw on hinge cup inset into door, 3-dimensional independent adjustment, all exposed parts nickel plated, opening angle 120°, for full or half overlay as required, on all units except 95° opening angle where doors open against walls. One pair per door, two pair per full height door. Supply "Blum" 94M 5500 or approved alternate.
- .2 Drawer Slides: Acceptable Manufacturers: Knape & Vogt, Richelieu. Accuride Heavy duty as noted on drawings. Acceptable Manufacturers Accuride model 3640. Where indicated on drawings provide soft close heavy-duty slides.
- .3 Drawer and Swing Door Pulls: U shaped wire pulls 89 mm c/w screw fastening, finish to be "Dull Nickel finish #195", supply #33204 by Richelieu or approved alternate.
- .4 Shelf Pilasters: zinc coated KV255 by Knape and Vogt, full height of gable, recessed in dado flush to face.
- .5 Shelf Supports: zinc coated KV256 by Knape and Vogt. Supply 20 spare shelf supports.
- .6 Door and Drawer Bumpers: rubber bumpers, 10 mm diameter x 3 mm thick, screwed on. Two per door on drawer. Supply 100 spare bumpers.
- .7 Open Shelving Components: brackets prefinished silver, "Medium Duty" Richelieu #69912106 and pilaster supports, Richelieu #085 Series, zinc finish.
- .10 Magnetic Catch and plate: Single (32mm c.o), double 64mm c.c.), Acceptable Manufacturer Richelieu 520-90, 6591-90.
- .17 Grommet: Richelieu 76090 65mm diameter, ABS.
- .18 Shelving supports: Knape & Vogt 24276 series with mounting hole.

2.4 PLASTIC LAMINATE FABRICATION

- .1 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .2 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 3000 mm. Keep joints 600 mm from sink cutouts. Mitre all corners in counter.
- .3 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- .4 Use straight self edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .5 Apply laminate backing sheet to reverse side of core of plastic laminate work.

- .6 Apply laminated plastic liner sheet to interior of cabinetry where indicated.
- .7 Apply high impact ridged 3.0mm PVC vinyl where noted. Standard colour to consultants later selection.

2.5 THERMOFUSED MELAMINE

.1 Melamine panels in finished (installed) condition shall show no exposed fasteners on exterior surfaces. Assemble melamine millwork using doweled/wafered-and-glue construction. Only where specified, construction may also include assembly using hardware (ie. screws). For more information, consult MDF/Particleboard AFrom Start to Finish@ documents prepared by The Composite Panel Assoc.

2.6 COUNTER FABRICATION

.1 Plastic Laminate Counters: On particleboard core or plywood as noted on drawings, post formed where indicated, with or without nosing and to profiles as detailed. Hardwood nosing to profile indicated unless otherwise noted.

3 EXECUTION

3.1 INSTALLATION

- .1 Do architectural woodwork to <u>Custom Grade</u> Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- .2 Fasten and anchor millwork securely. Provide heavy duty fixture attachments for wall mounted cabinets.
- .3 Use draw bolts in countertop joints.
- .4 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.
- .5 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant.
- .6 Apply water resistant building paper or bituminous coating over wood framing members in contact with masonry or cementitious construction.
- .7 Fit hardware accurately and securely in accordance with manufacturer's directions.
- .8 Confirm millwork and cove base requirements for each room. See finish schedule.
- .9 Accurately fit all members to provide flush hairline joints.
- .10 Fillers: See drawings

3.2 CLEANING

- .1 Clean millwork and cabinet work inside cupboards and drawers and outside surfaces.
- .2 See drawings for existing millwork to be salvaged from demolition and reinstalled in new location. Store and protect millwork as required. Damaged millwork shall be replaced with new to match at consultant's discretion.

3.3 PROTECTION

.1 Protect millwork and cabinet work from damage until final inspection.

1 GENERAL

1.1 **RELATED SECTIONS**

- Section 01 60 00 Basic Product Requirements .1
- .2 Section 31 _____ - Excavation and Backfill
- .3 Section 03 30 00 - Cast-In-Place Concrete
- Section 04 05 19 Masonry Reinforcement & Connectors .4
- .5 Section 04 22 00 - Concrete Masonry Units
- Section 07 26 00 Sheet Vapour Retarder Section 07 27 00 Air Vapour Barrie .6
- .7
- Section 07 46 16 Preformed Metal Panels .8
- Section 07422 Exterior Composite Wood Panels .9
- .10 Section 07 62 00 - Sheet Metal Flashing & Trim
- Section 07 90 13 Foamed in Place Insulating Sealant .11

1.2 REFERENCES

- .1 ASTM E96-96, Test Methods for Water Vapor Transmission of Materials.
- ASTM C591-94, Standard Specification for Unfaced Preformed Rigid Cellular .2 Polyisocyanurate Thermal
- .3 CGSB 71-GP-24M-77, Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .4 CAN/ULC-S701.1:2017, Thermal Insulation, Polystrene, Boards and Pipe Coverings.
- .5 CAN/ULC-S702-09, Thermal Insulation, Mineral Fibre, for Buildings.

1.3 SUBMITTALS

- .1 Product Data:
 - Submit manufacturer's printed product literature, specifications and data sheet in .1 accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01330 - Submittal Procedures. Indicate VOC's insulation products and adhesives.
- .2 Manufacturer's Instructions:
 - Submit manufacturer's installation instructions. 1

1.4 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Co-ordinate with other building subtrades.
- .3 Review manufacturer's installation instructions and warranty requirements.

2 PRODUCTS

2.1 INSULATION

- .1 Extruded polystyrene: to CAN/ULC S701-97, Type 2 thickness as indicated on drawings with shiplapped edges unless otherwise noted. Only polystyrene insulations listed on CGSB Qualified Products List (41 GP Series) are acceptable for use on this project. .1
 - Acceptable material:
 - .1 Below Grade: Styrofoam SM (Type 4) by Dow Chemicals Canada Inc. or approved equal. Owens Corning Canada LP' Foamular C-300 is an approved equal product
 - .2 Exterior walls and parapet (Steel Stud/Masonry), (Steel stud/ girts/metal cladding): Styrospan (Type 3) squared edges by Dow Chemicals Canada Inc. or approved equal. Owens Corning Canada LP' Foamular C-200 is an approved equal product
 - .2 Insulting sealant: Foam in place to section 07 21 29

2.2 **ADHESIVE**

- Type A: for polystyrene below grade insulation against foundation walls: to CGSB .1 71-GP-24.
- .2 Type C: Trowel consistency solvent type adhesive for rigid insulation: to CGSB 71-GP-24 Type 2.
 - Acceptable Product: Bakor 230-21

2.3 ACCESSORIES

Insulation clips: impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, .1 adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.

EXECUTION 3

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 WORKMANSHIP

- .1 Install insulation after building substrate materials are dry.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only .3 insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- Offset both vertical and horizontal joints in multiple layer applications. On wall applications .4 offset vertical joints to facilitate installation of masonry reinforcement and girt systems...
- .5 Do not enclose insulation until it has been inspected and approved by Consultant.

EXAMINATION 3.3

.1 Examine substrates and immediately inform Consultant in writing of defects. .2 Prior to commencement of work ensure substrates are firm, straight, smooth, dry, clean, free of snow, ice or frost and clean of dust and debris.

3.4 RIGID INSULATION INSTALLATION

- .1 Install insulation board to thickness shown at locates indicated on Drawings and Details.
- .2 Apply adhesive to polystyrene, insulation board in accordance with manufacturer's recommendations.
- .3 Imbed insulation boards into vapour barrier type adhesive, applied as specified, prior to skinning of adhesive.
- .4 Leave insulation board joints unbonded over line of expansion and control joints. Bond a continuous 150 mm wide [0.15 mm polyethylene] [flexible SBS modified membrane] strip over expansion and control joints using compatible [adhesive] [primer] before application of insulation.

3.5 PERIMETER FOUNDATION INSULATION

- .1 Extend boards vertically below bottom of finish floor slab as indicated on drawings, installed on face of perimeter foundation walls. Install on face of perimeter foundation wall with adhesive.
- .2 At intersection of perimeter foundation wall and interior foundation walls turn insulation minimum 1200 onto both side of the interior wall.

3.6 **PROTECTION**

.1 After installation of board insulation and prior to installation of exterior wall finish, protect insulation from physical damage and exposure to ultra violate sun damage per manufacturer's instructions.

3.7 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

1 GENERAL

1.1 SUMMARY OF WORK

.1 This Section specifies stone fiber batt and blanket thermal insulation and stone fiber batt and blanket acoustical insulation.

1.2 RELATED REQUIREMENTS

- .1 Section 07 84 00 Firestopping.
- .2 Section 07 92 00 Joint Sealants.
- .3 Section 06 10 00- Rough Carpentry

1.3 REFERENCE STANDARDS

- .1 ASTM International (ASTM).
 - 1. ASTM C167 [2009], Standard Test Method for Thickness and Density of Blanket or Batt Thermal Insulations.
 - 2. ASTM C356 [2010], Standard Test Method for Linear Shrinkage of Preformed High- Temperature Thermal Insulation Subjected to Soaking Heat.
 - 3. ASTM C423 [2009a], Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - 4. ASTM C518 [2010], Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 5. ASTM C553 [2011], Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - 6. ASTM C665 [2011], Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 7. ASTM C795 [2013], Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
 - 8. ASTM C1104/C1104M [2013], Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
 - 9. ASTM E84 [2012b], Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 10. ASTM E90 [2009], Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 11. ASTM E136 [2011], Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
- 2. Underwriters' Laboratories (UL).
 - 1. UL 181 [2013], Factory-Made Air Ducts and Connectors.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Contract Conditions and Section 01 33 00 -Submittal Procedures.
- .2 Product Data: Submit product data including manufacturer's literature for insulation materials and accessories, indicating compliance with specified requirements and material characteristics.
 - 1. Submit list on insulation manufacturer's letterhead of materials and accessories to be incorporated into Work.
 - 2. MSDS report.
 - 3. Include product name.
 - 4. Include preparation instructions and recommendations, installation methods, and storage and handling requirements.

- 5. Include contact information for manufacturer and their representative for this Project.
- .3 Test Reports:
 - 1. Submit evaluation service reports or other independent testing agency reports showing compliance with specified performance characteristics and physical properties.

1.8 DELIVERY STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:
 - 1. Deliver material in accordance with Section 01 61 00 Common Product Requirements.
 - 2. Deliver materials and accessories in insulation manufacture's original packaging with identification labels intact and in sizes to suit project.
 - 3. Ensure insulation materials are not exposed to moisture during delivery.
 - 4. Replace wet or damaged insulation materials.
- .2 Storage and Handling Requirements: Store materials off ground in dry location and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
 - 1. Store in original packaging until installed.
- .3 Packaging Waste Management:
 - Separate and recycle waste packaging materials in accordance with Section 01 74 19 - Construction Waste Management and Disposal.
 - 2. Remove waste packaging materials from site and dispose of packaging materials at appropriate recycling facilities.
 - 3. Collect and separate for disposal paper and plastic material in appropriate on-site storage containers for recycling.

2 PRODUCTS

2.1 MANUFACTURER

- 1. Manufacturer: ROCKWOOL
- 2. Equivalent products manufactured by "Owens Corning", " John Mansville" and "Knauf" are acceptable alternatives.

2.2 MATERIALS

- .1 Non-combustible, lightweight, semi-rigid stone wool batt insulation to ASTM C612 that provides fire resistance to ASTM E136.
 - 1. Install to fill perimeter gaps of fire rated assemblies and around conduit pipes and duct openness through walls and floor slabs.
 - 2. Acceptable Material: ROCKWOOL, ROXUL SAFE.
- .2 Non-combustible, lightweight, semi-rigid stone wool batt insulation to C665, Type 1, that provides fire resistance to ASTM E136 and a sound control to ASTM E90 and ASTM E423. Install within stud cavities of all acoustical steel stud partitions.
 - 1. Size: to suit stud spacing.
 - 2. Thickness: as indicated on drawings.
 - 3. Acceptable Material: ROCKWOOL AFB.

2.3 ACCESSORIES

- .1 Mechanical fasteners in accordance with insulation manufacturer's written recommendations.
- .2 Acoustical sealant in accordance with Section 07 92 00 Joint Sealants.
- .3 Firestopping materials in accordance with Section 07 84 00 Firestopping.

2.4 SOURCE QUALITY CONTROL

.1 Ensure insulation components and accessories are supplied or approved in writing by single manufacturer.

2.5 **PRODUCT SUBSTITUTIONS**

.1 Substitutions: In accordance with Section 01 33 00 - Substitution Procedures.

3 EXECUTION

3.1 INSTALLERS

.1 Use only installers with 5 years minimum experience with work similar to work of this Section.

3.2 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for insulation installation in accordance with manufacturer's written recommendations.
 - 1. Visually inspect substrate in presence of Consultant.
 - 2. Ensure surfaces are free of snow, ice, frost, grease and other deleterious materials.
 - 3. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
- .2 Start of insulation installation indicates installer's acceptance of substrate installation conditions.

3.3 INSTALLATION

- .1 Install insulation in accordance with manufacturer's written recommendations.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- 3. Do not compress insulation to fit into spaces.
- .4 Co-ordinate installation of firestopping insulation with Section 07 84 00 Firestopping.
- .5 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .6 Seal joints with acoustical joint sealant in accordance with Section 07 92 00 Joint Sealants.
- .7 Do not enclose insulation until before inspection and receipt of Consultant's written approval.

3.4 FIELD QUALITY CONTROL

.1 Field Inspection: Coordinate field inspection in accordance with Section 01 45 00 - Quality Control.

3.5 CLEANING

- Progress Cleaning: Perform cleanup as work progresses in accordance with Section 01 74 19 Cleaning and Waste Management.
 - 1. Leave work area clean at end of each day.
- .2 Final Cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 19 Cleaning and Waste Management.
- .3 Waste Management:
 - 1. Co-ordinate recycling of waste materials with 01 74 19 Construction Waste Management and Disposal.
 - 2. Collect recyclable waste and dispose of or recycle field generated construction waste created during construction or final cleaning related to work of this Section.
 - 3. Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

- .1 Protect installed products and accessories from damage during construction.
- .2 Repair damage to adjacent materials caused by insulation installation.

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 60 00 Basic Product Requirements
- .2 Section 07 21 13 Board Insulation
- .3 Section 07 27 00 Air Barriers
- .4 Section 07 90 00 Joint Sealers
- .5 Section 08 11 00 Steel Doors and Frames.
- .6 Section 08 11 16 Aluminum Doors & Frames
- .7 Section 08 44 13 Glazed Aluminum Curtain wall
- .8 Section 08 50 20 Windows

1.2 **REFERENCES**

.1 CAN/ULC - S705.1-98 Polyurethane foam spray thermal insulation.

1.3 SUBMITTALS

- .1 Submit product data to requirements of Section 01 33 00.
- .2 Product Data: Provide data on material characteristics, performance criteria, limitations.
- .3 Manufacturers installation instructions: Indicate preparation, installation requirements and techniques, product storage and handling criteria.
- .4 Include manufacturers material safety data sheets in accordance with WHMIS requirements.

1.4 ENVIRONMENTAL REQUIREMENTS

.1 Maintain temperature and humidity recommended by materials manufacturers before, during and after installation.

1.5 COORDINATION

.1 Coordinate work of this section with all sections referencing this section.

PART 2 PRODUCTS

2.1 INSULATING FOAM AIR SEAL MATERIALS

.1 Insulating foam air seal materials: Single component spray in place polyurethane foam, final cured foam shall have a density of 35.2kg/m3 and a design thermal resistance of minimum 1.0 m2E C/W per 25mm thickness.

Acceptable Products:	.1	CANAM Building Products - " ZERO DRAFT "
	.2	BASF: Walltite

3 EXECUTION

3.1 EXAMINATION

Verify that surfaces and conditions are ready to accept the work of this section. .1

PREPARATION 3.1

- .1 Remove loose or foreign matter that might impair adhesion of foam materials.
- .2 Clean and prime substrate surfaces to receive in accordance with manufacturer's instructions. Ensure all surfaces to receive foam are free of all grease, oil, frost, loose scale, rust, water and other unsuitable material.
- .3 Cover surrounding surfaces with temporary masking to protect form over spray.

3.1 INSTALLATION

- Install materials in accordance with manufacturers instructions. .1
- .2 Apply insulating foam air-seal material to produce a continuous air seal to bridge and seal openings and penetrations in building envelope.
- Apply in sufficient thickness to provide continuity of thermal protection between adjacent .3 installed assemblies and exposed components.
- Apply materials within recommended application temperature ranges. Consult .4 manufacturers when sealant cannot be applied within these temperature ranges.
- .5 Apply the foam in passes of between 15 and 50mm thickness.
- .6 Keep foam at least 75mm away from heat emitting devices such as recessed light fixtures and chimneys.
- .7 Do not cover electrical wiring by more than 20mm unless protective shielding is installed to prevent overheating.
- .8 Ensure that foam is not exposed in final assembly.

3.2 **PROTECTION OF FINISHED WORK**

- .1 Protect finished work under provisions of Division 01.
- .2 Do not permit adjacent work to damage work of this section.

3.5 **CLEANING**

- .1 Remove masking and other temporary protection from adjacent surfaces.
- .2 Clean and make good all damage caused by work of this section.

SCHEDULE 3.6

- .1 Install foamed-in-place insulating air seal at the following locations:
 - in exterior steel door frames. .1
 - .2 .3 between exterior door frames and adjacent construction
 - at penetrations of building envelope
 - at gaps in building envelope.
 - .4 .5 .5 gaps between board insulation panels.
 - All other locations indicated on drawings

PART 1) GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 74 19 Site Cleaning & Waste Management.
- .2 Section 03 30 00 Cast in Place Concrete
- .3 Section 07 27 36 Spray Foam Insulation
- .4 Section 07 21 13 Board Insulation

1.2 **REFERENCES**

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

1.3 SUBMITTALS

.1 Submit proof of manufacturers CCMC Listing and listing number to Engineer Consultant.

1.4 **PRODUCT DATA**

- .1 Submit product data in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit product data sheets for sheet vapour retarders. Include:
 - .1 Product characteristics.
 - .2 Performance criteria.
 - .3 Limitations.

2 PRODUCTS

2.1 SHEET VAPOUR BARRIER

- .1 Vapour Retarder: virgin polyolefin resin sheet to ASTM E1745.
 - .1 Thickness:10 mil.below slab on grade, 6mil all other locations
 - .2 Roll size: 3.66 m wide x 60.96 m long.
 - .3 Water vapour permeance: 0.0183 perms as per ASTM E96.
 - .4 Puncture resistance: >3500 grams as per ASTM D1709.
 - .5 Tensile strength: 9.12 kN/m as per ASTM E154.
 - .6 Approved product for below grade: 10mil Perminator as manufactured by W.R. Meadows or approved equal. VaporBlock VB10 is acceptable underslab vapour barrier 10mil as per specifications.
- .2 Jointing Tape: Air resistant pressure sensitive adhesive tape, type recommended by vapour retarder manufacturer for sealing joints and penetrations.
- .3 Sealant: Single-component, non-skinning, non-hardening, flexible, synthetic rubber sealing and bedding compound to CAN/CGSB-19.21, recommended by polyethylene sheet manufacturer.
- .4 Polyethylene film: to CAN/CGSB-51.34, 10 mil thick as noted on drawings. EcoLogo certified containing minimum 50 % recycled content, VOC content.
- .5 Refer to Sction 07 54 00 for application included in work under adhered elastometric sheet roofing.

2.2 ACCESSORIES

- .1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour retarder manufacturer, 100 mm wide for lap joints and perimeter seals.
- .2 Sealant: EcoLogo certified, not to contain total of volatile organic compounds in excess of 5 % by weight, asbestos-free sealant, compatible with vapour retarder materials, recommended by vapour retarder manufacturer.

3 EXECUTION

3.1 INSTALLATION

- .1 Install vapour retarder under interior slabs-on-grade.
- .2 Lap joints minimum 152 mm.
- .3 Seal all joints with tape.
- .4 Ensure services are installed and inspected prior to installation of retarder.
- .5 Sheet vapour retarder to be installed free of folds and ripples and without voids between vapour retarder and insulation.
- .6 Loose lay 10 mil sheet vapour retarder below slab on grade. Seal around all services penetrating vapour barrier. Turn up perimeter of slab on warm side of perimeter slab insulation and seal to thru-wall flashing or adjacent wall sheet vapour barrier as indicated on drawings.
- .7 Mechanically fastened 6mil sheet vapour retarder to sound framing material with manufacture approved methods.
- .8 Use sheets of largest practical size to minimize joints.
- .9 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.
- .10 Seal protrusions caused by pipes, conduits, electrical boxes, and similar items penetrating vapour retarders by creating a collar with vapour retarder and sealing with jointing tape to create air-tight seal between penetrating objects and vapour retarder.
- .11 Where damage to vapour retarder exceeds tape width, repair with additional layer of vapour retarder, minimum 300 mm overlap in all directions from edge of damage. Tape continuously around perimeter of patch.
1 GENERAL

1.1 **GENERAL REQUIREMENTS**

- The General Conditions of the Contract, Supplementary Conditions, and the General .1 Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section, and all related sections.
- .2 The work of this section, and related work specified in other sections shall comply with all requirements of Division 1 - General Requirements.

1.2 SECTION INCLUDES

Provision of all labour, materials, equipment and incidental services necessary to provide .1 all spray-in-place foam insulation.

1.3 **RELATED SECTIONS**

- Section 01 60 00: Basic Product Requirements .1
- .2 .3 Section 05 41 00: Wind Load Bearing Steel Stud System
- Section 06 10 00: Rough Carpentry
- .4 Section 07 24 00: Air Barriers
- .5 Section 09 29 00: Gypsum Board
- .6 Division 23: Insulation for mechanical work.

1.4 REFERENCES

- ASTM E283; Rate of Air Leakage Through Exterior Windows Curtain Walls and Doors. .1
- .2 CAN/ULC-S102; Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- CAN/ULC-S705.1; Thermal insulation Spray-Applied Rigid Polyurethane Foam, Medium .3 Density, Material Specification.
- .4 CAN/ULC-S705.2; Thermal insulation - Spray-Applied Rigid Polyurethane Foam, Medium Density. Installer's Responsibilities Specification.
- .5 CAN/ULC-S770: Determination of Long Term Thermal Resistance of Closed Cell Thermal Insulating Foams.

1.5 QUALITY ASSURANCE

- **Applicator Qualifications** .1
 - Work of this section shall be performed by applicators having a minimum of 2 .1 years documented experience in the installation of spray-in-place foam insulation. Submit proof of experience to Consultant. Application must belong to CUFCA.
- .2 Installation

.1 Work shall be performed in strict accordance with manufacturer's printed instructions, and in accordance with all warranty requirements.

- .3 Pre-installation Meeting
 - Convene a pre-installation meeting for the Products specified in this section. .1 Attendees must include, as a minimum, representatives of the following:
 - Contractor (Site Superintendent & Project Manager) .1
 - .2 Installation Subcontractor (Site Foreman & Project Manager)

- .3 Product Manufacturer and/or Distributor (Technical Representatives)
- .4 Related Subcontractors (ie. Mechanical and/or Electrical) .
- .5 Consultant

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Materials shall be delivered to jobsite in original and clearly marked containers with manufacturer's labels and seals intact.
- .2 Store solvent base liquids away from excessive heat and open flame, at above freezing temperatures, and free from contact with cold or frozen surfaces.
- .3 Do not double stack pallets of materials. Provide cover and adequate ventilation.

1.7 MOCK-UP

- .1 Construct mock-up of 10m[⁻] minimum, of spray-in-place foam insulation including one inside corner and one outside corner. Mock-up may be part of finished work.
- .2 Allow 24 hours for inspection of mock-up by Consultant before proceeding with insulation work.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Provide protection and environmental controls in accordance with Division 23, and CAN/ULC-S705.2.
- .2 Ventilate areas to receive insulation, in accordance with Division 23, by introducing fresh air and exhausting air continuously during, and for 24 hours after application to maintain non-toxic, unpolluted, safe working conditions.
- .3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.
- .4 Protect workers as recommended by insulation manufacturer. Applicator must wear appropriate breathing apparatus, safety goggles, and other protective clothing and equipment.
- .5 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.
- .6 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.
- .7 Dispose of waste foam daily in location designated by Consultant and decontaminate empty drums in accordance with foam manufacturer's instructions.

1.10 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01330 Submittal Procedures.
 - .2 Submit WHMIS MSDS Material Safety Data Sheets in accordance with Section 01330 Submittal Procedures. Indicate VOC's insulation products and adhesives.

- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.11 **PERFORMANCE REQUIREMENTS**

- .1 Material Performance: Provide materials which have an air permeance not to exceed 0.004 cubic feet per minute per square foot under a pressure differential of 0.3 in. water (1.57 psf) (0.02 L/sm @ 75 Pa.) when tested according to ASTM E 2178.
- .2 Spray Polyurethane Foam: Material shall meet requirements of ULC S705.1, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material - Specification. CCMC Evaluation Report or reports from accredited testing laboratory shall be made available upon request. Materials shall meet or exceed the following performance requirements as indicated in the test reports.
 - 1. Design R value minimum R 6 per inch.
 - 2. Density of 1.9 pounds per cubic foot.
 - 3. Smoke development not greater than 450 and flame spread not greater than 25 when tested in accordance with ASTM E 84.
- .3 Connections to Adjacent Materials: Provide connections to prevent air leakage at the following locations:
 - 1. Foundation and walls, including penetrations, ties and anchors.
 - 2. Walls, windows, curtain walls, storefronts, louvers or doors.
 - 3. Different wall assemblies, and fixed openings within those assemblies.
 - 4. Wall and roof connections.
 - 5. Floors over unconditioned space.
 - 6. Walls, floor and roof across construction, control and expansion joints.
 - 7. Walls, floors and roof to utility, pipe and duct penetrations.
 - 8. Seismic and expansion joints.
 - 9. All other leakage pathways in the building envelope.

2 PRODUCTS

2.1 MATERIALS

- .1 Insulation: spray-applied rigid polyurethane foam to CAN/ULC-S705.1;
 - .1 Compressive strength: 174kPa,
 - .2 Flame spread rating: less than 500 to CAN/ULC-S102,
 - .3 Air leakage of less than 0.001 L/s/m² at 75Pa to CAN/ULC-S705.1, for 25mm thickness of board,
 - .4 Water Vapour Permeance: 86.6 ng/Pa.s.m⁻, and
 - .5 Long Term Thermal Resistance (LTTR) of minimum;
 - .1 1.05m[°] °C/W for 25mm thickness of board.
 - .6 Acceptable Products;
 - .1 WALLTITE, by BASF Canada Inc.
 - .2 INSULBLOC by NCFI Polyurethanes
 - .3 PERMAX 2.0 by Henry
 - .4 CORBOND III by Johns Manville

- .5 CERTASPRAY CC by CertainTeed Corporation
- .6 Elastochem' Insulthane Extreme.
- .7 Heatlok Soya / Polarfoam PF 7300-0 Soya by Demilec
- .8 Icynene
- .2 Primers: in accordance with manufacturers recommendations for surface conditions.

2.2 AUXILIARY MATERIALS

- .1 Membrane at Transitions in Substrate and Connections to Adjacent Elements: One of the following as acceptable to the spray polyurethane foam air barrier manufacturer:
 - 1. CCW-705 TWF by Carlisle Coatings and Waterproofing.
 - 2. Perm-A-Barrier Flashing by Grace Construction Products.
 - 3. Blueskin SA by Henry.
 - 4. Poly-Wall Crack Guard by Protective Coatings Technology, Inc.
 - 5. ExoAir 110 by Tremco, Inc.
 - 6. Air Shield by W. R. Meadows, Inc.
- .2 Counterflashing for Masonry Through-Wall Flashing: One of the following and as acceptable to the spray polyurethane foam air barrier manufacturer:
 - 1. CCW-705 TWF by Carlisle Coatings and Waterproofing.
 - 2. Perm-A-Barrier Flashing by Grace Construction Products.
 - 3. Blueskin TWF by Henry.
 - 4. Poly-Wall Crack Guard by Protective Coatings Technology, Inc.
 - 5. ExoAir TWF by Tremco, Inc.
 - 6. Detail Strip by W. R. Meadows, Inc.

3 EXECUTION

3.1 EXAMINATION

- .1 Examine substrates, areas, and conditions under which air barrier assemblies will be applied, with installer present, for compliance with requirements.
 - .1 Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.
 - .2 Do not proceed with installation until after minimum concrete curing period recommended by air barrier manufacturer.
 - .3 Ensure that the following conditions are met:
 - .1 Surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants
 - .2 Concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions.
 - .3 Masonry joints are flush, and all excess mortar sitting on masonry ties has been removed.
 - .4 Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263 and take suitable measures until substrate passes moisture test.
 - .5 Verify sealants used in sheathing are compatible with membrane proposed for use. Perform field peel-adhesion test on materials to which sealants are adhered.

.6 Notify Architect in writing of anticipated problems using air barrier over substrate prior to proceeding.

3.2 SURFACE PREPARATION

- .1 Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.
 - 1. Ensure that penetrating work by other trades is in place and complete.
 - 2. Prepare surfaces by brushing, scrubbing, scraping, or grinding to remove loose mortar, dust, oil, grease, oxidation, mill scale and other contaminants which will affect adhesion of the spray polyurethane foam.
 - 3. Wipe down metal surfaces to remove release agents or other non-compatible coatings, using clean sponges or rags soaked in a solvent compatible with the spray polyurethane foam.
 - 4. Ensure veneer anchors are in place.
- .2 Prime substrate for application of sheet membrane transition strips as recommended by manufacturer and as follows:
 - .1 Prime masonry, concrete substrates with conditioning primers.
 - .2 Prime glass-fiber surfaced gypsum sheathing an adequate number of coats to achieve required bond, with adequate drying time between coats.
 - .3 Prime wood, metal, and painted substrates with primer.
 - .4 Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air barrier and at protrusions.
- .3 Protection from Spray Applied Materials:
 - 1. Mask and cover adjacent areas to protect from over spray.
 - 2. Ensure any required foam stop or back up material are in place to prevent over spray and achieve complete seal.
 - 3. Seal off existing ventilation equipment. Install temporary ducting and fans to ensure exhaust fumes. Provide for make-up air.
 - 4. Erect barriers, isolate area and post warning signs to advise non-protected personnel to avoid the spray area.

3.3 INSTALLATION

- .1 Transition Strip Installation: Install transition strip materials to provide continuity throughout the building envelope. Install materials in accordance with manufacturer's recommendations and the following:
 - .1 Apply primer for transition strips at rate recommended by manufacturer. Allow primer to dry completely before transition strip application. Apply as many coats as necessary for proper adhesion.
 - .2 Position subsequent sheets of transition strips applied above so that membrane overlaps the membrane sheet below by a minimum of 2 inches (50 mm), unless greater overlap is recommended by manufacturer. Roll into place with roller.
 - .3 Overlap horizontally adjacent pieces of transition strips a minimum of 2 inches (50 mm), unless greater overlap is recommended by manufacturer. Roll seams with roller.
 - .4 Seal around all penetrations with a transition strip or other procedure in accordance with manufacturer's recommendations.
 - .5 Connect air barrier in exterior wall assembly continuously to the air barrier of the roof, to concrete below-grade structures, to windows, curtain wall, storefront,

louvers, exterior doors, penetrations, and other intersection conditions using transition membranes and in accordance with the manufacturer's recommendations.

- .6 At changes in substrate plane, provide transition material recommended by manufacturer to make a smooth transition from one plane to another.
- .7 Provide mechanically fastened non-corrosive metal sheet to span gaps in substrate plane and to make a smooth transition from one plane to the other. Membrane shall be continuously supported by substrate.
- .8 At through-wall flashings, provide an additional 6 inch wide strip of manufacturer's recommended membrane counterflashing to seal top of through-wall flashing to membrane. Seal exposed top edge of strip with bead of mastic as recommended by manufacturer.
- .9 At deflection and control joints, provide backup for the membrane to accommodate anticipated movement.
- .10 At expansion and seismic joints provide transition to the joint assemblies.
- .11 Apply a bead or trowel coat of mastic along membrane seams at reverse lapped seams, rough cuts, and as recommended by the manufacturer when membrane will be exposed to the elements.
- .12 At end of each working day, seal top edge of self-adhered membrane to substrate with termination mastic if exposed.
- .13 Do not allow materials to come in contact with chemically incompatible materials.
- .14 Do not expose transition membrane to sunlight longer than as recommended by the manufacturer.
- .15 Inspect installation prior to enclosing assembly and repair damaged areas with spray polyurethane foam as recommended by manufacturer.
- .2 Spray Application of Polyurethane: Install materials in accordance with manufacturer's recommendations, ULC S705.2 and the following:
 - 1. Equipment used to spray polyurethane foam shall comply with ULC S705.2 and the manufacturer's recommendations for the specific type of application. Record equipment settings on the Daily Work Record as required by the ULC S705.2 installation standard. Each proportioner unit shall supply only one spray gun.
 - 2. Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer and the ULC S705.2 Installation standard.
 - 3. Apply in consecutive passes as recommended by manufacturer to thickness as indicated on drawings. Passes shall be not less than 1/2 inch and not greater than 2 inches. An additional pass of 2 inches shall only be done after the first pass has had time to cool down. At no time shall more than 4 inches be installed in a single day.
 - 4. Install within manufacturer's tolerances, but not more than minus 1/4 inch or plus 1/2 inch.
 - 5. Do not install spray polyurethane foam within 3 inches of heat emitting devices such as light fixtures and chimneys.
 - 6. Finished surface of foam insulation to be free of voids and embedded foreign objects.
 - 7. Remove masking materials and over spray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed by other sections.
 - 8. Trim, as required, any excess thickness that would interfere with the application of cladding/covering system by other trades.
 - 9. Clean and restore surfaces soiled or damaged by work of the section. Consult

with section of work soiled before cleaning to ensure methods used will not damage the work.

10. Complete connections to other components and repair any gaps, holes or other damage using material which conforms to ULC S710.1 or ULC S711.1 and installed in accordance with ULC S710.2 or ULC S711.2 as applicable.

3.4 FIELD QUALITY CONTROL

- .1 CUCFA Site Inspections: Arrange and pay for site inspections by CUFCA to verify conformance with the manufacturer's instructions.
 - 1. Inspections and testing shall be carried out at 5, 50 and 95 percent of completion. Forward written inspection reports to the Architect within 10 working days of the inspection and test being performed.
 - 2. If the inspections reveal any defects, promptly remove and replace defective work at no additional expense to the Owner.

3.5 PROTECTING AND CLEANING

- .1 Protect air barrier assemblies from damage during application and remainder of construction period, according to manufacturer's written instructions.
 - .1 Coordinate with installation of materials which cover air barrier, to ensure exposure period does not exceed that recommended by the air barrier manufacturer.
- .2 Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction and acceptable to the primary material manufacturer.

END OF SECTION

GENERAL

1.1 SECTION INCLUDES

Foamed-insulation-core concealed fastener metal wall panels, with related metal trim and accessories.

1.2 RELATED REQUIREMENTS

- .1 Section 07 62 00 -Sheet Metal Flashing and Trim, for sheet metal flashing items in addition to items specified in this Section.
- .2 Section 07 92 00 Joint Sealers.

1.3 REFERENCES

The Ontario Building Code.

ASTM International (ASTM): www.astm.org:

- ASTM A 653 Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- ASTM A 755 Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
- ASTM A 792 Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- ASTM C 518 Standard Test Method for Steady State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- ASTM C 1363 Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
- ASTM D 1621 Compressive Properties of Rigid Cellular Plastics.
- ASTM D 1622 Apparent Density of Rigid Cellular Plastics.
- ASTM D 2244 Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
- ASTM D 4214 Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
- ASTM D 6226 Standard Test Method for Open Cell Content of Rigid Cellular Plastics
- ASTM E 72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
- ASTM E 84 Test Methods for Surface Burning Characteristics of Building Materials.
- ASTM E 283 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- ASTM E 331 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- ASTM E 1592 Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
- National Fire Protection Association (NFPA)

NFPA 259 – Test Method for Potential Heat of Building Materials.

- NFPA 285 Evaluation of Fire Propagation Characteristics of Exterior Non-Load Bearing Wall Assemblies.
- NFPA 286 Fire Test of Evaluating Conditions of Wall and Ceiling Finish to Roof Fire Growth.
- Canadian Standards Association (CSA)
- CAN/ULC S102 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

CAN/ULC S101 – Fire Endurance Tests of Building Construction and Materials. CAN/ULC S134 – Fire Test of Exterior Wall Assemblies. CAN/ULC S138 – Fire Growth of Insulated Building Panels in a Full Scale Room Configuration.

1.4 QUALITY ASSURANCE

- .1 Manufacturer/Source: Provide metal panel assemblies and accessories from a single manufacturer approved under an accredited third-party quality control program
- .2 Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum ten years' experience in the manufacturing of similar products and successful use in similar applications.
- .3 Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - .1 Product data, including certified independent test data indicating compliance with requirements.
 - .2 Samples of each component.
 - .3 Sample submittal from similar project.
 - .4 Project references: Minimum of five installations not less than five years old, with Owner and Architect contact information.
 - .5 Sample warranty.
 - .6 Certificate from an accredited third-party Quality Control Program.
- .4 Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
- .5 Approved manufacturers must meet separate requirements of Submittals Article.
- .6 Installer Qualifications: Experienced Installer certified by metal panel manufacturer with minimum of five years experience with successfully completed projects of a similar nature and scope.
- .7 Installer's Field Supervisor: Experienced mechanic certified by metal panel manufacturer supervising work on site whenever work is underway.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Preinstallation Meeting: Prior to erection of framing, conduct preinstallation meeting at site attended by Owner, Architect, metal panel installer, metal panel manufacturer's technical representative and related trade contractors.
 - .1 Coordinate building framing in relation to metal panel system.
 - .2 Coordinate openings and penetrations of metal panel system.

1.6 ACTION SUBMITTALS

- .1 Product Data: Manufacturer's data sheets for specified products.
- .2 Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, and special details. Make distinctions between factory and field assembled work.
 - .1 Include data indicating compliance with performance requirements.

Indicate points of supporting structure that must coordinate with metal panel system installation.

- .2 Include structural data indicating compliance with performance requirements and requirements of local authorities having jurisdiction.
- .3 Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.
- .4 Samples for Verification:
 - .1 Provide 12-inch- (305 mm) long section of each metal panel profile.
 - .2 Provide color chip verifying color selection.

1.7 INFORMATIONAL SUBMITTALS

- .1 Product Test Results: Indicating compliance of products with requirements.
- .2 Qualification Information: For Installer
 - .1 Accreditation Certificate: Indicating that manufacturer is accredited under an accredited third-party Quality Control Program
- .3 Warranty:
 - .1 Submit manufacturer's written two (2) year limited warranty providing panels to be free from defects in materials and workmanship, beginning from the date of substantial completion excluding coil coatings (paint finishes) that are covered under a separate warranty.
 - .2 The installation contractor shall issue a separate warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.

1.8 CLOSEOUT SUBMITTALS

- .1 Maintenance data.
 - .1 Manufacturer's Warranty: Executed copy of manufacturer's warranty.

1.9 DELIVERY, STORAGE, AND HANDLING

- .1 Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping. Protect painted surfaces with a protective covering before shipping.
 - .1 Deliver, unload, store, and erect metal panels and accessory items without deforming panels or exposing panels to surface damage from weather or construction operations.
 - .2 Store in accordance with Manufacturer's written instructions. Shield foam insulated metal panels from direct sunlight until all components are installed.

1.10 WARRANTY

.1 Special Manufacturer's Warranty: Submit Manufacturer's two (2) year limited warranty providing panels to be free from defects in materials and workmanship, beginning from the date of substantial completion excluding coil coatings (paint finishes) that are covered under a separate warranty.

- .2 The installation contractor shall issue a separate warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.
- .3 Special Panel Finish Warranty: Submit Manufacturer's limited warranty on the exterior paint finish for adhesion to the metal substrate and limited warranty on the exterior paint finish for chalk and fade.
 - .1 Modified Silicone-Polyester Two-Coat System:
 - Color fading in excess of 7 for crimson red; Hunter units per ASTM D 2244.

Chalking in excess of 7 for crimson red per ASTM D 4214.

Failure of adhesion, peeling, checking, or cracking.

.3 Other finish options available; additional information can be found at metlspan.com or contact Metl-Span at 972.221.6656.

PRODUCTS

2.1 MANUFACTURER

- .1 Basis of Design Manufacturer: Metl-Span, "CF Mesa" info@metlspan.com; Web: metlspan.com.
- .2 Equivalent product manufactured by Vic West or Kingspan. To be approved by Architect prior to close of tender bid.

2.2 PERFORMANCE REQUIREMENTS

- .1 General: Provide metal panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.
- .2 Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, as determined by ASTM E 72 or ASTM E 1592 applied in accordance with ICC AC 04, Section 4, Panel Load Test Option or Section 5, Panel Analysis Option:
 - .1 Wind Loads: Determine loads based on the latest edition of the Ontario Building Code, wind speed, importance factor, exposure category, and internal pressure coefficient, as indicated for the geographic location local conditions.
 - .1 Wind Negative Pressure: Certify capacity of metal panels by testing of proposed assembly.
 - .2 Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of 1/180 of the span with no evidence of failure.
 - .3 Fire Propagation: The fire assembly shall meet the requirements of the standard for NFPA 285
 - .4 Fire Growth: The fire assembly shall meet the requirements of the standard for NFPA 286
 - .5 Potential Heat: Determined in accordance with NFPA 259
 - .6 Canadian Certifications:

- .1 Surface Burning Characteristics: The composite panel shall have to be tested per CAN/ULC S102. Meets the Ontario Building Code.
- .2 Fire Endurance Tests of Building Construction and Materials: The composite panel shall have to be tested per CAN/ULS S101. Meets 15 minute stay in place requirement.
- .3 Fire Test of Exterior Wall Assemblies. The composite panel shall have to be tested per CAN/ULS S134. Complies with the fire spread and heat flux limitations required by the Ontario Building Code.
- .4 Fire Growth of Insulated Building Panels in a Full-Scale Room Configuration: The composite panel shall have to be tested per CAN/ULS S138 Met the Criteria of the Standard.
- .2 Air Infiltration, ASTM E 283:

Maximum 0.01 cfm/sq. ft. (0.050 L/s per sq. m) at static-air-pressure difference of 20 lbf/sq. ft. (958 Pa).

.3 Water Penetration Static Pressure:

ASTM E 331: No uncontrolled water penetration at a static pressure of 20 lbf/sq. ft. (958 Pa). ASTM E 331 Modified (2 hour duration): No uncontrolled water penetration at a static pressure of 6.24 lbf/sq. ft. (300 Pa).

.4 Thermal Performance: When tested in accordance with ASTM C 518, Measurement of Steady State thermal Transmission, the panels shall provide a k factor of 0.14 btu/sf/hr/deg F at a 75° F (24° C) mean temperature, as required by code, or 0.126 btu/sf/hr/deg F at a 40° F (4° C) mean temperature.

2.3 INSULATED METAL WALL PANELS

- .1 Basis of Design: Metl-Span, CF Mesa
 - .1 G-90 galvanized coated steel conforming to ASTM A 653 and/or AZ50 aluminumzinc alloy coated steel, conforming to ASTM A 792/A 792M, minimum grade 33, prepainted by the coil-coating process per ASTM A 755/A 755M.
 - .1 Exterior Face Sheet: 22 gauge thickness, with stucco embossed surface.
 - .1 Finish: Modified silicone-polyester two-coat system
 - .2 Color: As selected by Architect from manufacturer's premium colors. All for 3 IMP colours. Refer to drawing elevations.
 - .2 Interior Face Sheet: 26 gauge thickness, with stucco embossed surface and Mesa or Light Mesa profile.
 - .1 Finish: Modified silicone-polyester two-coat system
 - .2 Color: As selected by Architect from manufacturer's standard colors.
 - .2 Panel Width: 42 inches (1067 mm).
 - .3 Panel Thickness: 4 inch (102 mm).

- .4 Insulating Core: Polyurethane with zero ozone depletion potential blowing agent
 - .1 Closed Cell Content: 90% or more as determined by ASTM D 6226
 - .2 Compressive Strength: As required to meet structural performance requirements and with a minimum of 22 psi as determined by ASTM D 1621
 - .3 Shear Strength: As required to meet structural performance requirements and with a minimum of 36 psi as determined by ASTM C 273
 - .4 Tensile Strength: As required to meet structural performance requirements and with a minimum of 41 psi ASTM D 1623
 - .5 Minimum Density: 2.0 pcf (32 kg/m3) as determined by ASTM D 1622
- .5 Thermal Resistance R-Value: 30.86 deg. F * hr * sq. ft./Btu (K * sq. m/W) per ASTM C 518 at 75 degrees Fahrenheit mean temperature.
- .2 Concealed Fastener, Insulated Metal Wall Panels with foam core: Structural metal panels consisting of exterior metal sheet and interior metal sheet with matching 4 by 1/16 inch (102 by 1.5 mm) o.c. profile. Factory foamed-in-place polyurethane core in thermally-separated profile, with tongue-and-groove panel edges, attached to supports using concealed fasteners.

2.4 METAL WALL PANEL ACCESSORIES

- .1 General: Provide complete metal panel assemblies incorporating trim, copings, fasciae, gutters and downspouts, and miscellaneous flashings. Provide required fasteners, closure strips, and sealants as indicated in manufacturer's written instructions.
- .2 Flashing and Trim: Match material, thickness, and finish of metal panels.
- .3 Panel Clips: ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating, one-piece, configured for concealment in panel joints, and identical to clips utilized in tests demonstrating compliance with performance requirements.
- .4 Panel Fasteners: Self-drilling or Self-tapping screws and other acceptable fasteners recommended by metal panel manufacturer. Where exposed fasteners cannot be avoided, supply corrosion-resistant fasteners with heads matching color of metal panels by means of factory-applied coating, with weathertight resilient washers.
- .5 Joint Sealers:
 - .1 Sealants: Provide Tape Mastic Sealants, Non-skinning sealants, and Urethane Sealants in accordance with manufacturers standards
 - .2 Vertical Joint Gasket: Manufacturers standard EPDM gasket. Color: Black.

2.5 FABRICATION

- .1 General: Provide factory fabricated and finished metal panels, trim, and accessories meeting performance requirements, indicated profiles, and structural requirements.
- .2 Fabricate metal panel joints configured to accept sealant providing weathertight seal.
- .3 Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings.

2.6 FINISHES

- .1 Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
- .2 Exterior Face Sheet Coil-Coated Finish System
 - .1 Silicone-Polyester Two-Coat System: 0.20 0.25 mil primer with 0.7 0.8 mil color coat, meeting solar reflectance index requirements. Basis of Design: Metl-Span, Silicone Polyester.
- .3 Interior Face Sheet Coil-Coated Finish System
 - .1 Polyester Two-Coat System: 0.20 0.25 mil primer with 0.7 0.8 mil color coat Basis of Design: Metl-Span, Igloo White

EXECUTION

3.1 EXAMINATION

- .1 Examine metal panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panels.
 - .1 Inspect framing that will support insulated metal panels to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to metal panel manufacturer and installer. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal panels.
 - .2 Panel Support Tolerances: Confirm that metal panel supports are within tolerances acceptable to metal panel manufacturer but not greater than the following:
 - 1/4 inch (6 mm) in 20 foot (6100 mm) in any direction.
 - 3/8 inch (9 mm) over any single wall plane.
 - Girt Spacing 8 feet (2438 mm) or more: 1/4 inch (6 mm) out only.
 - Girt Spacing Less Than 8 feet (2438 mm): 1/8 inch (3 mm) out only.
 - CF Architectural girt spacing less than 4 feet (1219 mm): 1/16 inch (1.5 mm) inch out only.
- .2 Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal panel installation.

3.2 METAL PANEL INSTALLATION

- .1 Concealed-Fastener Insulated Metal Panels with foam core: Install metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal panels in orientation, sizes, and locations indicated. Anchor panels and other components securely in place. Provide for thermal and structural movement.
- .2 Attach panels to metal framing using screws, fasteners, sealants, and adhesives recommended for application by metal panel manufacturer.
 - .1 Fasten metal panels to supports with fasteners at each location indicated on approved shop drawings, at spacing and with fasteners recommended by manufacturer.
 - .2 Cut panels in field where required using manufacturer's recommended methods.
 - .3 Provide weatherproof jacks for pipe and conduit penetrating metal panels.
 - .4 Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer
- .3 Attach panel flashing trim pieces to supports using recommended fasteners and joint sealers

- .4 Joint Sealers: Install sealants where indicated and where required for weatherproof performance of metal panel assemblies
 - .1 Seal panel base assembly, openings, panel head joints, and perimeter joints using sealants indicated in manufacturer's instructions
 - .2 Seal wall panel joints; apply continuously without gaps in accordance with manufacturer's written instructions, approved shop drawings, and project drawings
 - .3 Prepare joints and apply sealants per requirements of Division 07 Section.

3.3 ACCESSORY INSTALLATION

- .1 General: Install metal panel accessories with positive anchorage to building and weather tight mounting; provide for thermal expansion. Coordinate installation with flashings and other components.
 - .1 Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
 - .2 Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
 - .3 Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

3.4 FIELD QUALITY CONTROL

- .1 Testing Agency: Engage an independent testing and inspecting agency acceptable to Architect to perform field tests and inspections and to prepare test reports.
- .2 Water-Spray Test: After completing portion of metal panel assembly including accessories and trim, test 2-bay area selected by Architect for water penetration, according to AAMA 501.2.

3.5 CLEANING AND PROTECTION

- .1 Remove temporary protective films immediately in accordance with metal panel manufacturer's instructions. Clean finished surfaces as recommended by metal panel manufacturer.
- .2 Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Latex modified concrete facing, bonded to rigid polystyrene foam insulation backing, for exterior application to low rise, and perimeter foundation walls, with related flashings and accessory components.
- .2 Above and below grade locations: Suitable air/vapour barriers site specific, as required over structural walls.

1.2 RELATED SECTIONS

- .1 Section 07 26 00 Vapour Retarders.
- .2 Section 07 27 00 Air Barriers.
- .3 Section 07 62 00 Sheet Metal Flashing And Trim.
- .4 Section 07 84 00 Firestopping.

1.3 REFERENCES

- .1 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701, Standard for Thermal Insulations, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .2 American Society for Testing and Materials International(ASTM)
 - .1 ASTM A123/A123M, Zinc (Hot Dip Galvanized) Coatings on Iron or Steel Products.
 - .2 ASTM C518, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - .3 ASTM D1621, Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.
 - .4 ASTM D2842, Standard Test Method for Water Absorption of Rigid Cellular Plastics.
 - .5 ASTM E96, Standard Test Methods for Water Vapor Transmission of Materials.
 - .6 ASTM D696, Standard Test Method for Determining Coefficient of Linear Thermal Expansion of Plastics between -30C and +30C.
 - .7 ASTM C203,Standard Test Method for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.
 - .8 ASTM D2126, Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
- .3 Canada Green Building Council (CaGBC)
 - .1 LEED® Canada For New Construction and Major Renovations 2009 and LEED® Canada for Core and Shell Development 2009 Rating System.
- .4 Canadian Standards Association
 - .1 CSA S478-95 (R2007) Guideline on Durability in Buildings.
 - Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Visit www.tech-crete.com for a current copy of the Material Safety Data Sheet (MSDS) .6 Canadian Construction Materials Centre (CCMC) Evaluation Listing, published by the Institute
 - for Research in Construction (IRC) of the National Research Center Canada (NRC/CNRC):
 - .1 Evaluation Listing CCMC 04888-L for STYROFOAM[™] Tech-Crete Blanks
 - .2

.5

1.4 SYSTEM DESCRIPTION

- .1 Assembly of components includes purpose supplied, preformed panel mounting clips capable of securing factory bonded concrete faced insulated wall panels to structural supporting wall framing.
- .2 Comply with requirements for continuity of building air barriers, vapour retarders plus wind and suction loads as identified in the National Building Code and applicable local requirements.

1.5 PERFORMANCE REQUIREMENTS

- .1 Wall assembly: Design components to withstand flexing and physical distortion due to dead and live loads caused by positive and negative wind pressure acting normal to plane of wall cladding surfaces.
- .2 Maximum Allowable Deflection of Wall Assembly: Determined by supporting structure and imposed weather loads.
- .3 Movement: Accommodate thermal and wind loads within wall assembly without damage to components or deterioration of seals, movement within assembly and between components, when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing.
- .4 Maximum Allowable Deflection of Wall Assembly: 1/280 of span.
- .5 Drainage: Provide positive drainage to water and condensate collectors within wall assembly.
- .6 Products: Provide continuity of thermal barrier at building enclosure elements in conjunction with other thermal insulating materials.
- .7 Vapour Retarder: Provide continuity of vapour retarder at building enclosure elements in conjunction with vapour retarders specified in Section 07 26 00.
- .8 Air Seal: Provide continuity of air barrier seal at building enclosure elements in conjunction with air seal materials specified in Section 07 27 00.
- .9 Vapour Retarder: Provide continuity of vapour retarder at building enclosure elements in conjunction with vapour retarders specified in Section 07 26 00.

1.6 ADMINISTRATIVE REQUIREMENTS

- .1 Section 01 31 00: Project management and coordination procedures.
- .2 Coordination
 - .1 Coordinate with other work having a direct bearing on work of this section.
 - .2 Coordinate the Work for installation of vapour retarder and air barrier seals.
 - .3 Coordinate the Work with installation of windows, louvres, and components or materials

1.7 SUBMITTALS FOR REVIEW

- .1 Submission procedures as specified in Section 01 33 00.
- .2 Shop Drawings: Indicate dimensions, layout, construction and expansion joints, construction details, methods of anchorage.
- .3 Samples: Submit two (2) samples of full size wall siding, 200 x 200 mm (8 x 8 inch) in size illustrating manner of fitment devices with adjacent panels, with specified finishes and surface texture.

1.8 SUBMITTALS FOR INFORMATION

- .1 Submission procedures as specified in Section 01 33 00.
- .2 Installation Data: Manufacturer's special installation requirements.

1.9 SUSTAINABILITY

.1 Minimal Packaging

- .2 Materials and manufacturing within a 800 km (500 mile) radius by truck or 2400 km (1500 mile) radius by rail of the project site. (Confirm locations with manufacturer.)
- .3 Manufacturing process includes a comprehensive recycling program.
- .4 For potential contribution of Tech-Crete Insulated Roof Panels towards the LEED® certification of the building project, review the sustainability information at <u>www.tech-crete.com</u>. For additional information, call Tech-Crete Processors Ltd at 250-832-9705.

1.10 QUALITY ASSURANCE

- .1 Installer Qualifications: Company specializing in performing the work of this section with training and experience.
- .2 Product Identification: Each pallet of insulated roof panels shall be labelled with product name; manufacturers name or trademark; insulation conforming to ULC S701 Type 4; number of panels per pallet; insulation thickness, and thermal resistance per unit of thickness.
- .3 Insulation must conform to CCMC Evaluation Listing #04888-L, for NBC compliance.

1.11 DELIVERY, STORAGE, AND PROTECTION

- .1 Transport, handle, store, and protect delivered products as specified in Section 01 61 00.
- .2 Store concrete faced insulated wall panels under cover, and in original packaging until ready to install. Store opened packages under cover until installed. Schedule installation to minimize open package time
- .3 Store prefinished material off ground protected from weather, to prevent twisting, bending, or abrasion, and to provide ventilation.
- .4 Prevent contact with materials which may cause electrolysis, discolouration or staining.

1.12 WARRANTY

- .1 Provide warranties as specified in Section 01 78 00: Closeout Procedures.
- .2 Provide manufacturers five (5) year limited warranty to include panel replacement for delamination of concrete facing.

Part 2 Products

2.1 MANUFACTURERS

- .1 Tech-Crete Processors Ltd., CFI®Wall Panel, in modular sections, website: www.techcrete.com, Telephone: 250-832-9705
- .2 Substitutions: To be approved by consultant during tender only.

2.2 WALL PANEL ATTACHMENT

.1 Galvanized Steel: ASTM A123/A123M-08 - Zinc-Coated (Galvanized), Z275 to G90 coating designation, preformed as supplied by manufacturer, complete with corrosion proof masonry fasteners.

2.3 INSULATION

- .1 STYROFOAM[™] Tech-Crete Blanks by DOW Chemical, extruded polystyrene, conforming to code requirements, in accordance with CAN/ULC S701 type 4.
- .2 Thermal resistance: RSI 0.87/25mm to ASTM C518.
- .3 Foam Compressive Strength: 240 kPa (35 PSI) in accordance with ASTM D1621.
- .4 Water Absorption: ASTM D2842: <0.7 % by volume.

- .5 Water Vapour Permeance: 0.8 perms in accordance with ASTM E96.
- .6 Insulation Thickness: [2][3][4] inches ([51][76][102] mm).

2.4 CONCRETE FACED INSULATED WALL PANELS

- .1 Concrete: Latex modified concrete mix, 8 mm (5/16") thick, with control joint score at mid-length.
- .2 Edge Treatment: Tongue and groove along longitudinal foam edges, butt joints on lateral edges.
- .3 Surface Finish: Textured Broom finish; Grey colour, may be coated.

2.5 ACCESSORIES

- .1 Gaskets to Adjacent Substrates: Standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant; colour to match adjacent colour.
- .2 Sealants to Adjacent Substrates: Standard type suitable for use with installation of system; nonstaining, non-skinning, non-shrinking and non-sagging; ultraviolet and ozone resistant; colour as selected.
- .3 Clips and Fasteners: Manufacturer's standard type to suit application; as supplied.
- .4 Field Repair and Touch-up: As recommended by panel manufacturer.
- .5 Wall panel coloured coating (if required): Exterior grade, latex based, concrete or masonry paint or stain.
- .6 Building Paper Over Surface of Supporting Wall Structure: [Cellulose fibre] [_____] building paper, water repellent breather type.
- .7 Perimeter Insulation Flashings 24 gauge minimum: Coordinate supply of end closures and flashings for perimeter insulation system with Section 07 62 00.

2.6 COMPONENTS

- .1 Exterior concrete faced insulated wall panel sizes:
 - .1 Width: 610 mm (24 inches).
 - .2 Length: 1220 mm (48 inches).
 - .3 Thickness: [50] [76] [100] mm ([2] [3] [4] inches)
- .2 Internal and External Corners:
 - .1 Manufacturers installation guidelines provide corner details (see CFI Installation at www.tech-crete.com). Diagrams are also provided in each fastener package.
 - .2 Metal profiles to suit assembly, brake formed to required profiles
 - .3 Trim, Closure Pieces, Caps, Flashings, Facias, Soffits and Infills: Brake formed to required profiles.

2.7 FABRICATION

- .1 Form sections true to shape, accurate in size, square, and free from distortion or defects.
- .2 Form custom pieces in longest practicable lengths.
- .3 Fabricate corners in one continuous piece.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify existing conditions and substrates before starting work as specified in Section 01 71 00.
- .2 Verify that building framing members are ready to receive panel assembly.
- .3 Remove substrate surface irregularities before installing wall panels. Sweep and clear debris clear of surfaces to receive panels.
- .4 Ensure existing [damp proofing] [water proofing] below grade is cured and dry.

.5 If the lowest substrate surface is not level to receive panels, create a level surface with a galvanized steel ledger angle, and secure level.

3.2 INSTALLATION

- .1 Weather lap barriers, stagger vertical joints of each course. Repair incidental tears.
- .2 Seal securely to achieve air and moisture tightness.
- .3 Ensure snug fit between panel tongue and grooves, and lateral butt joints.
- .4 Fasten concrete faced insulated panels to structural supports; aligned level and plumb.
- .5 Install panels with vertical joints and panel control joints in alignment.
- .6 Use manufacturer's fasteners. Maintain neat appearance.
- .7 Cover exposed insulation at corners and top of perimeter insulation with prefinished flashing as specified in Section 07 62 00.
- .8 Where concrete flatwork or asphalt is to be laid adjacent to CFI Wall Panels, an isolation joint should be provided to protect the CFI mortar surface from differential movement

3.3 CLEANING

- .1 Clean installed work as specified in Section 01 74 11 Cleaning.
- .2 Remove and collect site cuttings, foam bits and packaging for re-cycling.

END OF SECTION

PART 1GENERAL

1.1 RELATED WORK

- .1 Rough Carpentry:
- .2 Sheet Metal Flashing and Trim

1.2 **REFERENCE STANDARDS**

.1 Do roofing work to applicable standard in Canadian Roofing Contractors' Association (CRCA) Roofing Specifications Manual and Manufacturers' written instructions.

Section 06 10 00

Section 07 62 00

1.3 SUBMITTALS

.1 Submit shop drawings of wood nailers, insulation tapered insulation, flashings and other roofing details in accordance with Section 0 133 00.

1.4 WARRANTY

.1 Provide membrane manufacturer / labour and material written warranty, inspected and signed stating that the elastomeric sheet roofing and flashing will stay in place and remain leakproof for a period of 20 years from the date of final inspection.

1.5 INSPECTION

.1 Roofing inspection will be provided by the owner's consultant during installation of roof assembly.

PART 2 PRODUCTS

2.1 MANUFACTURER

- .1 'Firestone' RubberGuard EPDM Membrane Fully Adhered System. Alternative products will only be considered by the consultant prior to Tender Bid Submission. Alternative products will only be considered for equality to the specified system if they are Fully Adhered EPDM Membrane systems. Consultant reserves the right not to approve alternative products. Alternative products will only be accepted if they are incorporated into the contract via addendum.
- .2 Use products of a single manufacturer.

2.2 MATERIALS

- .1 Membrane: not less than 1.5 mm (0.060") thick black EPDM in sheets to CGSB 37-GP-52M, Type 1, Class A. Maximum width shall be 16.5'.
- .2 Membrane Flashing: EPDM sheet recommended by membrane manufacturer.
- .3 Flashing adhesive and membrane lap adhesive: as supplied by membrane manufacturer.
- .4 Water cut-off mastic: as supplied by membrane manufacturer.
- .5 Seam Tape: As required by membrane manufacturer.

- .6 Perimeter securement: 2" diameter seam plates with Heavy Duty 1 ¼" (minimum length) fasteners (with corrosion coating) at 12" inch on center, as supplied by the membrane manufacture.
- .7 Premolded vent pipe flashing: Molded EPDM vent pipe flashing compatible with roof membrane.
- .8 Pourable Sealer: Two component, solvent free, polyurethane based compound compatible with elastomeric membrane.
- .9 Penetration Pocket: Use membrane manufactures supplied pocket.
- .10 Sealant: Sikaflex 1a or approved equal.
- .11 Rigid Insulation: Conform to CAN/ULC-S704, flat 2 layers 100mm Polyisocyanurate foam, 20psi minimum compressive strength, sheets size will be 4'x8' secured with a minimum of eight(8) screws and insulation plates for each sheet as per manufactures insulation procedure Sheets shall have joints staggered between layers.
- .12 Rigid Sloped Insulation: Conform to CAN/ULC-S704, sloped 4% Polyisocyanurate foam, 20psi minimum compressive strength, sheets size will be 1200mm x1200mm, minimum thickness 13mm. Sump an area 2400mmx2400mm around each roof drain using insulation sloped as required, eight pieces required at each drain.
- .13 Insulation Plates: 75mm round, Galvalume AZ50 with corrosion resistance to meet FM No. 4470.
- .14 Fasteners: Heavy duty Fasteners to SAE 1022, heat treated steel .260" with corrosion coating, length to suit required penetration.
- .15 Class 1 vapour retarder, tri-laminate woven polyethylene with SBS modified bitumen adhesive in the membrane to be self-adhered to the substrate with product compatible solvent or water based primer. 'Firestone' V-Force or equal product that will comply with roofing systems specified warranty.
- .16 Insulation adhesive- A two-component low rise polyurethane adhesive designed for anchoring acceptable roof insulation, I.S.O. Twin pack insulation adhesive or approved equal.
- .17 Walkway: X-Tread walkway pads. Refer to drawings for layout and route.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Apply roofing in accordance with drawings, specifications and requirements of jurisdictional authorities and the Canadian Roofing Contractor's Association Roofing Manual.
- .2 Schedule work to prevent undue traffic on completed or have new roof covered with plywood, particle board, etc over all areas subject to traffic.

.3 Before commencing with roof installation work, dry and sweep surfaces clean of debris and adhering materials which would impair the work.

3.2 NEW ROOF APPLICATION

- .1 After vapour barrier is installed apply layers of Polyisocyanurate insulation mechanically fastened and a top layer of sloped polyisocyanurate insulation, with their joints staggered between layers. Attach sloped insulation using manufacture approved adhesive. The second layer of flat insulation shall be fully adhered to the top layer. Use 8 heavy duty fasteners for each 4'x8' sheet or as required by membrane manufacture.
- .2 Insulation mechanically fastened to the top rib of the metal roof deck only. Screws penetrating the bottom of the deck shall be removed and replaced.
- .3 At the roof drain, sump an area 2400mm x 2400mm with a base layer sloped to the drain. Install additional fasteners as required.

3.3 FULLY ADHERED EPDM MEMBRANE

- .1 Position membrane over substrate without stretching, lapping 4 inches over adjacent sheets and over edges.
- .2 Allow membrane to relax at least one half hour before splicing and fastening.
- .3 Fully adhere membrane and complete membrane seams in strict accordance with membrane manufacture's latest specifications.
- .4 Mechanically fasten all edges as shown and in accordance with membrane manufacturer's details and shop drawings and specifications.
- .5 Roll or broom membrane to ensure full adhesion.

3.4 MEMBRANE FLASHING

- .1 Install membrane flashing at all vertical surfaces and around all roof penetrations. The membrane manufactures semi-cured EPDM laminated with cured seam tape products shall be used for all flashing details, corners, joint covers, etc. as supplied by membrane manufacture.
- .2 Run flashing up vertical surfaces terminating in manufacturer's recommended mechanical flashing system. Lap bottom edge at least 4 inches over membrane and seal with seam tape. At parapets and curbs run flashing over top and 2 inches down outside face or as shown on the drawings.
- .3 Bed membrane flashing in flashing adhesive.
- .4 All corner details will be completed with membrane manufactures pre-made corner flashing.

3.5 ROOF DRAINS

.1 Drain insert to be set over EPDM membrane in a bead of water cut-off mastic and secured to the wood blocking with screws, then flashed with EPDM membrane material exclusive of factory and field seams and clamped with ring, tightened with moderate pressure.

3.6 ROOF VENTS

.1 Fill pre-molded vent pipe flashings with insulation to prevent condensation.

END OF SECTION

PART 1) GENERAL

1.1 **RELATED SECTIONS**

- .1 Section 01 61 00 - Basic Product Requirements
- .2 Section 04 05 23 - Masonry Accessories.
- .3 Section 06 10 00 - Rough Carpentry.
- .4 Section 07 46 16 - Preformed Metal Siding & Trim.
- .5 Section 07 62 00 - Adhered Elastomeric Sheet Roofing
- .6 Section 07 90 00 - Joint Sealers

1.2 REFERENCES

- .1 Aluminum Sheet Metal Work in Building Construction-1980
- ASTM A 653/A 653 M-95, Specification for Steel Sheet, Zinc-Coated (Galvanized) or .2 Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .3 Canadian Roofing Contractors Association (CRCA). Roofing Specifications

1.3 SAMPLES

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish.

1.4 WARRANTY

1 Contractor hereby warrants that work performed under this Section shall remain free against leakage, joint spalling, loss of finish and similar defects in accordance with General Conditions, but for a period of five (5) years.

1.5 **INSPECTION AND TESTING**

1 Inspection and testing of this Work is included in inspection and testing of roofing and roof insulation.

2 PRODUCTS

2.1 SHEET METAL MATERIALS

Aluminum-zinc alloy coated steel sheet: to ASTM A 792/A 792M, commercial quality, with .1 AZ150 Galvalume coating, regular spangle, 0.72 mm base metal thickness, prefinished.

2.2 PREFINISHED STEEL SHEET

- Prefinished steel with factory applied silicone modified polyester. .1
 - Colour selected by Consultant from manufacturer's standard range. .1
 - Specular gloss: 30 units +/- 5 in accordance with ASTM D 523.
 - .2 .3 Coating thickness: not less than 25 micrometres.
 - Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or .4 less and erosion rate less than 20 % to ASTM D 822 as follows:
 - Outdoor exposure period 1000 hours. .1
 - Humidity resistance exposure period 500 1000 hours. .2
 - .5 Acceptable Product: Baycoat 8000

2.3 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB 37.5-M89.
- .3 Underlay for metal flashing: To Section 07 65 26 Self-Adhering Sheet Flashing.
- .4 Sealants: to Section 07 90 00.
- .5 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .6 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .8 Solder: to ASTM B 32, alloy composition.
- .9 Flux: rosin, cut hydrochloric acid, or commercial preparation suitable for materials to be soldered.
- .10 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details as indicated.
- .2 Fabricate aluminum flashings and other sheet aluminum work in accordance with Aluminum Association Aluminum Sheet Metal Work in Building Construction.
- .3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .4 Hem exposed edges on underside 12 mm. Miter and seal corners with sealant.
- .5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

.1 Form flashings, copings and fascias to profiles indicated of 0.7mm thick prefinished steel.

2.6 **REGLETS AND CAP FLASHINGS**

.1 Form recessed surface mounted reglets metal cap flashing sheet metal to be built-in concrete masonry work for base flashings as detailed in accordance with CRCA FL series details. Provide slotted fixing holes and steel/plastic washer fasteners. Cover face and ends with plastic tape.

2.9 GASKETING

.1 Provide neoprene gasketing at all connections of dissimilar metals as required to guard against electrolytic action.

3 EXECUTION

3.1 INSTALLATION

- .1 Install sheet metal work in accordance with CRCA FL series details, and as detailed.
- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.
- .4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints forming tight fit hook as detailed.
- .5 Lock end joints and caulk with sealant.
- .6 Install surface mounted reglets true and level, and caulk top of reglet with sealant.
- .7 Insert metal flashing into reglets under cap flashing to form weather tight junction.
- .8 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.
- .9 Caulk flashing at reglet cap flashing with sealant.
- .10 Install scuppers as indicated.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section, and all related sections.
- .2 The work of this section, and related work specified in other sections shall comply with all requirements of Division 1 General Requirements.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide firestop products and systems intended to act as a firestop and smoke seal within fire resistive wall and floor assemblies.
- .2 Firestop systems shall be used in locations including, but not limited to, the following:
 - .1 Penetrations through fire resistance rated floor and roof assemblies including both empty openings and openings containing penetrants.
 - .2 Penetrations through fire resistance rated wall assemblies including both empty openings and openings containing penetrants.
 - .3 Membrane penetrations in fire resistance rated wall assemblies where items penetrate on side of the barrier.
 - .4 Joints between fire resistance rated assemblies.
 - .5 Perimeter gaps between rated floors/roofs and an exterior wall assembly.
- .3 Firestops and smoke seals within mechanical and electrical assemblies (i.e. inside ducts, dampers and bus ducts) shall be provided as part of the work of Divisions 15 and 16 respectively.
- .4 Firestops and smoke seals around the outside of such mechanical and electrical assemblies, where they penetrate fire separations, shall form part of the work of this section.
- .5 Firestop systems provide for the Work must be from one manufacturer only, whether provided by Divisions 15, 16, or by this section.

1.3 RELATED SECTIONS

.1	Cast-in-Place Concrete	Section 03 30 00
.2	Concrete Unit Masonry	Section 04 22 00
.3	Structural Steel for Building	Section 05 12 00
.4	Sprayed Fireproofing	Section 07 80 11
.6	Joint Sealers	Section 07 90 00
.7	Glazed Aluminum Frame Curtain Wall	Section 08 44 13
.8	Gypsum Board	Section 09 2 9 00
.9	Mechanical; Pipe and Duct	Division 23
.10	Electrical; Lighting, Power, Alarms, and Communications Division 26-28	

1.4 QUALITY ASSURANCE

.1 Applicator Qualifications

- .1 Work of this section shall be performed by applicators having a minimum of 2 years documented experience in the installation of firestop products and systems. Submit proof of experience to Consultant.
- .2 Installation
 - .1 Work shall be performed in strict accordance with manufacturer's printed instructions, and in accordance with all warranty requirements.
- .3 Pre-installation Meeting
 - .1 Convene a pre-installation meeting for the Products specified in this section. Attendees must
 - include, as a minimum, representatives of the following:
 - .1 Contractor (Site Superintendent & Project Manager),
 - .2 Installation Subcontractor (Site Foreman & Project Manager),
 - .3 Product Manufacturer and Distributor (Technical Representatives),
 - .4 Related Subcontractors (ie. Mechanical and/or Electrical), and
 - .5 Consultant.

1.5 **REFERENCE STANDARDS**

- .1 ASTM E84-01; Standard Test Method For Surface Burning Characteristics of Building Materials.
- .2 ASTM E119; Methods of Fire Tests of Building Construction and Materials.
- .3 ASTM E814-00; Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
- .4 ASTM E1399-97 (2000); Test Method for Cyclic Movement and Measuring Minimum and Maximum Joint Width.
- .5 ASTM E1966-00; Test Method For Resistance of Building Joint Systems
- .6 UL 263; Fire Tests of Building Construction and Materials.
- .7 UL 723; Surface Burning Characteristics of Building Materials.
- .8 UL 1479; Fire Tests of Through-Penetration Fire Stops.
- .9 UL 2079; Tests for Fire Resistance of Building Joint Systems.
- .10 ULC-S115-1995 (R2001); Fire Tests of Firestop Systems.
- .11 CAN/ULC-S102-1988 (R2000); Surface Burning Characteristics of Building Materials and Assemblies.
- .12 Underwriters Laboratories of Canada; List of Equipment and Materials Fire Resistance.
- .13 Underwriters Laboratories Inc.; Fire Resistance Directory Volume 2.
- .14 Intertek Testing Services; Directory of Listed Building Products.
- .15 Factory Mutual Research (FM); FM Approval Standard of Firestop Contractors Class 4991.
- .16 Omega Point Laboratories (OPL); Building Products, Materials & Assemblies Volume II.

1.6 **DEFINITIONS**

- .1 Firestop: The use of a material or combination of materials in a fire-rated structure (wall or floor) where it has been breached, so as to restore the integrity of the fire rating on that wall or floor.
- .2 System: The use of a specific firestop material or combination of materials in conjunction with a specific wall or flow construction type and specific entrant(s).
- .3 Barrier: Any bearing or non-bearing wall or floor that has an hourly fire and smoke rating.

- .4 Through-Penetration: Any penetration of a fire-rated wall or floor that completely breaches the barrier.
- .5 Membrane-Penetration: Any penetration in a fire-rated wall that breaches only one side of the barrier.
- .6 Fire Resistive Joint: Any gap, joint, or opening, whether static or dynamic, between two fire rated barriers including where the top of a wall meets a floor; wall edge to wall edge applications; floor edge to floor edge configurations; floor edge to wall.
- .7 Perimeter Barrier: Any gap, joint, or opening, whether static or dynamic, between a firerated floor assembly and a non-rated wall assembly.

1.7 PERFORMANCE REQUIREMENTS

- .1 Penetrations: Provide through-penetration firestop systems that are produced and installed to resist the spread of fire, passage of smoke and other hot gases according to requirements indicated, to restore the original fire-resistance rating of assembly penetrated.
- .2 Provide and install complete penetration firestop systems that have been tested and approved by nationally accepted testing agencies per ASTM E814, UL 1479, or ULC-S115 fire tests in a configuration that is representative of field conditions.
- .3 F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, to ASTM E814, UL 1479, or ULC-S115 but not less than one (1) hour or the fire resistance rating of the assembly being penetrated.
- .4 FT-Rated Systems: Provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, to ASTM E814, UL 1479, or ULC-S115, where required by the Building Code.
- .5 FH-Rated Systems: Provide through-penetration firestop systems with H-ratings indicated, as well as F-ratings, to ASTM E814, UL 1479, or ULC-S115, where required by the Building Code.
- .6 FTH-Rated Systems: Provide through-penetration firestop systems with H-ratings indicated, as well as F-ratings and T-ratings, to ASTM E814, UL 1479, or ULC-S115, where required by the Building Code.
- .7 For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moistureresistant through-penetration firestop systems.
- .8 For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- .9 Fire Resistive Joints: Provide joint systems with fire resistance assembly ratings indicated, as determined by UL 2079 (ASTM E1399 and E1966), but not less than the fire resistance assembly rating of the construction in which the joint occurs. Firestop assemblies must be capable of withstanding anticipated movements for the installed field conditions.

- .10 For firestop assemblies exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
- .11 For floor penetrations exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
- .12 Firestop products shall have flames spread ratings less than 25 and smoke-developed ratings less than 450, to ASTM E 84 or CAN/ULC-S102.
- .13 Where there is no specific third party tested and classified firestop system available for an installed condition, the firestop contractor shall obtain from the firestop material manufacturer an Engineering Judgment (EJ) to be submitted to the Consultant and authorities having jurisdiction for approval prior to installation. The EJ shall follow International Firestop Council (IFC) guidelines.

1.8 MOCK-UP

- .1 Prepare sample joints for approval by the Consultant, representative of each type of firestop condition in accordance with Section 01 30 00.
- .2 Where not approved by the Consultant, remove and replace sample joints to the satisfaction of the Consultant.
- .3 Approved installations may become part of the finished work.

1.9 SUBMITTALS

- .1 Product Data: For each type of firestop product selected. Certify that firestop materials are asbestos free and contain volatile organic compounds (VOC's) within limits of the local jurisdiction.
- .2 Design Listings: Submit system design listings, including illustrations, from a qualified testing and inspecting agency that is applicable to each firestop configuration.
- .3 Where there is no specific third party tested and classified firestop system available for a particular configuration, the firestop contractor shall obtain from the firestop material manufacturer an Engineering Judgment (EJ) for submittal.
- .4 Qualification Data: For firms and persons specified under Quality Assurance to demonstrate their capabilities and experience. Submit document from manufacturer wherein manufacturer recognizes the installer as qualified.

1.10 ENVIRONMENTAL CONDITIONS

- .1 Install firestops when ambient or substrate temperatures are within limits permitted by the manufacturer's written instructions. Do not install firestops when substrates are wet due to rain, frost, condensation, or other causes.
- .2 Ventilate per the manufacturers written instructions on the product's Material Safety Data Sheet.

1.11 COORDINATION

- .1 Coordinate construction of openings and penetrating items to ensure that firestop assemblies are installed according to specified requirements.
- .2 Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- .3 Do not conceal firestop installations until the Owner's inspection agency or Authorities Having Jurisdiction have examined each installation.
- .4 Schedule firestop work after installation of penetrants but prior to concealing the openings.

1.12 EXTENDED WARRANTY

- .1 Submit a warranty of the firestop installation specified in this Section covering a period of an additional two years beyond the expiration of the warranty period specified in the General Conditions of the Contract, including materials and application. Replacement of firestop shall include removal of defective materials, preparation for and application of new material, and the repair and making good of damaged adjacent materials.
- .2 "Defective" firestop installation shall include; joint leakage, hardening, cracking, crumbling, melting, bubbling, shrinkage, running, sagging, loss of adhesion, loss of cohesion, and staining of adjacent finished materials or surfaces.

2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- .1 3M Fire Protection Products
- .2 A/D Fire Protection
- .3 Hilti Firestop Systems
- .4 Grace Construction Products
- .5 TREMstop Firestopping Systems

2.2 MATERIALS

- .1 Firestop And Smoke Seal Systems: in accordance with ASTM E814, UL 1479, or ULC-S115, asbestos- free materials and systems capable of maintaining an effective barrier against flame, smoke, and gases to ASTM E814, UL 1479, or ULC-S115, and not to exceed opening sizes for which they are intended.
- .2 Service Penetration Assemblies: certified in accordance with ASTM E814, UL 1479, or ULC-S115 and listed in testing laboratory directory.
- .3 Service Penetration Firestop Components: certified in accordance with ASTM E814, UL 1479, or ULC-S115 and listed in testing laboratory directory.
- .4 Fire resistance rating of installed firestop assemblies shall be in accordance with design requirements, and requirements of Ontario Building Code.
- .5 Primers: to Firestop manufacturer's recommendation for specific material, substrate, and end use.
- .6 Intumescent Firestop Sealants and Caulks

- .1 Grace FlameSafe FS1900.
- .2 Hilti FS-One.
- .3 A/D FIREBARRIER Intumescent Caulk.
- .4 3M Fire Barrier CP 25WB+ Caulk.
- .5 TREMstop IA by, TREMstop Firestopping Systems.
- .7 Elastomeric Sealant
 - .1 Grace FlameSafe FS1900, FS900+.
 - .2 Hilti CP601S.
 - .3 A/D FIREBARRIER Seal/Seal NS.
 - .4 3M Fire Barrier Sealant 2000 and 2000N/S.
 - .5 Fyre-Sil/Fyre-Sil S/L by, TREMstop Firestopping Systems.
- .8 Joint Spray
 - .1 Grace FlameSafe FS3000.
 - .2 Hilti CP672.
 - .3 A/D FIREBARRIER SprayMastic.
 - .4 3M FireDam Spray 100.
 - .5 TREMstop Acrylic SP by, TREMstop Firestopping Systems.
- .9 Firestop Putty
 - .1 Grace FlameSafe FSP1000 Putty & FSP1077 Putty Pads.
 - .2 Hilti CP617/617L Putty Pads, & CP618 Putty Stick.
 - .3 A/D FIREBARRIER Putty.
 - .4 3M Fire Barrier Moldable Putty+.
 - .5 TREMstop MP by, TREMstop Firestopping Systems.
- .10 Firestop Devices
 - .1 Grace FlameSafe FSWSD Collar, FSIS Intumescent Sleeve.
 - .2 Hilti CP642/643 Collar.
 - .3 A/D FIREBARRIER Collar/Sleeve.
 - .4 3M Fire Barrier RC-1 Restricting Collar.
 - .5 Fyre-Can/Fyre-Can Sleeve by, TREMstop Firestopping Systems.
- .11 Wrap Strips
 - .1 Grace FlameSafe FSWS 100/150.
 - .2 Hilti CP645.
 - .3 AD FIREBARRIER Wrap Strip.
 - .4 3M FS-195+.
 - .5 TREMstop WS by, TREMstop Firestopping Systems.
- .12 Firestop Mortars
 - .1 Grace FlameSafe FSM Mortar.
 - .2 Hilti FS635 Trowelable Compound.
 - .3 A/D FIREBARRIER Mortar.
 - .4 3M Fire Barrier Mortar.
 - .5 TREMstop Fire Mortar by, TREMstop Firestopping Systems.
- .13 Firestop Bags/Pillows/Blocks
 - .1 Grace FlameSafe Bags, FlameSafe Pillows.
 - .2 Hilti FS657 Fire Block.
 - .3 AD FIREBARRIER Pillows.
 - .4 3M Fire Barrier Pillows.

- .5 TREMstop PS by, TREMstop Firestopping Systems.
- .14 Forming/Damming Materials: Mineral Wool or other type as per manufacturer's recommendations.
- .15 Accessories: Provide components for each firestop system that are needed to install fill materials and to comply with Performance Requirements. Use only approved components specified by the firestop manufacturer for the firestop systems indicated. Accessories include, but are not limited to the following items:
 - .1 Permanent forming/damming/backing materials, including the following:
 - .2 Mineral wool fiber insulation.
 - .3 Foams or sealants used to prevent leakage of fill materials in liquid state.
 - .4 Fire-rated form board.
 - .5 Polyethylene/polyurethane backer rod.
 - .6 Rigid polystyrene board, and other temporary forming materials.
 - .7 Substrate primers.
 - .8 Steel sleeves.
- .16 All firestop products and systems shall be designed and installed so that the basic sealing system will allow the full restoration of the thermal and fire resistance properties of the barrier being penetrated with minimal repair if penetrants are subsequently removed.

2.3 MIXING

.1 For those products requiring mixing before application, comply with firestop manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

3 EXECUTION

3.1 EXAMINATION

- .1 Examine substrates and conditions for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.
- .3 Verify that all pipes, conduits, cables, and/or other items which penetrate fire-rated construction have been permanently installed prior to installation of firestops.

3.2 **PREPARATION**

- .1 Surface Cleaning: Clean out openings immediately before installing firestop systems to comply with written recommendations of firestop manufacturer and the following requirements:
 - .1 Remove from surfaces of opening substrates and from penetrating items foreign materials that
 - could interfere with adhesion of firestop systems.
 - .2 Clean opening substrates and penetrating items to produce clean, sound

surfaces capable of developing optimum bond with firestop systems. Remove loose particles remaining from cleaning operation.

- .3 Remove laitance and form-release agents from concrete.
- .2 Firestop shall be installed before fireproofing where bonding of firestop to metal deck is required.
- .3 Firestop must precede installation of insulation around pipes and ducts penetrating fire separation.
- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces.

3.3 INSTALLATION

- .1 General
 - .1 Install firestop and smoke seal material and components in accordance with certification and manufacturer's instruction.
 - .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separations.
 - .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength to maintain their integrity.
 - .4 Tool or trowel exposed surfaces to a neat smooth finish.
 - .5 Remove excess compound promptly as work progresses and upon completion.
- .2 Penetration Firestop Systems
 - .1 Install through-penetration firestop systems to comply with Performance Requirements in Part 1 and firestop manufacturer's written installation instructions and published drawings for products and applications indicated.
 - .2 Apply firestops in accordance with listed system designs or manufacturer's EJ per the manufacturer's installation instructions.
 - .3 Install forming/damming/backing materials and other accessories required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire resistance ratings required.
 - .4 Install fill materials for firestop systems by proven techniques to produce the following results:
 - .1 Fill voids and cavities formed by openings, forming materials,
 - accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - .2 Apply materials so they fully contact and adhere to substrates formed by openings and penetrating items.
 - .3 For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
- .3 Joint Firestop Systems
 - .1 Install fire resistive joint firestop systems to comply with Performance Requirements in Part 1 and firestop manufacturer's written installation instructions and published drawings for products and applications indicated.
 - .2 Apply firestops in accordance with listed system designs or manufacturer's EJ per the manufacturer's installation instructions.
 - .3 Install joint forming/damming materials and other accessories required to support fill materials during their application and in the position needed to produce cross-

sectional shapes and depths of installed firestop material relative to joint widths that allow optimum movement capability and achieve fire resistance ratings required.

- .4 Install fill materials for firestop systems by proven techniques to produce the following results: .
 - .1 Fill joint as required to achieve fire-resistance ratings indicated.
 - .2 Apply materials so they fully contact and adhere to substrates forming the openings.
 - .3 Completely fill recesses provided for each joint configuration.
 - .4 Tool non-sag firestop materials after their application and prior to the time skinning begins. Use tooling agents approved by the firestop manufacturer.
- .4 Perimeter Barrier Firestop Systems
 - .1 Install perimeter barrier firestop systems to comply with Performance Requirements in Part 1 and firestop manufacturer's written installation instructions and published drawings for products and applications indicated.
 - .2 Apply firestops in accordance with listed system designs or manufacturer's EJ per the manufacturer's installation instructions.
 - .3 Install metal framing, curtain wall insulation, mechanical attachments, safing materials and firestop materials as applicable within the system design.

3.4 INSPECTION

.1 Notify Consultant when installation is complete and ready for inspection, and prior to concealing or enclosing firestop materials and service penetration assemblies.

3.5 TOLERANCES

- .1 The following shall regulate sizing of service penetrations:
 - .1 Divisions 15 and 16 shall sleeve single, circular penetrants, except in fire resistance rated gypsum board.
 - .2 Multiple penetrations of circular penetrants shall be considered such if the penetrants are not further than 102mm apart.
 - .3 Forming of multiple penetrations and single penetrants in fire resistance rated gypsum board assemblies shall be created by respective trades by forming a square or rectangular opening around the penetrants. The edges of the opening shall be covered in gypsum board
 - .4 Perimeter clearance shall be 13mm to 25mm for single penetrants, or 13mm to 25mm around outer penetrants in multiple penetrations.
 - .5 Penetrations of square or rectangular configuration shall be constructed as specified above. Perimeter clearance shall be 40 to 50mm.

3.6 SCHEDULE

- .1 Non-Service Penetrations Through Vertical Fire Separations Consisting Of Masonry, Concrete, Or Gypsum Board/Stud Construction;
 - .1 Elastomeric seal and backup/forming material.
 - .2 Firestop system rating: **F**.
- .2 Edge Of Floor Slabs At Curtain Wall Or Precast Concrete Panel Assemblies;
 - .1 Self-leveling elastomeric seal and backup/forming material.
 - .2 Firestop system rating: F.
- .3 Voids At Perimeter Edges Of Vertical Fire Separations Consisting Of Masonry, Concrete, Or Gypsum Board/Steel Stud Construction;
 - .1 Elastomeric seal and backup/forming material.
 - .2 Firestop system rating: **F**.
- .4 Intersection Of Masonry And Gypsum Board/Steel Stud Fire Separations;
 - .1 Elastomeric seal and backup/forming material.
 - .2 Firestop system rating: **F**.
- .5 Control And Deflection Joints In Fire Separations;
 - .1 Elastomeric seal and backup/forming material.
 - .2 Firestop system rating: **F**.
- .6 Non-Service Penetrations Through Horizontal Fire Separations And Fire-Resistance Rated Floor Slabs.
 - 1 Self-leveling elastomeric seal and backup/forming material.
 - .2 Firestop system rating: F.
- .7 Openings And Sleeves Installed For Future Use In Fire Separations;
 - .1 Elastomeric seal and backup/forming material.
 - .2 Firestop system rating: **FH**.
- .8 Service Penetrations Around Mechanical Ductwork And Noncombustible Piping, Rigid Electrical Conduit And Other Assemblies Penetrating Fire Separations;
 - .1 Elastomeric seal and backup/forming material.
 - .2 Firestop system rating: **F**.
- .9 Service Penetrations Around Combustible Piping Penetrating Fire Separations;
 - .1 Intumescent mastic collar.
 - .2 Firestop system rating: F.
- .10 Service Penetrations Around Multiple Flexible Cables Penetrating Fire Separations;
 - .1 Removable intumescent bags/pillows, or intumescent cable sleeve systems.
 - .2 Firestop system rating: **FT**.

3.7 CLEANUP

.1 Remove excess materials and debris from site, and clean adjacent surfaces immediately after application.

PART 1) GENERAL

1.1 GENERAL

.1 The work of this Section is for fireproofing for portions of structural steel columns, beams and steel trusses not fire protected within wall construction. Includes any portion or face of any supporting structural member that projects out or beyond any wall condition unprotected. Refer to column and beam fireproofing schedule.

1.2 RELATED WORK

- .1 Section 07270 Firestopping and Smoke Sealers.
- .2 Section 09900 Painting

1.3 SECTION INCLUDES

.1 Intumescent fireproofing.

1.4 **REFERENCES**

- .1 Comply with the requirements of the latest editions of the following.
 - .1 CAN4-S101M Standard Method of Fire Endurance Tests of Building Construction and Materials.
 - .2 ULC List of Equipment and Materials.

1.5 SYSTEM DESCRIPTION

.1 Intumescent fireproofing system to provide a fire resistance rating of 1 hour for all portions or parts of steel columns and steel trusses not encased in masonry, in accordance with ULC Assembly No. Z603.

1.6 SUBMITTALS

- .1 Submit product data to requirements of Section 01300 Submittals.
- .2 Submit product data indicating product characteristics, performance and limitation criteria.
- .3 Submit test reports to requirements of Section 01400 Quality Control.
- .4 Submit copies of fire test reports of sprayed fireproofing application to substrate materials required.

1.7 QUALITY ASSURANCE

- .1 Manufacturer: Company specializing in manufacturing products of this section.
- .2 Applicator: Approved licensed and supervised by manufacturer of fireproofing materials. Company with minimum 3 years documented experience.
- .3 Product: Manufactured under ULC Followup Program. Each container or package shall bear ULC label or listing mark.

1.8 **REGULATORY REQUIREMENTS**

- .1 Conform to applicable code for fire resistance rating.
- .2 Submit certification of acceptability of fireproofing materials to authority having jurisdiction.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store material at a temperature not below 5 deg. C and in a dry protected area, off ground in original undamaged, sealed container with manufacturer's labels and seals intact.
- .2 Discard any materials which have come into contact with water prior to actual use.

1.9 **PROJECT / SITE CONDITIONS**

- .1 Do not apply sprayed intumescent fireproofing when temperature of substrate and surrounding air is below 5 deg. C.
- .2 Do not apply sprayed intumescent fireproofing until concrete topping and/or roofing applications have been installed.
- .3 Do not apply sprayed intumescent fireproofing until ventilation is sufficient in areas to receive work of this Section, during and 24 hours after application.
- .4 Do not apply sprayed intumescent fireproofing if relative humidity exceeds 75% during total period of application and drying for the intumescent fireproofing, or if it exceeds 65% throughout the application and drying for the protective decorative finish.

1.10 SEQUENCING AND SCHEDULING

- .1 Sequence work in conjunction with other fireproofing by Section 07270.
- .2 Steel surfaces with less than 1.0 meter clear working area may necessitate applying material to inaccessible surfaces prior to erection of the finished steel members, either at the point of fabrication or on site.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Intumescent Firesproofing: A/D Firefilm as manufactured by A/D Fire Protection Systems Inc., listed by Underwriters Laboratories and bearing ULC or ULI label on each container or Caflo "Sprayfilm – WB" ULC design Z607 (H.S.S.) or ULC design Z606 (W shapes).
- .2 Primer: Primer for steel to receive intumescent fireproofing to be red exide primer conforming to CGSB 1-GP-404, compatible with intumescent fireproofing.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Examine surfaces to receive work of this Section and report any defects which may affect the work of this section, including solvent based identification markings on the steel components and weld flashes.
- .2 Verify that all clips, hangers, sleeves and similar devices have been attached.
- .3 Confirm compatibility of surfaces to receive fireproofing materials. Verify that the steel surfaces have been prepared with a compatible primer and in accordance with manufacturer's written instructions.
- .4 Beginning of installation means acceptance of existing surfaces.

3.2 PREPARATION

.1 Clean substrate free of dust, grease or other foreign matter which would impair bond of fire resistance materials.

3.3 PROTECTION

.1 Protect adjacent surfaces and equipment from over-spray of sprayed fireproofing materials.

3.4 APPLICATION

.1 Thoroughly mix the intumescent fireproofing in accordance with manufacturer's instructions and apply in sufficient thickness to achieve the fire resistance rating. Apply in as many passes as necessary to cover with uniformed texture.

3.5 PATCHING

.1 Patch and repair any sprayed fireproofing that has been damaged by this or any other Section. Cost of repairs to be borne by Sections of work responsible for damage, and as assessed by the Contractor.

3.6 CLEAN UP

- .1 Remove fireproofing from materials and surfaces not specifically required to be fireproofed.
- .2 Remove excess material, overspray, droppings and debris.

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 61 00 - Basic Product Requirements

1.2 **REFERENCES**

- .1 ASTM C 1193 Standard guide for use of joint sealants.
- .2 CGSB 19-GP-5M-76, Sealing Compound, One Component, Acrylic Base, Solvent Curing.
- .3 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
- .4 CGSB 19-GP-14M-76, Sealing Compound, One Component, Butyl-polyisobutylene Polymer Base, Solvent Curing.
- .5 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
- .6 CAN/CGSB-19.18-M87, Sealing Compound, One Component, Silicone Base, Solvent Curing.
- .7 CAN/CGSB-19.21-M87, Sealing and Bedding Compound Acoustical.
- .8 CAN/CGSB-19.22-M89, Mildew Resistant, Sealing Compound for Tubs and Tiles.
- .9 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 Submittal Procedures.
- .2 Provide consultant with samples of all coloured sealers for colour selection

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 Basic Product Requirements.
- .2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.5 ENVIRONMENTAL AND SAFETY REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .3 Ventilate area of work by use of approved portable supply and exhaust fans.

1.6 QUALITY ASSURANCE

.1 Installation of sealants shall be preformed by a firm with minimum of five (5) years experience.

1.7 WARRANTY

.1 Submit written warranty against leaks, cohesive failure, staining of adjacent materials, in accordance with GC 12.3 but for five (5) years.

The warranty shall be issued by the Contractor and the Sealant Manufacturer.

2 PRODUCTS

2.1 SEALANT MATERIALS

- Sealants and caulking compounds must: .1
 - meet or exceed all applicable governmental and industrial safety and performance .1 standards: and
 - .2 be manufactured and transported in such a manner that all steps of the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the fisheries Act and the Canadian Environmental Protection Act (CEPA).
 - .3 Use products of a single manufacturer for each different product and required recommended primers.
- .2 Sealant and caulking compounds must not be formulated or manufactured with: aromatic solvents, fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, barium or their compounds, except barium sulfate.
- .3 Sealant and caulking compounds must not contain a total of volatile organic compounds (VOCs) in excess of 5% by weight as calculated from records of the amounts of constituents used to make the product;
- Sealant and caulking compounds must be accompanied by detailed instructions for proper .4 application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.
- .5 Caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant shall not be used in air handling units.
- .6 When low toxicity caulks are not possible, confine usage to areas which offgas to the exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.
- .7 Sealants acceptable for use on this project except CAN/CGSB-19.1 and CAN/CGSB-19.18 must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

- Polyurethane One Part. .1
 - Self-Levelling and Non Sag to CAN/CGSB-19.13, Type 1 and 2, .1
 - Acceptable material: Tremco: Dymonic .2

Sonneborn: NP1, SL1 Sikaflex 1A Pourethane NS

- .2 Polyurethane Two Part.
 - Self-Levelling and Non Sag to CAN/CGSB-19.24, Type 1 and 2 .1 .2
 - Acceptable material: Tremco: Dymeric
 - Sonneborn: NP2 Sikaflex: 2C or 2CSL.
- Acrylic Latex One Part. .3
 - To CAN/CGSB-19.17. .1
 - .2 Acceptable material:

Tremco: Tremflex 834 General Electric (G.E. Supply): Acryliasil AL1300 (RC520)

Sonneborn: Sonolac.

.4

- Silicone Sanitary Sealant .1 To CAN/CGSB-19.22 one part mildew resistant paintable..
- Acceptable material: .2

Tremco - Tremsil 200 General Electric (G.E. Supply): 1700 Dow Corning: 786.

- .5 Acoustical Sealant - Synthetic Rubber
 - To CGSB 19.21 .1
 - .2 Acceptable material: Tremco - Acoustical Sealant.

PREFORMED COMPRESSIBLE AND NON-COMPRESSIBLE BACK UP MATERIALS 2.3

- Polyethylene, Urethane, Neoprene or Vinyl Foam. .1
 - Extruded open closed cell foam backer rod. .1
 - Size: oversize 30 to 50 %. .2
- .2 Neoprene or Butyl Rubber.
 - Round solid rod, Shore A hardness 70.
- .3 High Density Foam.
 - Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, .1 Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m³ density, or neoprene foam backer, size as recommended by manufacturer.
- Bond Breaker Tape. .4
 - Polyethylene bond breaker tape which will not bond to sealant. 1

2.4 JOINT CLEANER

- Non-corrosive and non-staining type, compatible with joint forming materials and sealant .1 recommended by sealant manufacturer.
- .2 Primer: as recommended by manufacturer.

3 EXECUTION

3.1 PROTECTION

.1 Protect installed work of other trades from staining or contamination.

3.2 PREPARATION OF JOINT SURFACES

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

PRIMING 3.3

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

BACKUP MATERIAL 3.4

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

3.5 MIXING

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

3.6 **APPLICATION**

- .1 Sealant.
 - Apply sealant in accordance with manufacturer's written instructions. .1
 - Mask edges of joint where irregular surface or sensitive joint border exists to provide .2 neat ioint.
 - .3 Apply sealant in continuous beads.
 - Apply sealant using gun with proper size nozzle. .4
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - Remove excess compound promptly as work progresses and upon completion. .8
- Curing. .2
 - Cure sealants in accordance with sealant manufacturer's instructions. .1
 - .2 Do not cover up sealants until proper curing has taken place.
- .3 Cleanup.
 - Clean adjacent surfaces immediately and leave work neat and clean. .1
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
 - .3 Remove masking tape after initial set of sealant.

SEALANT SCHEDULE 3.7

.1

- Interior Sealants Non Elastomeric (acrylic latex)
 - Perimeter of built in architectural wood work .1
 - .2 Junction: of casework gables and flooring.
 - .3 Perimeter of pressed steel frames and adjacent finishes, including bottom at floor.
 - Interior perimeter of exterior openings. .4
- .2 Interior Sealants Elastomeric: Polyurethane One Part
 - Interior side of expansion and control joints of concrete, masonry and precast .1 concrete walls.
 - .2 Interior control and expansion joints in floor and deck surfaces (self levelling) sealant.
 - .3 Joints at underside of precast beams or slabs.
 - .4 Interior joints of precast concrete walls.
 - .5 Joints or tops of non load bearing masonry walls at underside of poured concrete.
 - .6 .7 Exposed interior control joints in drywall.
 - Interior perimeter of exterior openings
- Interior Sealants Silicone Sanitary .3
 - Perimeter of bath fixtures (sinks, tubs, showers, urinals, water closets, basins, .1 showers, vanities, stools)
 - .2 Junction of ceramic wall tile and finished flooring
- Interior Sealants Acoustical .4
 - as indicated in section 09250. .1
- .5 Exterior Sealants – Elastomeric: Polvurethane Two Part
 - Perimeter of exterior openings where frames connect exterior facade of building (ie. .1

- brick, block, precast, masonry) Expansion and control joints in exterior surfaces of poured in place concrete, precast .2 concrete, unit masonry, and architectural wall panels. Coping joints and coping to facade joints.
- .3
- .4 .5 Cornice and wash or horizontal surface joints Exterior control expansion and joints in concrete decks and horizontal traffic surfaces (use self levelling sealants).
- .6
- Self Levelling Sealants .1 Sealant Control joints in concrete decks.

 - .2 .3 Exterior joints in horizontal traffic surfaces Exterior control and expansion joints in decks.

1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 61 00 Basic Product Requirements
- .2 Section07 90 00 Joint Sealers
- .3 Section 08 71 00 Door Hardware
- .4 Section 08 71 13 Power Door Operators
- .5 Section 08 80 00 Glazing.
- .6 Division 26: Wiring for electronic hardware.

1.2 **REFERENCES**

- .1 ASTM A 653M-95, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 CSA A101-M1983, Thermal Insulation, Mineral Fibre, for Buildings.
- .3 CAN/CSA-G40.21-M92, Structural Quality Steels.
- .4 CSA W59-M1989, Welded Steel Construction (Metal Arc Welding).
- .5 CSDFMA, Specifications for Commercial Steel Doors and Frames, 1990.
- .6 CSDFMA, Recommended Selection and Usage Guide for Commercial Steel Doors, 1990.
- .7 CAN4-S104M- M80(R1985), Fire Tests of Door Assemblies.
- .8 CAN4-S105M-M85, Fire Door Frames.

1.3 DESIGN REQUIREMENTS

- .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35°C to 3°C.
- .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00.
- .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed louvred, arrangement of hardware and fire rating and finishes.
- .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing finishes.
- .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .5 Submit test and engineering data, and installation instructions.
- .6 Indicate all special conditions.

1.5 REQUIREMENTS OF REGULATORY AGENCIES

- .1 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104M NFPA 252 for ratings specified or indicated.
 - .1 Provide fire labelled frame products for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with CAN4-S104.

1.6 WARRANTY

.1 Provide a written warranty for work of this section from manufacturer for failure due to defective materials and from contractor for failure due to defective installation workmanship, for one (1) year respectively.

2 PRODUCTS

2.1 MATERIALS

- .1 Hot dipped galvanized steel sheet: to ASTM A 653M, ZF75, minimum base steel thickness in accordance with CSDFMA Table 1 Thickness for Component Parts. (Paintable Galvanneal)
- .2 Reinforcement channel: to CAN/CSA-G40.21, Type 44W, coating designation to ASTM A 653M, ZF75.

2.2 DOOR CORE MATERIALS

- .1 Interior Construction:
 - .1 Both face sheets with honeycomb core, laminated under pressure to face sheets. .2 Structural small cell, 24.5 mm maximum kraft paper 'honeycomb', weight: 36.3 kg per ream minimum, density: 16.5 kg/m3 minimum sanded to required thickness.
- .2 Exterior Construction:
- .1 Both face sheets with polystyrene core, laminated under pressure to face sheets. .2 Expanded polystyrene: CAN/CGSB-51.20, density 16 to 32 kg/m3 fire retardant.

2.3 ADHESIVES

.1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement or ULC approved equivalent.

.2 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.

.3 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

2.4 PRIMERS

.1 Touch-up prime CAN/CGSB-1.181.

2.5 ACCESSORIES

.1 Door silencers: single stud rubber/neoprene type.

.2 Exterior and interior top caps: rigid polyvinyl chloride extrusion conforming to CGSB 41-GP-19Ma.

.3 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.

- .4 Door bottom seal.
- .5 Metallic paste filler: to manufacturer's standard.

- .6 Fire labels: metal rivetted.
- .7 Sealant: to Section 07 90 00.
- .8 Glazing: to Section 08 80 00.
- .9 Make provisions for glazing as indicated and provide necessary glazing stops. .1 Provide removable stainless steel glazing beads for use with glazing tapes and compounds and secured with countersunk stainless steel screws dry glazing of snap-on type.
 - .2 Design exterior glazing stops to be tamper proof.

2.6 FRAMES FABRICATION GENERAL

- .1 Fabricate doors and frames in accordance with CSDFMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Exterior frames: 1.6mm thermally broken type construction.
- .4 Interior frames: 1.6 mm welded construction.

.5 Blank, reinforce, drill and tap frames for mortised, template hardware, and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.

- .6 Protect mortised cutouts with steel guard boxes.
- .7 Prepare frame for door silencers, 3 for single door, 2 at head for double door.
- .8 Manufacturer's nameplates on frames and screens are not permitted.
- .9 Conceal fastenings except where exposed fastenings are indicated.

.10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.

.11 Insulate exterior frame components with polyurethane insulation.

2.7 FRAME ANCHORAGE

.1 Provide appropriate anchorage to floor and wall construction.

.2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.

.3 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.

2.8 FRAMES: 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, transom bars, 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 Securely attach floor anchors to inside of each jamb profile.

.6 Weld in 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.

.7 Securely attach lead to inside of frame profile from return to jamb soffit inclusive on door side of frame only at lead lined door assembly

2.9 DOOR FABRICATION GENERAL

.1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.

.2 Exterior doors: honeycomb construction. Interior doors: honeycomb construction.

.3 Fabricate doors with longitudinal edges locked seamed, adhesive assisted welded. Seams: grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.

.4 Blank, reinforce, drill doors and tap for mortised, template hardware and electronic hardware.

.5 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.

.6 Reinforce doors where required, for surface mounted hardware. Provide flush PVC top caps to exterior doors. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.

.7 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

.8 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in strict conformance with CAN4-S104, ASTM E 152 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.

.9 Manufacturer's nameplates on doors are not permitted.

2.10 DOORS: HONEYCOMB CORE CONSTRUCTION

.1 Form each face sheet for exterior doors from 1.6 mm sheet steel with honeycomb polystyrene polyurethane core laminated under pressure to face sheets.

.2 Form each face sheet for interior doors from 1.6 mm sheet steel with honeycomb - temperature rise rated core laminated under pressure to face sheets.

2.11 HOLLOW STEEL CONSTRUCTION

.1 Form each face sheet for exterior doors from 1.6 mm sheet steel.

.2 Form each face sheet for interior doors from 1.6 sheet steel.

.3 Reinforce doors with vertical stiffeners, securely welded to each face sheet at 150 mm on centre maximum.

.4 Fill voids between stiffeners of exterior doors with fibreglass core.

.5 Fill voids between stiffeners of interior doors with fibreglass core.

2.12 THERMALLY BROKEN DOORS AND FRAMES

.1 Fabricate thermally broken doors by using insulated core and separating exterior parts from interior parts with continuous interlocking thermal break.

.2 Thermal break: rigid polyvinyl chloride extrusion conforming to CGSB 41-GP-19Ma.

.3 Fabricate thermally broken frames separating exterior parts form interior parts with continuous interlocking thermal break.

.4 Apply insulation to frame.

EXECUTION 3

3.1 INSTALLATION GENERAL

Install labelled steel fire rated doors and frames to NFPA 80 except where specified .1 otherwise.

.2 Install doors and frames to CSDFMA Installation Guide.

FRAME INSTALLATION 3.2

Set frames plumb, square, level and at correct elevation. .1

.2 Secure anchorages and connections to adjacent construction.

.3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.

Make allowances for deflection of structure to ensure structural loads are not transmitted 4 to frames.

.5 Caulk perimeter of frames between frame and adjacent material.

DOOR INSTALLATION 3.3

.1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 0 - Door Hardware.

Provide even margins between doors and jambs and doors and finished floor and 2 thresholds as follows.

- Hinge side: 1.0 mm. .1
- .2 .3 Latch side and head: 1.5 mm.
- Finished floor, top of carpet noncombustible sill and thresholds: 13 mm.

.3 Adjust operable parts for correct function.

.4 Install louvres.

FINISH REPAIRS 3.4

Touch up with primer finishes damaged during installation. .1

Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and .2 sand to a uniform smooth finish.

GLAZING 3.5

.1 Install glazing for doors and frames in accordance with Section 08 80 00 - Glazing.

1 **GENERAL**

RELATED SECTIONS 1.1

- .1 Section 01 60 00 - Basic Product Requirements
- .2 Section 07 90 00 - Joints Sealers:
- .3 Section 07 21 29 Foamed in Place Insulating Sealant
- .4 Section 08 71 13 - Power Door Operators
- .5 Section 08 80 00 - Glazing.
- .6 Division 26: Wiring for electronic hardware.

1.2 REFERENCES

- ASTM A653/A653M; Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron .1 Alloy Coated (Galvannealed) by the Hot-Dip Process. Aluminum Association (AA); DAF-45, Designation System for Aluminum Finishes.
- .2
- American Architectural Manufacturers Association (AAMA); Aluminum Curtain Wall .3 Design Guide Manual.
- .4 ASTM B209; Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .5 ASTM B221M; Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- ASTM E283; Test Method for Rate of Air Leakage Through Exterior Windows, Curtain .6 Walls, Doors.
- .7 ASTM E330; Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- ASTM E331; Test Method for Water Penetration of Exterior Windows, Curtain Walls, and .8 Doors by Uniform Static Air Pressure Difference.
- ASTM E1105; Test Method for Field Determination of Water Penetration of Exterior .9 Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
- CSA-G40.21: Structural Quality Steels .10
- CAN/CSA G164; Hot Dip Galvanizing of Irregularly Shaped Articles. .11
- .12 CAN3-S157; Strength Design in Aluminum.
- CSA W59.2; Welded Aluminum Construction. .13
- .14 CAN/ULC-S702; Standard for Mineral Fibre Thermal Insulation for Buildings.
- .15 CAN/ULC-S114; Determination of Non-combustibility of Building Materials.

1.3 **DESIGN CRITERIA**

- .1 Design frames and doors in exterior walls to:
 - Accommodate expansion and contraction within service temperature range of -35 .1 to 35°C.
 - .2 Limit deflection of mullions to maximum 1/175th of clear span when tested to ASTM E 330 under wind load of 1.2 kpa. Submit certificate of tests performed.

1.4 SHOP DRAWINGS

- Submit shop drawings in accordance with Section 01 33 00. .1
- Indicate each type of door and frame, extrusion profiles, method of assembly, section and .2 hardware reinforcement, locations of exposed fasteners, finishes and location of manufacturer's nameplates.
- .3 Submit catalogue details for each type of door and frame illustrating profiles, dimensions and methods of assembly.

1.5 **CLOSEOUT SUBMITTALS**

.1 Provide maintenance data for cleaning and maintenance of aluminium finishes for incorporation into manual specified in Section 01 78 00.

1.6 PROTECTION

- .1 Apply temporary protective coating to finished surfaces. Remove coating after erection. Do not use coatings that will become hard to remove or leave residue.
- .2 Leave protective covering in place until final cleaning of building.

1.7 WARRANTY

Submit written warranty against leaking, deformation, loss of glass seal, glass breakage, .1 distortion, colour fade and hardware in accordance to GC12.3 but for 10 years.

2 PRODUCTS

MATERIALS 2.1

- .1 Aluminum extrusions: Aluminum Association alloy AA6063-T5 or T6 anodizing quality.
- .2 Sheet aluminum: Aluminum Association alloy AA1100-H14 anodizing quality.
- Steel reinforcement: to CAN/CSA-G40.21, grade 300 W. .3
- Fasteners: cadmium plated steel, finished to match adjacent material. .4
- .5 Weatherstrip: replaceable metal backed synthetic pile.
- .6 Door bumpers: black neoprene.
- .7 Door bottom seal: automatic adjustable door seal of anodized extruded aluminum frame and vinyl weather seal, recessed in door bottom, automatic retract mechanism when door is open.
- .8 Isolation coating: alkali resistant.
- .9 Glass: tempered glass to CAN/CGSB-12.1, Type 2.

2.2 ALUMINUM DOORS

.1

- Thermally broken exterior doors.
 - Acceptable material: Alumicor ThermaPorte 7700 .1
 - .2 Acceptable equals by: Kawneer, Old Castle Glass, CR Lawrence
 - .3 Construct doors of porthole exteriors with minimum well thickness of 3mm.
 - .4 Door stiles 102 wide plus or minus 10mm.
 - .5 Top rail 98mm wide plus or minus 10mm.
 - .6 .7 Centre rail 260mm wide plus or minus 10mm.
 - Bottom rail 178mm wide plus or minus 10mm.
 - Weather strip and door bottom seal to be supplied and factory installed by .8 aluminum door manufacturer.
 - .9 Door hardware by Section 08 71 00 Hardware to be shipped to aluminum door manufacturer and factory installed.
- .2 Non-thermally broken interior doors:
 - Refer to Door and Frame Schedule for profile type. .1
 - .2 .3 Acceptable materials: Alumicor Canadiana HD
 - Acceptable equals by: Kawneer, Old Castle Glass, CR Lawrence
 - Door .4

- stiles 165mm plus or minus 10mm
- Top rail 116mm plus or minus 10mm .2
- bottom rail 203mm plus or minus 10mm .3
- Door thickness to be 50.8mm thick .5
- .6 Aluminum sheat thickness minimum 3mm.
- .7 Four welds per corner
- Door hardware by Section 08 71 00 Hardware to be shipped to aluminum door .8 manufacturer and factory installed.

2.3 **ALUMINUM FRAMES**

.1 Thermally broken frames

.1

- Refer to Section 08 44 13 Glazed Aluminum Curtain Walls. 1
- .2 Non-Thermally broken frames.
 - Acceptable Material: Alumicore Flushglaze TL 1800 .1
 - Acceptable Equals by: Kawneer, Old Častle Glass, CR Lawrence .2
 - .3 Construct all frames of aluminum extrusions with minimum wall thickness of 3mm.

2.4 **ALUMINUM FINISH**

- Finish exposed surfaces of aluminum components in accordance with Aluminum .1 Association Designation System for Aluminum Finishes. 1
 - Standard bronze anodic finish: designation AA-M12 C22 A31, Class 1.
- .2 Appearance and properties of anodized finishes designated by the Aluminum Association as Architectural Class 1, Architectural Class 2, and Protective and Decorative.

2.5 STEEL FINISHES

.1 Finish steel clips and reinforcing steel with steel primer to CGSB 1.40 zinc coating to CSA G164.

2.6 FABRICATION

- .1 Doors and framing to be by same manufacturer.
- .2 Fabricate doors and frames to profiles and maximum face sizes as shown. Provide minimum 22 mm bite for insulating glazed units.
- .3 Provide structural steel reinforcement as required.
- .4 Fit joints tightly and secure mechanically.
- .5 Conceal fastenings.
- Mortise, reinforce, drill and tap doors, frames and reinforcements to receive hardware .6 using templates provided under Section 08 71 00 - Door Hardware.
- .7 Isolate aluminum from direct contact with dissimilar metals, concrete and masonry.

3 **EXECUTION**

3.1 INSTALLATION

- Set frames plumb, square, level at correct elevation in alignment with adjacent work. .1
- .2 Anchor securely.

- .3 Install doors and hardware in accordance with hardware templates and manufacturer's instructions.
- .4 Adjust operable parts for correct function.
- .5 Make allowances for deflection of structure to ensure that structural loads are not transmitted to frames.
- .6 Insulate frame cavities as indicated.

3.1 GLAZING

.1 Glaze aluminum doors and frames in accordance with Section 08 80 00 - Glazing.

3.2 CAULKING

- .1 Seal joints to provide weather tight seal at outside and air, vapour seal at inside.
- .2 Apply sealant in accordance with Section 07 90 00 Joint Sealers. Sealant colour to match frame colour.
- .3 Fill gap between framing and adjacent construction with foamed in place insulating sealant to section.

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 05500 Metal Fabrications: Steel (plate, angle and channel) door frames.
- .2 Section 08710 Door Hardware
- .3 Section 09900 Painting.
- .4 Division 26 : Electrical power supply.

1.2 REFERENCES

- .1 Aluminum Association Designation System for Aluminum Finishes- 1997.
- .2 ASTM A 366M-97, Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
- .3 ASTM D 822-96, Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
- .4 CAN/CGSB-1.105-M91, Quick-Drying Primer.
- .5 CGSB 1.181-99, Coating, Zinc-Rich, Organic, Ready Mixed.
- .6 CSA G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 DESIGN REQUIREMENTS

- .1 Design exterior door assembly to withstand windload of 1 kPa with a maximum horizontal deflection of 1/240 of opening width.
- .2 Design door panel assemblies with thermal insulation factor 2.65 RSI.
- .3 Design door assembly to withstand minimum 100,000 cycles total life.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00.
- .2 Indicate sizes, service rating, types, materials, operating mechanisms, glazing locations and details, hardware and accessories, required clearances and electrical connections.

1.5 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for overhead door hardware for incorporation into operations manual.

1.6 EXTRA MATERIALS

- .1 Provide spare parts in accordance with Section 01780 Closeout Submittals.
- .2 Store where directed. Identify each part and reference to appropriate door.

1.7 WARRANTY

- .1 Provide 10 year Manufacturer's warranty on workmanship, materials and door finish.
- .2 Provide 10 year manufacturer's warranty for electric operating equipment.
- .3 Door manufacturer shall provide complete installation instructions for doors and hardware.
- .4 Provide a letter of conformance indicating that the doors are installed in accordance to the drawings and the specifications

PART 2 PRODUCTS

2.1 MATERIALS

- Galvanized steel sheet: commercial quality to ASTM A 526 at with 2275 zinc coating. .1
- .2 Steel sheet: commercial guality to ASTM A 366M
- .3 Anodized aluminum sheet: plain pattern anodizing quality aluminum sheet.
- .4 Aluminum extrusions: Aluminum Association alloy AA6063-T5.
- .5 Primer: to CAN/CGSB-1.105 for steel CGSB1.181, for galvanized steel surfaces.
- .6 Insulation: Polyurethane foam to meet design requirements.
- .7 Cable: multi-strand galvanized steel aircraft cable.

2.2 ACCEPTABLE MANUFACTURERS

- Standard of Acceptance: Thermatite door model "T200C MR" 51 mm (2") thick Multi-rib .1 design, polyurethane insulated, tongue-and groove sections joint as manufactured by Richards-Wilcox Canada Inc., with minimum requirements as specified herein:
 - Acceptable Equal form the following manufacturers: .1
 - Garaga Inc.: Model G2323 .1 .2
 - Wayne Dalton:

2.3 DOORS

- .1 Steel skins with polyurethane core sandwich type construction, interior and exterior skins separated by continuous thermal break and shall feature WeatherLoc[™] tongue-andgroove joint for weather-tight seal between sections. Sections shall have a minimum thermal insulating value of RSI 3.22 (R18.28).
- .2 Exterior Skin: Structural quality hot-dipped galvanized steel, 0.36 mm (0.014") minimum, factory applied baked on polyester paint finish, shall have stucco texture and Multi-Ribbed profile.
- .3 Interior Skin: Structural quality hot-dipped galvanized steel, 0.33 mm (0.013") minimum, baked-onacrylic paint finish, non-repeating random stucco texture and rib pattern.
- Ends of each door section shall be caped with 1.6 mm (0.0625") hot dipped galvanized .4 steel full height end caps. Doors width 16'-3" (4953 mm) and over shall all have double end caps.
- .5 Insulation: Cavity shall be filled on continuous process, formed-in-place, CFC and HCFC free rigid polyurethane core, interior and exterior skins shall feature thermal break.
- Reinforcements: Provide 0.9 mm (0.039") minimum, continuous reinforcing strip, within .6 core of door sections, for all hardware, accessories and mounting locations. Reinforcing strip must be of adequate width to enable the attachment of all fasteners and screws to penetrate both door interior skin and reinforcing strip. Fasteners or screws etc., secured only to the door skin will not be acceptable.
- .7 Weather-stripping: Doors shall be equipped with a heavy duty, factory installed continuous top seal to seal against header, continuous replaceable seals between sections and vinyl bulb shaped astragal on the bottom edge of the bottom section. Dual

Durometer vinyl jamb weather seal bolted to the continuous adjustable mounting angle (ADCA) for easy replacement, as supplied by Richards Wilcox Canada.

- .8 Glazing: as shown on the architectural drawings.
- .9 Door Finish: to consultants letter selection from standard colours.
- .10 Trusses: If required, provide adequate number of galvanized steel linear type reinforcing trusses to meet the wind loading.

2.4 STANDARD DUTY INDUSTRIAL HARDWARE

- .1 Standard of Acceptance: Linear Hardware System as manufactured by Richard-Wilcox Canada. Doors shall be equipped with double end roller brackets and long stem rollers.
- .2 Finish: Door tracks and track mounting hardware and torsion assembly mounting brackets shall be hot-dip galvanized.
- .3 Track: 2.7 mm (12ga), thick commercial galvanized track, formed track 80 mm (3 1/8") overall outside dimension. Vertical track sloped for weather tight closing.
- .4 Track Angle: Continuous adjustable track angle (ADCA), bolted type, field adjustable to ensure weather tight seal and serviceability, fabricated from 2.4 mm (13ga) commercially galvanized steel, designed to provide continuous support to the vertical track. Combination angle and clip mounting not acceptable.
- .5 Hinges: Linear type, fabricated from 2.75 mm (12ga) thick galvanized steel with embossments designed to resist higher load and to provide greater stability and improved performance. Doors width 16'-3" (4953 mm) and over shall have double end hinges featuring full width bushing for both the hinge pivot and roller carries to allow for ease installation and eliminating any possibility of misalignment of the hinges.
- .6 Track Hangers: Minimum 32 x 32 mm (1 1/4" x 1 1/4") steel angles roll formed from 2.0 mm (0.078") commercially galvanized steel.
- .7 Weather-stripping: Doors shall be equipped with a heavy duty, factory installed continuous top seal to seal against header, continuous co-polymer joint bulb seal between sections and vinyl bulb shaped astragal on the bottom edge of the door. Dual Durometer vinyl jamb weather seal bolted to the continuous adjustable mounting angle (ADCA) for easy replacement, as supplied by Richards-Wilcox Canada
- .8 Rollers: Steel rollers 73 mm (2 7/8") diameter, with ten (10), 8 mm (5/16") diameter ball bearings, 11 mm (7/16") diameter roller axles and both inner and outer ball races of hardened steel. Length of roller stem as required.
- .9 Linear Roller Brackets: Fabricated from 2.7 mm (12 ga) galvanized steel.
- .10 Shaft and Counter Balance Springs: Helically wound torsion springs manufactured from oil tempered spring wire stress relieved, minimum 10,000 cycles. Aluminum die cast grooved drums and flexible galvanized aircraft cables, 7 x 19 construction, mounted on minimum 25 mm (1") CRS solid steel shaft, keyed full length, rolling on flange bearings.
- .11 Bumper springs to be installed at the end of each horizontal track to prevent door over travel.
- .12 Track Guards: Continuous 4.7 mm, thick x 1524 mm, high (3/16" x 5'-0") chamfered at top at 45 degrees, painted safety yellow finish.
- .13 Doors quantity, size and the lift type as shown on door schedule and/or architectural drawings.

2.5 ELECTRIC OPERATORS

- .1 Provide Jack shaft type electric operators for doors as shown on Drawings, having sufficient power to operate the door at an approximate speed of 200 mm (8") per second.
- .2 Jack Shaft Operator: Manaras Opera industrial duty logic control type operator with on board radio receiver, model "OPERA-H" to NEMA 1, shall be equipped with an adjustable friction clutch, time delay on reverse, solenoid brake integral enclosure containing the controls and floor level disconnect and emergency manual chain hoist assembly with electrical interlock, motor __ HP minimum, suitable for ___ volts, _ Ph, 60 Hz power supply.
 - a) Provide one push button station "OPEN/CLOSE/STOP" to NEMA 1, for inside wall mounting near the door jamb on the operator side.
 - b) Provide and install a "Featheredge" Reversing Safety Edge along the bottom edge of door to reverse on contact with an object as supplied by Service Door Industries. Hose type pneumatic safety edges will not be accepted. Power to the safety edge shall be supplied by a reelite.
- .3 Power supply and fused disconnect near the opening on the operator side by division 16. Wiring from the fused disconnect to the operator and to the controls by the door contractor.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Installation shall be by door manufacturer or by authorized manufacture's representative for the region, as specified herein.
- .2 Install doors, tracks and operating equipment complete with necessary hardware, weather-stripping, anchors, hangers, brackets and accessories, in accordance to manufacturer's printed instructions.
- .3 Assemble and erect work plumbs, true, square, straight, level and accurate as per Drawings and reviewed shop drawings.
- .4 Isolate metals where necessary to prevent corrosion due to contact with dissimilar metals and between metals, masonry and concrete. Use bituminous paint or butyl tape or as recommended by the door manufacturer.
- .5 Supply written instructions, drawings, and where necessary provide supervision for the installation of items to be built in by work of other Sections.
- .6 Steel member's etc. including jamb extensions and spring pads, by Division 5 and as per structural drawings. All other mounting brackets, angles etc., required for the proper installation of work of this Section, shall be the responsibility of the door manufacturer.
- .7 Complete installation must be to the satisfaction of the Consultant. Any and all aspects of installation adversely affecting appearance and/or performance of such installation shall be deemed unacceptable and shall be fully replaced at no additional cost to the Owner

3.2 DOOR

- .1 Install sectional door in strict accordance with final reviewed shop drawings, manufacturer's instructions and as specified herein.
- .2 Fit, align and adjust overhead door assemblies, level and plumb, to ensure smooth operation and to provide correct closure to the satisfaction of the Consultant.

.3 Ensure that complete installation includes tracks, operating equipment, necessary hardware, weather-stripping, anchors, hangers, brackets and any other accessories deemed necessary. Include any other items, not specified herein, but is required for a complete installation.

3.3 HARDWARE

- .1 Install all necessary hardware, jamb and head mold strips, anchors, inserts, hangers and equipment supports in accordance with final reviewed shop drawings, manufacturer's instructions and as specified herein.
- .2 Mount counterbalancing mechanism with brackets at each end of shaft and at maximum 2438 mm (8'- 0") o/c. in between.
- .3 Fasten vertical track assembly to opening frame at maximum 508 mm (1'-8") o/c. vertically. Install additional track anchors where deemed necessary by the Consultant.
- .4 Support the horizontal track to transmit the door dead and operating loads to the building structure. Install sufficient supports, anchors, fasteners etc. so that the track assembly is rigid and free from undue movement as required by the door manufacturer and to the satisfaction of the Consultant. Install additional track anchors where deemed necessary by the Consultant.
- .5 Provide bumper springs at the end of each track of manually operated doors.
- .6 Ensure weather-stripping properly fastened and it forms a continuous weather-tight seal at perimeter.

3.4 ADJUSTMENT AND DEMONSTRATION

- .1 Lubrication: Upon completion of installation of doors and operating equipment, lubricate moving parts before operation.
- .2 Grease sprockets, bearings, cables, link chains and guides. Lubricant shall be as recommended by the manufacturer.

3.5 DEMONSTRATION:

- .1 Test the door operation and adjust it for smooth operation, free from warp, twist or distortion. Demonstrate the operation to the satisfaction of the Consultant at the same time of acceptance of the completed work.
- .2 Submit to the Owner a copy of proposed preventative maintenance program for overhead doors and other related components requiring regular maintenance and check-ups.

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures.
- .2 Section 01 74 21 Construction/Demolition Waste Management and Disposal.
- .3 Section 01 78 00 Closeout Submittals.
- .4 Section 07 21 20 Low Expanding Foam Sealant.
- .5 Section 07 26 00- Vapour Retarders.
- .6 Section 07 92 00 Joint Sealants.
- .7 Section 08 80 50 Glazing.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-79.1, Insect Screens.
- .2 Canadian Standards Association (CSA)
 - .1 CSA-A440/A440.1, A440, Windows / Special Publication A440.1, User Selection Guide to CSA Standard A440, Windows.
 - .2 CAN/CSA-Z91, Health and Safety Code for Suspended Equipment Operations.

1.3 SUBMITTALS

- .1 Indicate materials and details in scale full size 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 Shop drawings to include continuation of air barrier and vapour barrier between wall assembly and fiberglass window.
- .3 Submit one complete full size window sample of each type window.
- .4 Include frame, sash, sill, glazing and weatherproofing method, insect screens, surface finish and hardware. Show location of manufacturer's nameplates.
- .5 Include 150 mm long samples of head, jamb, sill, meeting rail, mullions to indicate profile.

1.4 TEST REPORTS

- .1 Submit test reports from approved independent testing laboratories, certifying compliance with specifications, for:
 - .1 Windows classifications
 - .2 Air tightness
 - .3 Water tightness
 - .4 Wind load resistance
 - .5 Condensation resistance
 - .6 Forced entry resistance
 - .7 Insect screens
 - .8 Glazing
 - .9 Safety drop vertical sliding windows only
 - .10 Ease of operation windows with operable lights
 - .11 Sash pull-off fiberglass windows

1.5 WARRANTY

.1 Provide a written warranty for work under this Section from Manufacturer for failure due to defective materials and from Contractor for failure due to defective installation, workmanship for ten (10) years respectively from the date of Substantial Completion.

1.6 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for windows for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Materials: to CSA-A440/A440.1 supplemented as follows:
- .2 All fiberglass windows by same manufacturer.
- .3 Sash: pultruded, fibreglass, nominal wall thickness 2.3 mm.
- .4 Main frame: pultruded, fibreglass, nominal wall thickness 2.3 mm.
- .5 Glass: in accordance with Section 08 80 00 Glazing. Supply and install by this section off site.

2.2 WINDOW TYPE AND CLASSIFICATION

- .1 Types:
 - .1 Operator type per drawings, insulating glass.
 - .2 Lo Profile Fixed Punched: with insulating glass. Equal to Duxton 328 Series
 - .3 Lo Profile Fixed Strip Windows: with insulting glass. Equal to Duxton Fibrewall 458.
 - .4 Refer to drawings for size and quantity required. Assume all windows to be punched type. Window elevations on drawings indicate specified fixed strip windows. Should any windows indicated on drawings to be punched type exceed the design limitations of the manufacturers allowance limits and /or specifications the window is to be designed and fabricated as a strip window type.
- .2 Energy ratings: windows to be Energy Star certified to Natural Resources Canada.
- .3 Acceptable Manufacturers:
 - .1 Duxton.
 - .2 Inline Fiberglass Windows
 - .3 Accurate Dorwin
 - .4 Approved alternate

2.3 FABRICATION

- .1 Fabricate in accordance with CSA-A440/A440.1 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 3.0 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.

2.4 FIBERGLASS FINISHES

- .1 Fiberglass finish: durable isocyanate-free two part polymer enamel with minimum dry film thickness of 0.038 mm and medium gloss of 25-40, conforming to AAMA 613, Organic Coatings.
- .2 Colour: Equal to 'Duxton' Expresso; interior exterior

2.5 GLAZING

.1 Glaze windows in accordance with CSA-A440/A440.1 and Section 08 80 00 - Glazing.

2.6 AIR BARRIER AND VAPOUR RETARDER

.1 Provide low expanding, single component polyurethane foam sealant installed at head, jamb and sill perimeter of window for sealing to building air barrier, vapour retarder and window frame. Foam sealant width to be adequate to provide required air tightness and vapour diffusion control to building air barrier and vapour retarder foam interior. Refer to Section 07 21 20 – Low Expanding Foam Sealant.

PART 3 EXECUTION

3.1 WINDOW INSTALLATION

- .1 Install in accordance with CSA-A440.
- .2 Arrange components to prevent abrupt variation in colour.
- .3 Install shims between windows and building frame at each installation screw location. Shim and fasten windows in accordance with manufacturer's recommendations and CAN/CSA A440.4.
- .4 Review project finishes of window sill, jamb and head opening. All installation components shall remain concealed as part of the finish work.

3.2 CAULKING

- .1 Seal joints between windows and window sills with sealant. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.
- .2 Apply sealant in accordance with Section 07 92 00 Joint Sealants. Conceal sealant within window units except where exposed use is permitted by Owner's Representative.

PART 1 GENERAL

1.1 WORK INCLUDED

.1 Supply and install shall be part of base bid. Refer to the attached hardware list

1.2 RELATED SECTIONS

- .1 01 61 00 Basic Product Requirements
- .2 06 20 00 Finish Carpentry
- .3 08 11 00 Steel Door & Frames
- .4 08 11 16 Aluminum Doors and Frames
- .5 Division 16: Electrical wiring for magnetic locks, electric strikes, electric locks, electric releases and power supplies.

1.3 PRODUCTS SUPPLIED BUT NOT INSTALLED IN THIS SECTION

.1 Power supplies, compressor/control boxes, junction boxes, magnetic locks, electric locks, electric strikes, door status switches and electric releases installed by 26.

1.4 REQUIREMENTS REGULATORY AGENCIES

- .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Provide permanently attached labels for all hardware required to be rated as part of a fire resistant door and frame assembly.

1.5 REFERENCES

- .1 Recommended locations for Architectural Hardware for Standard Steel Doors and Frames Door and Hardware Institute
- .2 Recommended locations for Architectural Hardware for Flush Wood Doors Door and Hardware Institute
- .3 NFPA 80-Standard for Fire Doors and Windows
- .4 Sequence Format for Hardware Schedule Door and Hardware Institute
- .5 Key Systems and Nomenclature Door and Hardware Institute
- .6 Abbreviations and Symbols used in Architectural Door and Hardware Schedules and Specifications Door and Hardware Institute.
- .7 Ontario Building Code 2012 Standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by

Canadian Steel Door and Frame Manufactures' Association.

1.6 WARRANTY

- .1 Provide a written manufacturer's warranty for work of this Section for failure due to defective materials for ten (10) years, dated from substantial completion.
- .2 Provide a written Contractor's warranty for work of this Section for failure due to defective installation workmanship for one (1) year, dated from submittal substantial completion.

2 PRODUCTS

2.1 MATERIAL

- .1 Refer to the hardware list included in this section.
- .2 Installation cost associated with the hardware must be included in the tender bid.
- .3 All work associated with section 08 71 13 Power Door Operators shall be excluded from this section and shall be included in the base bid.
- .4 All work associated with section 06 40 00 Architectural Woodwork shall be excluded from this section and shall be included in the base bid.

3 EXECUTION

3.1 EXAMINATION

- .1 Ensure that doors and frames are properly prepared and reinforced to receive finish hardware prior to installation.
- .2 Ensure that door frames and finished floor are sufficiently plumb and level to permit proper engagement and operation of hardware.
- .3 Submit in writing a list of deficiencies determined as part of inspection required in 3.1.1 and 3.12 to supervising consultant prior to installation of finished hardware.

3.2 INSTALLATION

- .1 Hardware Installers must have a minimum of five (5) years experience in installation of hardware. Provide verification of installer's qualification to Consultant for approval. All installers to attend review meetings with the hardware distributor.
- .2 Install hardware at mounting heights as specified in the manufacturers templates or specific references in approved hardware schedule or approved elevation drawings.
- .3 Where mounting height is not otherwise specified, install hardware at mounting heights as indicated in 1.5.1, 1.5.2.
- .4 Install hardware using only manufacturer supplied and approved fasteners in strict

adherence with manufacturers published installation instructions.

- .5 Ensure that all locksets / latchsets / deadlocks are of the correct hand before installation to ensure that the cylinder is in the correct position. Handing is part of installation procedure.
- .6 Ensure that all exit devices are of the correct hand and adjust device cam for proper outside trim function prior to installation. **Handing is part of installation procedure.**
- .7 Follow all manufactures installation instructions. Adjustment is inclusive of spring power, closing speed, latching speed and back-check at the time of installation.
- .8 Install head seal prior to installation of "PA"-parallel arm mounted door closers and push side mounted door stops/holders. .10 Counter sink through bolt of door pull under push plate during installation. .11 Mount all closers, automatic operators and hold-open devices with through bolts, as indicated in the finish hardware schedule.

3.3 FIELD QUALITY CONTROL

- .1 Perform bi-monthly on-site inspections during hardware installation and provide inspection reports listing progress of work, unacceptable work and corrective measures. Repair or replace as directed by the Consultant.
- .2 Before completion of the work but after the hardware has been installed, a certificate to the architect will be submitted stating that final inspection has been made and that hardware has been checked for installation and operation by a technician from the manufacturer and hardware consultant.

3.4 ADJUSTING AND CLEANING

- .1 Check and make final adjustments to each operating item of hardware on each door to ensure proper operation and function.
- .2 All hardware to be left clean and free of disfigurements.
- .3 Instruct/demonstrate to Consultant and Owner's staff in the proper operation, adjustment, maintenance of hardware and finishes.
- .4 Check all locked doors against approved keying schedule.
- .5 Remove protective coatings prior to final inspection.
- .6 Prior to date of substantial completion, adjust hardware. Repair or replace defective hardware or installation.

3.5 **PROTECTION**

.1 Protect hardware from damage during construction period by removing and reinstalling or where necessary, using temporary hardware to maintain finish in new condition and maintain manufacturers warranty.

3.6 HARDWARE GROUPS

.1 Under separate cover, see schedules.

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 <u>Work Included</u>: Furnish exterior and interior power door operators with visible mounting, as specified, that has been manufactured, fabricated and installed to maintain performance criteria stated by manufacturer without defects, damage or failure. Automatic door operators shall be configured as follows:
 - 1. Single doors: Outswing or Inswing.
 - 2. Simultaneous pairs: Outswing or Inswing.
 - 3. Double Egress: Outswing and Inswing.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental necessary to provide automatic power door operator systems including the following:
 - .1 Operator equipment
 - .2 Control system
 - .3 Activation devices
 - .4 Restroom Control Kits

1.3 RELATED SECTIONS

- .1 Section 04 22 00 Concrete Unit Masonry
- .2 Section 05 50 00 Metal Fabrications
- .3 Section 08 11 00 Steel Doors and Frames
- .4 Section 08 11 16 Aluminum Doors & Frames
- .5 Section 08 44 13 Glazed Aluminum Curtain Wall
- .6 Section 09 29 00 Gypsum Board.
- .7 Division 26- Power Supply
- .8 Appendix- Door Schedule

1.4 REFERENCE STANDARDS

- .1 American Architectural Manufacturers Association (AAMA) 101: Appendix Dissimilar Materials.
- .2 American Association of Automatic Door Manufactures (AAADM).
- .3 American National Standards Institute (ANSI):
 - .1 ANSI A156.19: For Power Assist and Low Energy Power Operated Doors
 - .2 ANSI.117.1: Accessible and Usable Buildings and Facilities
- .4 American Society for testing and Materials (ASTM) B221: Aluminum-Alloy Extruded Bars, Rods, Shapes and Tubes.
- .5 Accessibility for Ontarians with Disabilities Act (AODA)
- .6 International Code Council / International Building Code (ICC/IBC)
- .7 National Fire Protection Association (NFPA) 101:
 - .1 NFPA 101: Code for Safety to Life from Fire in Buildings & Structures.
 - .2 NFPA 70: National Electrical Code (NEC).
- .8 The Aluminum Association (AA) Aluminum Finishes Manual.

- .9 Underwriters Laboratory Inc. (CANADA) UL 325: Electrical Door, Drapery, Gate, Louver, and Window Operators and Systems.
- .10 CSA-G40.21; Structural Quality Steels
- .11 CAN/CSA G164-M92 (R1998); Hot Dip Galvanizing of Irregularly Shaped Articles.
- .12 CAN3-S157-M83 (R2001); Strength Design in Aluminum.
- .13 CSA W59.2-M1991 (R1998); Welded Aluminum Construction.
- .14 CAN/CGSB-69.26-96/ANSI/BHMA A156.10-1991; Power-Operated Pedestrian Doors.
- .15 CAN/CGSB-69.35-M89/ANSI/BHMA A156.19-1984; Power Assist and Low Energy Power-Operated Doors.
- .16 CAN/ULC-S533-2002; Egress Door Securing and Releasing Devices.

1.5 SUBMITTALS

- .1 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 33 00.
 - .2 Indicate on shop drawings, Electrical schematic,, layout, dimensions, elevations, detail sections of members, materials, finishes, hardware including mounting heights, anchors and reinforcement, provisions for expansion, and other pertinent information.
- .2 Maintenance Data
 - .1 Provide complete operation and maintenance data for inclusion in Operations and Maintenance Manual. Include spare parts list.
 - .2 Include manufacturer's parts lists, servicing frequencies, instructions for adjustment and operation applicable to each component.
 - .3 Include name, address and telephone number of nearest authorized service representative.
- .3 Closeout Submittals: Submit the following:
 - 1. Owner's Manual.
 - 2. Warranty document as specified herein.
 - 3. AAADM inspection compliance form completed and signed by certified AAADM inspector prior to doors being placed in operation as proof of compliance with ANSI A156.19.

1.6 QUALITY ASSURANCE AND PERFORMANCE REQUIREMENTS

- .1 Installation
 - .1 Installation of power door operators shall be performed by a company which is a certified installer of the manufacturer, for both installation and maintenance, and with minimum five (5) years documented servicing and installing experience. Submit documentation.
- .2 Manufacturers Qualification
 - .1 Manufacturer to have minimum (5) five years successful experience in the fabrication of automatic doors of the type required for this project. Manufacturer capable of providing field service representation during

installation, approving acceptable installer and approving application method.

- .3 Source Limitations:
 - .1 Obtain automatic door operators through one source from a single manufacturer.
- .4 Product Options:
 - .1 Drawings indicate sizes, profiles, and dimensional requirements of automatic entrance door assemblies and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
- .5 Power Operated Door Standards
 - .1 ANSI/BHMA A156.19.
- .6 Operation: Automatic and/or Manual:
 - Automatic: Pushbutton/Push Plate switch actuates door open; door closes after time delay expires. Opening and closing force, measured 1" (25.4 mm) out from the lock stile of the door, not to exceed 15 pounds (67 N) of force to stop the door when operating in either direction. Operator to include the following variable adjustments so as to comply with ANSI Standard A156.19: Opening speed 4 1/2 to 6 seconds; Closing speed 4 1/2 to 6 seconds.
- .7 Electrical Components, Devices and Accessories
 - .1 Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- .8 Operating Range: -30° F to 130° F (-34° C to 54° C)
- .9 Opening Force Requirements for Egress Doors:
 - .1 In the event power failure to the operator, swinging automatic entrance doors shall open with a manual force, not to exceed 30 lbf (133 N) applied at 1" (25 mm) form the latch edge of the door.
- .10 Door Energy: The kinetic energy of a door in motion shall not exceed 1.25 lbd-ft (1.69 Nm).
- .11 Closing Time:
 - 1. Doors shall be field adjusted to close from 90 degrees to 10 degrees in 3 seconds or longer.
 - 2. Doors shall be field adjusted to close from 10 degrees to fully closed in not less than 1.5 seconds.

1.7 WARRANTIES

- .1 Manufacturer's Warranty: Units to be warranted against defect in material and workmanship for a period of one year from the Date of Substantial Completion. Manufacturer's warranty is in addition to, and not a limitation of, other rights owner may have under Contract Documents.
- .2 Distributor's Warranty: One year warranty: Labor & transportation charges for

defective parts replacement.

.3 Provide separate restroom control kit manufactures warranty form defective for a three (3) year period from date of substantial completion.

1.8 **PROJECT CONDITIONS**

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

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Ordering and Delivery: Comply with factory's ordering instructions and lead time requirements. Delivery shall be in factory's original, unopened, undamaged containers with identification labels intact.
- .2 Storage and Protection: Provide protection from exposure to harmful weather conditions and vandalism.

1.10 SEQUENCING

.1 Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

2 PRODUCTS

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2.1 ACCEPTABLE PRODUCTS AND MANUFACTURERS

- The following Power Door Operator products and manufacturers are acceptable:
 - .1 Series 7000, by Horton Automatics
 - .2 Dorma ED400
 - .3 Series SW100, by Besam
 - .4 Stanley Magic Access
- .2 The following Restroom Control Kits and manufacturers are acceptable:
 - .1 Camden Door Controls

2.2 EQUIPMENT

- .1 Manufactured Door Units
 - .1 Surface Applied Operator with connecting arms and linkage shall provide positive control of door through entire swing; units shall permit use of butt hung and center pivot doors.
 - 1. Mounting: The operator header shall be mounted to the surface of the existing door frame or wall.
 - 2. Door Arms: Connecting hardware shall be a double arm arrangement that can either push the door or pull the door open to suit the job condition. When the operator mounting is on the pull side and adjacent wall is within 4" (102 mm) of the door frame, specify a parallel arm.
 - 3. Fasteners and Accessories: Manufacturer's standard corrosionresistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.

.2 Side access extruded aluminum case. Standard header size shall be 4" x 6" (102 mm x 152 mm) with optional 6" x 6" (152 mm x 152 mm).

.3 Electric Operating Mechanism shall be mounted and concealed in an extruded aluminum case for smooth and quiet operation. Maximum current draw shall not exceed 3.15 amps.

- 1. Opening Action: Shall be accomplished by a 1/15 HP D.C. permanent magnet motor working through reduction gears to the output shaft.
- 2. Field Adjustable Spring Closing Action: shall be accomplished by a field replaceable spring. When the door is in the closing mode or fully closed, motor voltage shall not be required and will be off. The door can be manually operated with power on or off without damage to the operator.
- 3. Independent Adjustable Closing and Latching Speed Control: The operator shall employ a rheostat module to allow for independent field adjustment of closing and latching speeds using the motor as a dynamic brake.
- 4. Field Adjustable Open Stop: The operator shall provide a field adjustable open stop to accommodate opening angles from 80 to 135 degrees without the need for additional components.
- 5. Consistent Cycle: The operator shall deliver an even, consistent open force across the entire transition from door fully closed to door open check. Additionally, the range of the force shall be field adjustable to accommodate a wide range of on-site conditions.
- 6. Manual Use: The operator shall function as a manual door closer in the direction of swing with or without electrical power. The operator shall deliver an even, consistent open force across the entire transition from door fully closed to door fully open.
- 7. Controller Protection: The controller shall incorporate the following features to ensure trouble free operation:
 - a. Automatic Reset upon power up.
 - b. Main fuse protection.
 - c. Electronic surge protection.
 - d. Internal power supply protection.
 - e. Resettable sensor supply fuse protection.
- 8. Push Button Interface: The controller shall have push button switches with to allow for selection or change of the following parameters: carpet or timer logic, single or dual door, activation options, normal back check or large back check, push-to-open assist on/off.
- 9. Soft Start/Stop: A "soft-start" "soft-stop" motor driving circuit shall be provided for smooth normal opening and recycling.
- 10. Control Switch: Automatic door operators shall be equipped with a three position function switch to control the operation of the door. Control switch shall provide three modes of operation, Automatic, Off, and Hold-Open.
- 11. Master Control: Shall incorporate the following features:
- a. Adjustable time delay of 2 to 30 seconds (ANSI A156.19 requirement is 5 second minimum time delay).
- b. Infinite adjustment to opening and open check speeds including adjusting the opening force without affecting the opening speed.

- c. Immediate reversal of door motion without undue strain on the drive train. This will be accomplished by supplying stepped voltage to the motor. The door shall reverse when closing if an object stops the door.
- d. Motor Protection Circuit: A locked door motor protection circuit will be supplied that will shut off current to the motor when the door is inadvertently locked or otherwise prevented from opening.

2.3 RELATED EQUIPMENT

- .1 Activating Devices: Shall be located on each side of door opening to dimensions indicated on drawings but to the following limitations:
 - a) Its centre is located between 900mm and 110mm above the finish floor,
 - b) Be located between 600mm and 1500mm beyond the door swing on the side where the door opens towards the control.
- .2 Push Plate: 114 mm square, stainless steel switch, wall mounted with international symbol for accessibility and "Press to Open" engraving.
- .3 Automatic Door Controls for Restrooms
 - .1 Performance: .
 - .1 Automatic door controls shall comply with Accessibility for Ontarians with Disabilities Act..
 - .2. Regulatory compliance with Accessibility Guidelines as required by Authority Having Jurisdiction (AHJ).
 - .2 Automatic door controls shall comply with National Building Code of Canada.
 - .3 Automatic door controls shall comply with NFPA National Fire Code or International Fire Code for restroom doors acting as egress doors as required by Authority Having Jurisdiction (AHJ).
 - .4 Product: Aura Illuminated Push Plate Restroom Control System CX-WC13XFM as manufactured by Camden Door Controls.
 - .1 Operation:
 - .1. The door is normally closed and either locked or unlocked. Pressing the exterior ' Push to Open' Aura push plate opens the door. Once inside and the door is closed, pressing the illuminated ' Push to Lock' Aura push plate, changes the color to red and locks the door. To exit, press the interior push plate to unlock the door and reset the system. The ' Push to Lock' Aura[™] push plate switch illuminated ring turns green and the exterior ' Push to Open' Aura[™] push plate outer ring turns green. If the door is opened manually to exit the restroom, the overhead magnetic contact switch resets the system.
 - .2 Status: Normally locked. Fail secure electric strike.
 - .3 Status: Normally unlocked. Fail safe electric strike.
 - 5. Components:
 - .1 The following items are part of the CX-WC13XFM equipment package:
 - .1 CX-33 Advanced Logic Control Relay with 14 modes of operation, secured and unsecured restroom control modes, (3) 3 form 'C' relay outputs rated 3 Amp. @ 30VDC and surge protection.
 - .2 CM-45/455SE1 with CM-45/4 flush mount 4-1/2 inches (114 mm) activation (wall) switch, stainless steel construction,
N/O contacts rated 15 Amps @ 30VDC, debossed and paint filled 'Push to Lock' graphics, CM-55i Illuminated Push Plate switch enclosure, Red, with selectable 12/24V, AC/DC, builtin 85db sounder, max 110mA current draw and form 'C' contact rated 3 Amp @ 30VDC and CM-SE1 double sided sign

- .3 CM-45/455SE1 with CM-45/4 flush mount 4-1/2 inches (114 mm) activation (wall) switch, stainless steel construction, N/O contacts rated 15 Amps @ 30VDC, debossed and paint filled 'wheelchair symbol and Push to Open' graphics, CM-55i Illuminated Push Plate switch enclosure, Green/Red, with selectable 12/24V, AC/DC, built-in 85db sounder, max 110mA current draw and form 'C' contact rated 3 Amp @ 30VDC and CM-SE1 double sided sign, 'OCCUPIED WHEN RED' / 'VACANT WHEN GREEN'
- .4 CX-MDA surface mount SPST N/C Door Contact.

2.4 RELATED WORK REQUIREMENTS

- .1 Electrical: To be provided under Division 16: 120 or 220 VAC, 60 cycle, 1 phase, 10 amps for doors with operators in pairs, 5 amps for single doors.
- .2 The following items are required, but not included in CX-WC13FM equipment package:
 - .1 Door Operator (by others)

2.5 MATERIALS, FINISHES AND FABRICATION

- .1 Extruded Aluminum : ASTM B221, 6063-T5 alloy and temper, anodized: Structural Header Sections: Minimum 1/8" (3 mm) thickness.
- .2 Finishes (for all exposed aluminum surfaces): Shall be one of the following:
 - .1 313-R1 Dark Bronze: Arch. Class 1 Anodized Coating, AA-MI2C22A44.
- .3 Operator Construction: Electromechanical.

3 EXECUTION

3.1 EXAMINATION

- .1 Site Verification of Conditions: Installer must verify that base conditions previously installed under other sections are acceptable for product installation according to with manufacturer's instructions. Notify the Contractor in writing of conditions detrimental to the proper and timely completion of work. Do not start work until all negative conditions are corrected in a manner acceptable to the installer and manufacturer.
- .2 The installer shall review the quality and compatibility of all reused equipment prior to shop drawing submission for new items provided within this specification. All concerns shall be reported to the Consultant immediately after such review.
 - .1 Install salvaged equipment to full operating condition. Field adjust as needed.

3.2 INSTALLATION

.1 General: Installer shall be factory trained, certified by AAADM, and experienced to perform work of this section. Install door units plumb, level and true to line,

without warp or rack of frames or sash with manufacturer's prescribed tolerances. Provide support and anchor in place.

- .2 Dissimilar Materials: Comply with AAMA 101, Appendix Dissimilar Materials by separating aluminum materials and other corrodible surfaces from sources of corrosion or electrolytic action contact points.
- .3 Weather Tight Construction: Install header and framing members in a bed of sealant or with joint filler or gaskets. Coordinate installation with wall flashings and other components of construction.
- .4 Electrical: General or electrical contractor to install all wiring to operator on a separate circuit breaker routed into header.

3.3 CLEANING, ADJUSTMENT AND PROTECTION

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- Cleaning: After installation, installer to take following steps:
 - 1. Remove temporary coverings and protection of adjacent work areas.
 - 2. Remove construction debris from construction site and legally dispose of debris.
 - 3. Repair or replace damaged installed products.
 - 4. Clean product surfaces and lubricate operating equipment for optimum condition and safety.
- .2 Adjustment: AAADM certified technician shall inspect and adjust installation to assure compliance with ANSI A156.19.
- .3 Advise Contractor: Of precautions required through the remainder of the construction period, to ensure that doors will be without damage or deterioration (other than normal weathering) at the time of acceptance.
- .4 Field Quality Control: Testing Services: Factory Trained Installer shall test and inspect each swinging automatic entrance door to determine compliance of installed systems with applicable ANSI standards.
- .5 Touch-up, repair or replace damaged products before Substantial Completion.

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 Conform to Sections of Division 1 as applicable.

1.2 RELATED WORK

- .1 Section 08 11 00 Steel Doors and Frames.
- .2 Section 08 11 16 Aluminium Doors and Frames.
- .3 Section 08 14 16 Wood Doors.

1.3 REFERENCES

- .1 References, General: Versions of cited standards current as of the date of issue of the Project apply to the Work of this Section, except where previous versions are cited in applicable codes.
- .2 ASTM C509 Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.
- .3 CAN/CGSB-12.1 M90 -Tempered or Laminated Safety Glass.
- .4 CAN2-12.3-M76 Glass, Polished Plate or Float, Flat, Clear.
- .5 CAN2-12.4-M76 Glass, Heat Absorbing.
- .6 CAN/CGSB-12.5-M86 Mirrors, Silvered.
- .7 CAN2-12.6-M76 Mirrors Transparent (One-Way).
- .8 CAN/CGSB-12.8-M90 Insulating Glass Units.
- .9 CAN2-12.9-M76 Glass, Spandrel.
- .10 CAN2-12.10-M76 Glass, Light and Heat Reflecting.
- .11 CAN/CGSB-12.11-M90 Wired Safety Glass.
- .12 CAN/CGSB-12.12-M90 Plastic Safety Glazing.
- .13 CAN/CGSB-19.18-M87 Sealing Compound, One-Component, Silicone Base, Solvent Curing.
- .14 GANA (Glass Association of North America)
 - .1 Glazing Manual 50th Anniversary Edition.
 - .2 IGMATM-3000-90(04) North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use.
 - .3 Laminated Glazing Reference Manual (2006).

.15 IGMA (Insulating Glass Manufacturers Alliance).

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Preinstallation Meetings: Convene one (1) week before starting work of this section.

1.5 SUBMITTALS

- .1 Product Data:
 - .1 Glazing: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
 - .1 Include principle center-of-glass performance metrics for each exterior glazing unit type.
 - .2 Glazing Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colours.
- .2 Samples: Submit two samples 200 x 200 mm (8 x 8 inches), exampling glass and colouration.
- .3 Shop Drawings:
 - .1 Indicate dimensions, tolerances, anticipated deflection under load, affected related Work, for all structural glass assemblies (total by glass to glass).
 - .2 Submit with shop drawings current IGMA certification for specified insulating glass makeup, including edge deletion of Low-E coating and specified gas fill, space and sealants.
- .4 Engineered Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- .5 Manufacturer's Certificate: Certify that sealed insulated glass meets or exceeds specified requirements.

1.6 QUALITY ASSURANCE

- .1 Perform Work in accordance with reference manuals, for glazing installation methods.
- .2 Installer Qualifications: Company specializing in performing the work of this section with minimum five (5) years' documented experience and approved by the manufacturer.
- .3 Perform Work in accordance with GANA Laminated Glazing Reference Manual, GANA Glazing Manual, GANA Sealant Manual, and IGMA for glazing installation methods.

1.7 PRECONSTRUCTION TESTING

- .1 Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
- .2 Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install glazing when ambient temperature is less than 10°C (50°F).
- .2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.9 WARRANTY

- .1 Provide ten (10) year warranty to include coverage for sealed glass units from peeling, cracking, and other indications of deterioration in coating, and replacement of same.
- .2 Provide ten (10) year warranty to include coverage for coated glass units from deterioration, and replacement of same.
- .3 Provide ten (10) year warranty to include coverage for delamination of laminated glass and replacement of same.
- .4 Provide ten (10) year warranty to include coverage against silver spoilage of the mirrors and replacement of same.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- .1 Provide glass and glazing materials for continuity of building enclosure vapour retarder and air barrier.
- .2 Strength: Where annealed float glass is indicated, provide annealed float glass, heatstrengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.
 - .1 Size glass to withstand dead loads and positive and negative live loads acting normal to plane of glass as calculated in accordance with the applicable code.
- .3 Limit glass deflection to 1/175 or flexure limit of glass with full recovery of glazing materials, whichever is less.

2.2 GLASS DESIGN

- .1 In accordance with CAN/CGSB 12.20.
- .2 Glass to conform to standards listed under References clause, this section.
- .3 Refer to drawings for location of glazing types including provisions for acoustical performance.

2.3 MANUFACTURERS

- .1 Acceptable Manufacturers for Glass Products:
 - .1 AGC Glass North America.

- .2 Guardian Industries Corporation.
- .3 Vitro Architectural Glass.
- .4 Substitutions: Section 01 25 00.

2.4 GENERAL GLASS REQUIREMENTS

- .1 All glass products of one type (including fabricated glass) shall be manufactured and fabricated by one company. All glass shall be delivered to site bearing manufacturer's label, complete with glazing instructions where applicable.
- .2 Apply all coatings of similar type in single production run to ensure color match.
- .3 Ensure edges of glass are free from spalls, flake chips, or rough chips which would be either visible or compromise adhesion of exterior weather seal.
- .4 Ensure thorough and complete deletion of Low E at periphery to avoid corrosion or visual distortion.

2.5 GLASS PRODUCTS

- .1 Float Glass: CAN/CGSB-12.3, glazing quality, clear, 6 mm (1/4 inch) minimum thickness unless otherwise indicated.
- .2 Safety Glass: CAN/CGSB-12.1, clear, Type 1 (laminated) and Type 2 (tempered).
 - .1 Minimum 6 mm (1/4 inch) thick unless otherwise noted on drawings.
 - .2 Exposed Edges: Machine ground and flat polished.
- .3 Fully Tempered Float Glass: CAN/CGSB-12.1 or ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - .1 Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- .4 Heat-Strengthened Float Glass: CAN/CGSB-12.1 or ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - .1 Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- .5 Polished Georgian Wire Glass: Fire rated glazing: 6.8mm ULC classified fire rated wire glass with a surface applied fire rated and impact safety rated film to ANSI 297 labelled up to 90 minutes.

2.6 NSULATING GLASS UNITS

- .1 Minimum Thickness of Each Glass Ply: 6 mm.
- .2 **Triple Glazed-** Insulated Glass Units: CAN/CGSB-12.8: Low-E-coated, clear tripleinsulating glass. To be installed on North elevation windows and curtain wall Only.
 - .1 Overall Unit Thickness: 1 3/4" (44mm).
 - .2 Minimum Thickness of Each Glass Lite: to CAN /CGSB 12:20.
 - .3 Outdoor Lite: Clear fully tempered float glass.

- .1 Low-E Coating: Sputtered on second surface.
- .4 Interspaces Content: Argon, 13mm.
- .5 Middle lite: Clear float glass. Tempered glass only where indicated.
- .6
- .7 Indoor Lites: Clear float glass. Tempered glass only where indicated.
- .8 Winter Nighttime U-Factor: 0.24 maximum.
- .9 Summer Daytime U-Factor: 0.22 maximum.
- .10 Summer Daytime U-Factor: 0.22 maximum.
- .11 Visible Light Transmittance: 54 percent minimum.
- .12 Solar Heat Gain Coefficient: 0.28 maximum.
- .13 Safety glazing label where required.

2.7 GLAZING SEALANTS

- .1 General:
 - .1 Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - .2 Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 - .3 Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- .2 Glazing Sealant: One part non-acidic moisture curing neutral-curing silicone glazing sealant complying with ASTM C 920 Class A, Type S, Grade NS, Class 100/50, Use NT.
 - .1 Dow Corning Corporation; 790
 - .2 GE Advanced Materials Silicones; SilPruf LM SCS2700
 - .3 Pecora Corporation; 890
 - .4 Tremco Incorporated; Spectrem 1
 - .5 Applications: High movement joints at metal-to metal and glass to metal.
- .3 Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 - .1 Dow Corning Corporation; 795
 - .2 GE Advanced Materials -Silicones; SilPruf NB SCS9000 or SilPruf SCS2000
 - .3 Pecora Corporation; 864
 - .4 Tremco Incorporated; Spectrem 2
- .4 Applications: General applications in glazing installation subject to high movement including perimeter; use non-staining formula at absorbent perimeter applications.

2.8 GLAZING ACCESSORIES

.1 Setting blocks: EPDM or Silicone, 80-90 Shore A durometer hardness to ASTM D2240, size to suit glazing method, glass light weight and area

- .2 Spacer Shims: ASTM C864, Silicone, 50 to 60 Shore A durometer hardness, tested to ASTM D2240, minimum 75 mm (3 inches) long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- .3 Glazing Tape:
 - .1 Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness tested to ASTM D2240; 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 of 2 percent, designed for compression of 25 percent to effect an air barrier and vapour retarder seal.
- .4 Glazing Splines and Gaskets: ASTM C864, resilient polyvinyl chloride or silicone extruded shape to suit glazing channel retaining slot.
- .5 Setting Blocks 80-90 Shore A Hardness to ASTM D2440. Size to suit glazing method, weight, and area.
- .6 Spacer Shims: ASTM C864, Silicone, 50 to 60 Shore A durometer hardness, tested to ASTM D2240, minimum 75 mm (3 inches) long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- .7 Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air barrier and vapour retarder seal.
- .8 Glazing Splines and Gaskets: ASTM C864, resilient polyvinyl chloride or silicone extruded shape to suit glazing channel retaining slot.
- .9 Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verify existing conditions before starting work.
- .2 Verify that openings for glazing are correctly sized and within tolerance.
- .3 Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 **PREPARATION**

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.
- .4 Install sealant in accordance with manufacturer's written instructions.

3.3 GLAZING INSTALLATION

- .1 Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- .2 Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- .3 Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- .4 Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- .5 Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- .6 Provide spacers for glass lites where length plus width is larger than 50 inches.
 - .1 Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - .2 Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- .7 Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- .8 Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- .9 Set glass lites with proper orientation so that coatings face exterior or interior as specified.

3.4 GLAZING INSTALLATION - EXTERIOR DRY METHOD (TAPE AND GASKET SPLINE GLAZING)

- .1 Cut glazing spline to length; install on glazing pane. Seal corners by butting tape and sealing junctions with sealant.
- .2 Place setting blocks at 1/4 points with edge block no more than 150 mm (6 inches) from corners.
- .3 Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- .4 Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- .5 Trim protruding tape edge.

3.5 GLAZING INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

- .1 Cut glazing tape to length and set against permanent stops, projecting 1.5 mm (1/16 inch) above sight line.
- .2 Place setting blocks at 1/4 points with edge block no more than 150 mm (6 inches) from corners.
- .3 Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- .4 Place glazing tape on free perimeter of glazing in same manner described above.
- .5 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- .6 Knife trim protruding tape.

3.6 CLEANING

- .1 Remove glazing materials from finish surfaces.
- .2 Remove labels after Work is complete.
- .3 Clean glass and adjacent surfaces.

3.7 PROTECTION OF FINISHED WORK

.1 After installation, mark pane with an 'X' by using removable plastic tape or paste.

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 61 00 Basic Product Requirements
- .2 Section 07 21 16 Loose, Batt and Blanket Insulation
- .3 Section 08 11 00 Steel Doors & Frames
- .4 Section 09 29 00 Gypsum Board

1.2 **REFERENCES**

- .1 ASTM C 645-99, Standard Specification for Nonstructural Steel Framing Members.
- .2 ASTM C 754-98a, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .3 CAN/CGSB 7.1 Cold Formed Steel Framing Components
- .4 CAN/CGSB-19.21-M87, Sealing and Bedding Compound Acoustical.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 3300.
- .2 Indicate details, materials, bracing and connections to structure.

2 PRODUCTS

2.1 MATERIALS

- .1 Non-load bearing channel stud framing: to ASTM C 645, to stud size indicated, roll formed from 0.91mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.
 - .1 B18 (Hard Board) stud, as manufacturers by Bailey Metal Products Limited is an acceptable alternative non-load bearing channel stud framing system.
- .2 Floor and ceiling tracks: to ASTM C 645, 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 Acoustical sealant: to CAN/CGSB-19.21.
- .5 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.

3 EXECUTION

3.1 ERECTION

- .1 Align partition tracks at floor and ceiling and secure at 400 mm o.c. maximum.
- .2 Install continuous sill gasket under stud shoe tracks of partitions as indicated.
- .3 Place studs vertically at 400mm oc 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 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 gauge single jamb studs at openings.
- .10 Erect track at head of door/window openings and sills of sidelight/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, towel rails, and building signage, 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 uninsulated surfaces.
- .16 Install two continuous beads of acoustical sealant at head and sill of studs and tracks each side, and around perimeter of all acoustically rated partitions. See interior Partition Schedule and details.
- .17 Extend partitions to underside of structure except where noted otherwise. Use telescoping or slotted hole track to accommodate deflection. Fill with loose batt insulation in acoustically rated partitions
- .18 Fill voids between top runner and structure or other voids and penetrations through fire rated partitions with mineral fibre firestopping and/or fire stopping sealant in accordance to Section 07840 and as indicated.
- .19 Do not extend partition framing across building expansion or control joints. Erect two studs 25mm apart in at joint.
- .20 Provide additional studs, or furring channels as required for attachment and support of work of other trades
- .21 Remove fireproofing from structure necessary to install and secure framing to structure. Patch and make good fire rating to ULC Design.
- .22 Where partitions occur parallel to trough of steel deck above install furring channels at 200mm o.c. spanning one or more troughs each side of partition.
- .23 Where studs extend over 3.6m in height, provide horizontal bracing at 2.4m o.c. vertically.

- .24 Design as per Ontario Building Code requirements, all structural members for openings less than 2400mm at all locations, (including but not limited to doors, screens, windows, openings, etc.).
- .25 Provide framing for suspended window head supports regardless of size.
- .26 Refer to interior partition schedule and furring schedule for location, types and design of all wall framing.

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 61 00 Basic Product Requirements
- .2 Section 05 41 00 Wind Load Bearing Steel Stud Systems
- .3 Section 09 22 16 Non Load Bearing Wall Framing
- .4 Section 09 90 00 Painting

1.2 REFERENCES

- .1 Designation for Aluminum Finishes-1997.
- .5 ASTM C 36-95, Specification for Gypsum Wallboard.
- .6 ASTM C 475-94, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .7 ASTM C 630-93, Specification for Water-Resistant Gypsum Backing Board.
- .8 ASTM C 840-95, Specification for Application and Finishing of Gypsum Board.
- .9 ASTM C 954-93, Specification for Steel Drill Screws for the Application of Gypsum Board.
- .10 ASTM C 1002-93, Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.
- .11 ASTM C 1047-94, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
- .12 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .13 CAN/ULC-S102-1988, Building Materials and Assemblies, Standard Method of Test for Surface Burning Characteristics.

1.3 SITE ENVIRONMENTAL REQUIREMENTS

- .1 Maintain temperature minimum 10°C, maximum 21 16C 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.

1.5 QUALITY ASSURANCE

- .1 Qualifications
 - .1 Installers shall have a minimum of two years documented experience in the installation of steel studs, gypsum board, and other products specified herein, including taping and jointing. Submit documentation to Consultant.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver material to site promptly without undue exposure to weather.
- .2 Deliver in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade.
- .3 Store above ground in dry, ventilated space.
- .4 Protect materials from soiling, rusting, or damage.

.5 Store board to be directly applied to masonry walls at 21°C for 24 hours prior to installation.

2 PRODUCTS

2.1 MATERIALS

- .1 Metal furring runners, hangers, tie wires, inserts, anchors: to CSA A82.30 galvanized.
- .2 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
- .3 Resilient clips drywall furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.
- .4 Nails: to ASTM C 514.
- .5 Steel drill screws: to ASTM C 1002.
- .6 Laminating compound: as recommended by manufacturer, asbestos-free.
- .7 Casing beads, corner beads, control joints and edge trim: to ASTM C 1047, metal, zinc-coated by hot-dip process, zinc coated by electrolytic process, 0.5 mm base thickness, perforated flanges, one-piece length per location.
- .8 Acoustic Sealants: in accordance with Section 07 90 00 Joint Sealers.
- .9 Acoustic Insulation Batts: in accordance with section 07 21 13 Loose, Batt and Blanket Insulation.
- .10 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.
- .11 Joint compound: to ASTM C 475.
- .12 Joint Tape to ASTM C475. Use fibreglas in connection with use of glass mat gypsum board. Elsewhere use paper tape.
- .13 Standard Board: to ASTM C36, Type X to E119, 16mm, 1220mm wide x maximum practical length, ends square cut, edges tapered. Use for all other surfaces except where otherwise indicated.
- .14 Glas Mat Gypsum Board.:
 - .1 Type 'X' 16mm thick x 1220mm wide x practical length, ends square cut, edges tapered. Equal to G-P Gypsum "DensArmor Plus" or equal.
 - .2 CGC' Sheetrock Glass Mat Mold Tough is an approved equal Glas Mat Gypsum Board.
- .15 Moisture Resistant Gypsum:
 - .1 Type 'X' 16mm thick x 1220mm wide x practical length, ends square cut, edges tapered. Equal to CertainTeed ProRoc or equal.

3 EXECUTION

3.1 ERECTION

- .1 Do work in accordance with ASTM C 840 except where specified otherwise.
- .2 Do application of gypsum sheathing in accordance with ASTM C 1280.

- .3 Install work level to tolerance of 1:1200.
- .4 Support light fixtures by providing additional ceiling suspension hangers within 150mm of each corner and at maximum 600mm around perimeter of fixture.
- .5 Install work level to tolerance of 1:1200.
- .6 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles, ceiling devices.
- .7 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.
- .8 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.
- .9 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.
- .10 Install wall furring for gypsum board wall finishes in accordance with ASTM C 840, except where specified otherwise.
- .11 Furr openings and around built-in equipment, cabinets, access panels, fitments, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- .12 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

3.2 APPLICATION

- .1 Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are approved.
- .2 Apply 12 mm diameter bead of acoustic sealant or as noted continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, and other penetrations, in partitions where perimeter sealed with acoustic sealant. See interior partition and furring schedule along with typical details.

3.3 INSTALLATION

- .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. Secure at 150 mm oc using contact adhesive for full length.
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.
- .4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.
- .5 Splice corners and intersections together and secure to each member with 3 screws.
- .6 Install access doors to electrical and mechanical fixtures specified in respective Sections. .1 Rigidly secure frames to furring or framing systems.
- .7 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.

- .8 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .9 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
- .10 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .11 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .12 Install sand and finish bulkheads completely as indicated in drawings. Both face and soffit of bulkhead prior to installation of casework.
- .13 Install shaft liner area separation wall assembly to manufacturer's instructions to achieve required fire rating.

3.4 ACOUSTICAL INSULATION

.1 Install as per the provisions of section 07 21 13 Loose, Batt and Blanket Insulation.

3.5 SCHEDULES

- Construct fire rated assemblies where indicated.
 - .1 one hour fire rated partition assembly, ULC Design No. W407 and W408
 - .2 2-hour fire rated area separation firewall assembly ULC Design No. U373.

PART 1 - GENERAL

REFERENCE STANDARDS 1.1

Do tile work in accordance with Installation Manual 200-1979, "Ceramic Tile", produced by Terrazzo 1 Tile and Marble Association of Canada (TTMAC), except where specified otherwise.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit full size sample panels of each colour, texture, size, and pattern of tile.
- .3 Adhere tile samples to 11 mm thick plywood and grout joints to represent project installation.

1.4 MAINTENANCE MATERIAL

- Provide minimum 15 floor tiles and 15 wall tiles of each type and colour of tile required for project for .1 maintenance use. Store where directed.
- .2 Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for .1 each type, composition, color, pattern, and size indicated.
 - .2 Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.5 ENVIRONMENTAL CONDITIONS

- Do not install tile until construction in spaces is complete and ambient temperature and humidity .1 conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.
- .2 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 C for 48 h before, during, and 48 h after, installation.

1.6 WARRANTEE

Provide manufacturer's warrantee for all accessories that they will be free of defects for a period of .1 five (5) years.

2 - PRODUCTS

2.1 PORCELAIN FLOOR TILES

Porcelain Ceramic Floor Tile to CAN2-75.1. Type 2. Class MR 1. 50 x 50 x 6 mm size, unglazed. cushion edges, slip resistant tile, complete with trim nosings coves and accessories necessary to complete work.Install in all shower floors.

.1	Acceptable Product:	Ceragres – Unit	
	•	Ocations Detti	

.2 Colour and installation pattern to be later selected by consultant.

2.2 WALL TILES

Porcelain Wall tile to CAN2-75.1, Type 5, Class MR 34, 100 x 300 x 6 mm size or 100 x 400 size, .1 glazed, matt glazed, colour as selected by Consultant.

1. Acceptable Product: Ceragres - Bloc

Centura – Vision (Vitra) Olympia – Maple Leaf's Colour & Dimensions Series

.2 Colour and installation pattern to be later selected by consultant.

2.3 LEVELERS, UNDERLAYMENTS AND MASTIC MATERIALS

- .1 Products by MAPEI or Armstrong Flooring products shall be deemed acceptable for their intended purpose:
 - .1 For surface preparation and patching: S-184 Fast Setting Patch and Underlayment with S-195 Underlayment Additive by Armstrong Flooring or equal.
 - .2 Mastics for floors: KER 121 polyer-modified thin set mortar by MAPEI or equal.
 - .3 Mastics for ceramic wall tile: KER 907 Ultra/Mastic 1 or equal.
 - .4 Sloped shower floors: Hydraulic cement underlayment "Quikrete" commercial grade floor mud or approved equal, 34.5 MPa compressive strength after 28 days, low sag to ASTM C387
- .2 Water: potable and free of minerals which are detrimental to mortar and grout mixes.
- .3 Dry set mortar: to ANSI A118.1-1976.

2.4 GROUT

- .1 Grout: KER 400 series KERAPOXY grout suitable for the intended use as supplied by MAPEI or approved equal. Coloured grout shall be used where indicated in colour schedule to be later issued by consultant. The Consultant shall have the discretion to use as many of the available colours.
- .2 Grout preparation: to manufacturer's instructions.

2.6 ACCESSORIES

- .1 Divider strips: Profile to suit specific condition. See schedule below:
 - Colour to be later selected by consultant.
 - .1 All edges and outside tile: Joly
 - .2 Provide all outside corner, inside corner and end trim accessories as required to suit each application. Accessories to match colour of trim.

2.7 MORTAR AND ADHESIVE MIXES

- .1 Scratch coat: 1 part Portland cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand.
- .2 Slurry bond coat: Portland cement and water mixed to creamy paste. Latex additive may be included.
- .3 Mortar bed for floors: 1 part Portland cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.
- .4 Mortar bed for walls and ceilings: 1 part Portland cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand and 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.
- .5 Levelling coat: 1 part Portland cement, 4 parts sand, minimum 1/10 part latex additive, 1 part water including latex additive.
- .6 Bond or setting coat: 1 part Portland cement, 1/3 part hydrated lime, 1 part water.
- .7 Measure mortar ingredients by volume.

- .8 Dry set mortar: mix to manufacturer's instructions.
- .9 Organic adhesive: pre-mixed.

2.8 FLOOR SEALER AND PROTECTIVE COATING

.1 Apply in accordance with manufacturer's instructions.

3 - EXECUTION

3.1 WORKMANSHIP

- .1 Apply tile or backing coats to clean and sound surfaces.
- .2 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even.
- .3 Maximum surface tolerance 1:800.
- .4 Make joints between tile uniform and approximately 1.5 mm wide, plumb, straight, true, even and flush with adjacent tile. Lay tiles in pattern as detailed in drawings.
- .5 Lay out tiles so perimeter tiles are minimum 1/2 size or as per drawings
- .6 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .7 Install divider strips at junction of tile flooring and dissimilar materials.
- .8 Allow minimum 24 h after installation of tiles, before grouting.
- .9 Clean installed tile surfaces after installation and grouting cured.
- .10 Line grout lines of base with adjacent floor tile grout lines. Apply trim to top of all tile base as detailed.
- .11 Segment tiles in 3 sections around all bullnose block wall base as detailed.

3.2 FLOOR SEALER, MEMBRANES AND PROTECTIVE COATINGS

.1 Apply in accordance with manufacturer's instructions.

PART 1GENERAL

1.1 **RELATED SECTIONS**

- .1 Section 01 61 00 - Basic Product Requirements
- Section 09 53 00-Acoustical Suspension .2
- .3 Division 26 - Lighting

1.2 REFERENCES

- .1
- CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units. CAN/ULC-S102-M88, Surface Burning Characteristics of Building Materials. .2

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00.
- .2 Submit duplicate samples of each type of acoustical units.

1.4 **ENVIRONMENTAL REQUIREMENTS**

- .1 Permit wet work to dry before commencement of installation.
- .2 Maintain uniform minimum temperature of 15°C and humidity of 20-40% before and during installation.

1.5 **EXTRA MATERIALS**

- .1 Provide acoustical units amounting to 2% of gross ceiling area for type 1 and 10% for type 2.
- .2 Extra materials to be from same production run as installed materials.
- .3 Clearly identify each type of acoustic unit, including colour and texture.
- .1 Store where directed by Owner.

2 PRODUCTS

2.1 MATERIALS .1

- Acoustic units for suspended ceiling system: to CAN/CGSB-92.1.
 - General. .1
 - .2 Flame spread rating of 25 or less.
 - .3 Smoke developed 50 or less.
 - Noise reduction coefficient (NRC) designation of .60 or better Light reflectance range of .70 or better .4
 - .5
- .2 Schedule: .1
 - ACT:
 - Panels: 1

.2 Acceptable Material: 610 x 610 mineral tile, tegular edge, white Armstrong: School Zone Fine Fissured Item No. 1717 Edge Profile: 15/16" Angled Tegular Dimensions: 24" x 24" x 3/4"

CGC: Radar High-NRC Panels Item No. 22350 Edge Profile: Shadowline Tapered Dimensions: 24" x 24" x 7/8"

Certainteed: Performa, Fine Fissured Item No. HHF-154 Edge Profile: Reveal

Dimensions: 24" x 24" x 5/8"

3 EXECUTION

3.1 EXAMINATION

.1 Do not install acoustical panels and tiles until work above ceiling has been inspected and approved by Consultant.

3.2 INSTALLATION

- .1 Install panels and tiles in ceiling suspension system to manufacturers instructions.
- .2 Install fibrous acoustical media and spacers over entire area above suspended metal panels.

3.3 APPLICATION

- .1 Install acoustic units to clean, dry and firm substrate.
- .2 Install acoustical units parallel to building lines with edge unit not less than 50% of unit width with directional pattern running in same for all tile and as per reflected ceiling plan.
- .3 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

3.4 INTERFACE WITH OTHER WORK

.1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

1 GENERAL

RELATED SECTIONS 1.1

- .1 Section 01 61 00 - Basic Product Requirements
- .2 .3 Section 09 29 00 - Gypsum Board Section 09 51 00 - Acoustical Ceilings
- Division 23: Trim for recessed mechanical fixtures. Division 26: Trim for recessed light fixtures. .4
- .5

1.2 REFERENCES

- ASTM C 635-91 Specifications for the Manufacture, Performance and Testing of Metal .1 Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
- ASTM C 636-91, Practice for Installation of Metal Ceiling Suspension Systems for .2 Acoustical Tile and Lay-In Panels.

1.3 **DESIGN REQUIREMENTS**

.1 Maximum deflection: 1/360th of span to ASTM C 635 deflection test.

1.4 SHOP DRAWINGS

Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures. .1

1.5 SAMPLES

- Submit samples in accordance with Section 01 33 00 Submittal Procedures. .1
- .2 Submit one representative model of each type ceiling suspension system.
- .3 Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.

REGULATORY REQUIREMENTS 1.6

Fire-resistance rated suspension system: certified by a Canadian Certification .1 Organization accredited by Standards Council of Canada.

2 PRODUCTS

2.1 MATERIALS

- .1 Intermediate duty system to ASTM C 635.
- .2 Basic materials for suspension system: commercial quality cold rolled steel zinc coated.
- .3 Suspension system: rated and non fire rated as indicated, made up as follows:
 - two directional exposed tee bar grid. .1
 - .2 one directional exposed tee bar grid
 - .3 one two directional concealed tee spline.
 - .4 Acceptable material:

Type 2: Armstrong: 15/16" Prelude CGC: Donn Brand DX/DXL 15/16" Suspension System CertainTeed: 15/16" Classic Stab System

.5 Exposed tee bar grid components: shop painted satin sheen white colour. Components die cut. Main tee with double web, rectangular bulb and 25 mm rolled cap on exposed

face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.

- .6 Hanger wire: galvanized soft annealed steel wire.
 - .1 3.6 mm diameter for access tile ceilings.
 - .2 to ULC design requirements for fire rated assemblies.
 - .3 2.6 mm diameter for other ceilings.
- .7 Hanger inserts: purpose made.
- .8 Carrying channels: 38 mm channel, 0.5mm thick galvanized steel.

3 EXECUTION

3.1 INSTALLATION

- .1 Installation: in accordance with ASTM C 636 except where specified otherwise.
- .2 Install suspension system to manufacturer's instructions and Certification Organizations tested design requirements.
- .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 acceptable to Consultant.
- .5 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.
- .6 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter and according to reflected ceiling plan.
- .7 Ensure suspension system is co-ordinated with location of related components.
- .8 Install wall moulding to provide correct ceiling height.
- .9 Completed suspension system to support super-imposed loads, such as lighting fixtures diffusers grilles and speakers.
- .10 Support at light fixtures diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .11 Attach 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 Finished ceiling system to be square with adjoining walls and level within1:1000.
- .14 Expansion joints.
 - .1 Supply and install "Z" shaped metal trim pieces at each side of expansion joint. Design to accommodate plus or minus 25 mm movement and maintain visual closure. Finish metal components to match adjacent exposed metal trim. Provide backing plates behind butt joints.

3.2 CLEANING

.1 Touch up scratches, abrasions, voids and other defects in painted surfaces.

1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 61 00 - Basic Product Requirements

1.2 REFERENCES

.1 CAN/CSA A 126.5 Resilient Wall Base.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit duplicate 300 mm long base, nosing, feature strips, treads, edge strips.

1.4 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for resilient wall base for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 EXTRA MATERIALS

- .1 Provide extra materials of resilient wall base and adhesives in accordance with Section 01 78 00 - Closeout Submittals.
- .3 Extra materials to be in one piece and from same production run as installed materials.
- .4 Clearly identify each roll of resilient wall base and each container of adhesive.
- .5 Deliver and store where directed by Consultant .

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees C for 48 hours before, during and 48 hours after installation.

2 PRODUCTS

2.1 MATERIALS

- .1 Rubber Base (RB): covered vulcanized rubber base, 102 mm high x 3.0 mm thick in manufacturer's standard colour range as later selected by consultant to a minimum of three (3) colours for project. Manufactured by Roppe, Johnsonite, or approved equal.
- .2 Feature strips: of same material and thickness as adjacent work 50mm wide, in colour selected by Consultant.
- .3 Primers and adhesives: waterproof, of types recommended by resilient wall base manufacturer for specific material on applicable substrate, above, on or below grade.

3 EXECUTION

3.1 SITE VERIFICATION OF CONDITIONS

.1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.

3.2 PREPARATION

- .1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .2 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .3 Prime and or Seal concrete slab to flooring manufacturer's printed instructions.

3.3 APPLICATION: WALL BASE

- .1 Lay out base to keep number of joints at minimum.
- .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 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 premoulded end pieces at flush door frames.
- .7 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles.
- .8 Use toeless type base where floor finish will be carpet, coved type elsewhere.
- .9 Install toeless type base before installation of carpet on floors.
- .10 Heat weld base in accordance with manufacturer's printed instructions.

3.4 CLEANING

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Clean, seal base surface to flooring manufacturer's printed instructions.

3.5 SCHEDULES

.1 As indicated.

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- .1 The flooring contractor's bid shall be in accordance with plans, specifications, and addenda, and shall include all items applicable to the scope of work for this trade.
- .2 The floor covering contractor shall provide labour and services necessary to supply and install resilient floor covering and related accessories.
- .3 All work shall be performed in accordance with the recommendations of the floor covering manufacturer.

1.2 RELATED WORK UNDER OTHER SECTIONS

- .1 Division 3, Section 03330 Cast-In-Place
 - .1 Concrete sub-floors to receive resilient flooring shall be clean, level, permanently dry, and free from excessive alkali, carbonation and dusting. Concrete sealers, hardeners, curing agents and other treatments are not recommended. The surface should be steel trowelled to a smooth, dense, and even finish. The surface shall be level to within 3 mm (1/8" in 3000 mm in all directions unless otherwise specified.
- .2 Division 23, Commercial lavatories
 - Floor drains must be supplied with a flash clamping strainer assembly for use with safety sheet flooring.

1.3 QUALITY ASSURANCE

.1

.1 All work to be performed by qualified tradesmen fully experienced in all aspects of installation procedures for the floor coverings specified herein.

.1 Flooring installer to have minimum 2 years experience installing specified Safety Flooring.

.2 Flooring installer to have minimum 2 years experience heat welding resilient vinyl flooring.

.3 Flooring installer to provide 3 reference installations using specified materials.

1.4 SUBMITTALS

- .1 Submit duplicate 300 mm x 300 mm sample pieces of flooring materials along with samples of any flooring system accessories.
- .2 Submit shop drawings to show seaming layout, treatment at walls, floor drains and other objects. Indicate treatment where different flooring materials meet.
- .3 Submit copy of warranty to be free from defects in materials and workmanship within the specified term after the installation date, when installed and maintained in accordance to manufacturers recommendations for a period of 10 years.
- .4 Submit maintenance data for resilient flooring for incorporation into Operation and Maintenance Manual specified.

1.5 EXTRA MATERIALS

- .1 Provide extra materials of resilient sheet flooring, welding rod and adhesives in accordance with Section 01 78 00 Closeout Submittals
- .2 Provide 2 sq. m. each colour, pattern and type flooring material required for project for maintenance use.

- .3 Extra materials to be in one piece and from same production run as installed materials. Clearly identify each roll of sheet flooring and each container of adhesive.
- .4 Provide one (1) 4 litre container of adhesive, as recommended by the manufacturer, for each flooring type used on this project.
- .5 Provide one (1) roll of each colour welding rod used on this project.
- .6 Deliver to Owner upon completion of the work of this section and store where directed by Consultant.

1.6 **PRODUCT STORAGE**

- .1 Sufficient space with adequate security, shall be provided by the Owner and/or general contractor to store the flooring materials, tools and equipment.
- .2 Maintain temperature of store room at a minimum of 21 deg. C (70 deg. F) for at least 24 hours prior to and during the installation.

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 All floor covering materials on site must be adequately conditioned prior to and after the installation to avoid a potential expansion or contraction problems.
- .2 Maintain air and structural temperatures at installation areas between 18 deg. C (65 deg. F) and 26 deg. C (80 deg F) 48 hours before, during and after installation. Avoid concentrated or irregular heating.
- .3 Consult other trades in advance and make provisions for work of other trades, to avoid future repairs.
- .4 Avoid static loads, rolling loads and heavy foot traffic on newly installed floor covering until adhesive has thoroughly set.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 VSSH: Supply and install in accordance to recommendations by the floor covering manufacturer: .1 Acceptable Materials:
 - .1 Altro Safety Flooring, Walkway 20 by
 - Compass Flooring Ltd., 6580 Kestrel Road, Mississauga, ON L5T 1Z9, phone (905) 564-1330, fax (905) 564-0750.
 - .2 Forbo Forshaga, Safestep by Forbo Resilients Inc., 8300 Keele St., Concord ON L4K 4T1 phone (416) 661-2351, fax (416) 661-5362.
 - .3 Colours to be selected by Consultant from manufacturer's full colour range. See drawings for extent of colours and patterning.
 - .4 Altro ContrX
 - .5 Approved alternate Polysafe Vogue Ultra
 - .6 "Armstrong World Industries Inc.: Safety Zone"
 - .7 "Mannington Mill: Assurance II"
 - .8 "Johnsonite a Tarkett Company: Granit Safe-T"
 - .2 Adhesives:
 - .1 Altrofix 300 two part polyurethane for areas subject to excessive surface moisture, cooking oils and fluctuating temperature conditions (for example –

shower, freezers, laundry, vestibule, tub room). Compass 1000 for areas not subject to excessive moisture (for example – washrooms, housekeeping, servery).

- .2 For Forbo use Plastic emulsion adhesives resistant to plastisizers such as Coltack 633, Eurocol 422, National Bondmaster 1800 and Rio, Bona Futurum and Alfa, Bostik Floor and Wallcovering adhesive Attack and 35, Cascoproff 3448 and Cascoflex 3442 or equivalent.
- .3 Accessories, including but not limited to the following:
 - .1 Altroseal (matching).
 - .2 Welding Rod (matching).
 - .3 Floor transition strips: Type as recommended by flooring manufacturer for each floor condition.
 - .4 C-8 Cap Tile Strip.
 - .5 # 38-R Cove Former.
 - .6 Sealants as recommended by manufacturer.
- .2 Cove Base: Continuous flash cove base 3 mm thick, complete with cove former and cap strip of matching colour material, 100mm high as indicated.

PART 3 - EXECUTION

3.1 INSPECTION OF EXISTING SUB-FLOOR

- .1 Ensure concrete sub-floors are permanently dry using test methods recommended by floor covering manufacturer and exhibit negative alkalinity, carbonation or dusting. The presence of concrete sealers, hardeners, curing agents and other treatments is not recommended.
- .2 Check moisture content does not exceed 2.5% by weight (calcium chloride test method) or moisture emissions do not exceed 3 pounds per 1000 sq. ft. over 24 hour period (calcium chloride test method).
- .3 It shall be the responsibility of the flooring contractor to provide adequate moisture testing by an independent agency acceptable to the floor covering manufacturer for products specified.

3.2 SUB-FLOOR PREPARATION

- .1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects using cementitious underlayment.
- .2 Apply underlayment following manufacturer's recommended application methods. Trowel and float to leave smooth, flat, hard surface. Protect from traffic.
- .3 Inspect and allow for smooth transition from other floor finishes to this flooring material. Use quality cementitious underlayments as manufactured by Mapei Inc., Armstrong or similar approved. For further technical services contact the manufacturer.

3.3 APPLICATION

- .1 Dry vacuum entire floor area immediately prior to adhesive application.
- .2 Always lay sheets in sequence and follow numerical consecutive order of rolls.
- .3 Run sheets in the same direction.
- .4 Overlap edges of safety flooring sheets approximately 25mm". Using the factory edge as a guide, score and then cut the underlying sheet to produce a neat fitting seam.

- .5 Double cut through the entire thickness ensuring a neat fitting seam.
- .6 Apply adhesive uniformly using recommended trowel as outlined on adhesive label. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .7 Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .8 As installation progress, roll flooring with 75 kg roller to remove adhesive ridges, entrapped air and ensure full adhesion.
- .9 Cut flooring neatly around fixed objects.
- .10 Continue flooring over areas which will be under built-in furniture.
- .11 Terminate flooring at centre line of door in openings, where adjacent floor finish or colour is dissimilar. Ensure smooth transition.
- 12. Install metal edge strips at unprotected or exposed edges where flooring terminates.
- .13 Heat weld seams.
- .14 Trim flush with a sharp trimming spatula using a trim plate for the initial cut followed by the trimming spatula only.
- .15 Provide water tight seal to all pipes and projections coming through floor, and at all door jambs, using Altroseal for Altro flooring and sealant recommended by manufacturer for Forbo flooring.
- .16 At new flash clamping drains remove clamping ring. Fix safety flooring into body of drain and mechanically clamp with clamping ring. New drains should be surface clamp type; Enpoco E1000 F. C. type or similar approved.
- .17 Application: Base
 - Install flash cove base at Resilient Seamless floor unless otherwise indicated. .1
 - Lay out base to keep number of joints at minimum.
 - Clean substrate and prime with one coat of adhesive.
 - .2.3.4.5.6.7 Apply adhesive to back of base.
 - Set base against wall and floor surfaces tightly by using 3 kg hand roller.
 - Install straight and level to variation of 1:1000.
 - Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
 - .8 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles.
 - .9 Use toeless type base where floor finish will be carpet, coved type elsewhere.
 - .10 Install toeless type base before installation of carpet on floors.
 - .11 Heat weld base in accordance with manufacturer's printed instructions.

3.4 **CLEANING**

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Wash floor with mild, neutral detergent, and vacuum dry.

3.5 PROTECTION

Prohibit traffic on floor for 48 hours after installation. .1

.2 Protect new floors from physical damage by other trades until possession of the building by the Owner.

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 61 00 - Basic Product Requirements

1.2 **REFERENCES**

- .1 ASTM F 1303, Specifications and ASTM 1913 for Sheet Vinyl Floor Covering
- .2 CAN/CSA A 126.5 Resilient Wall Base.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base, nosing, feature strips, treads, edge and welding strips to consultants later selection.

1.4 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01780 - Closeout Submittals.

1.5 EXTRA MATERIALS

- .1 Provide extra materials of resilient sheet flooring and adhesives in accordance with Section 01780 Closeout Submittals.
- .2 Provide 20m² of each colour, pattern and type flooring material required for project for maintenance use.
- .3 Extra materials to be in one piece and from same production run as installed materials.
- .4 Clearly identify each roll of sheet flooring and each container of adhesive.
- .5 Deliver and store where directed by Consultant.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Maintain air temperature and structural base temperature at flooring installation area above 20°C for 48 hours before, during and 48 hours after installation.

1.9 WARRANTY

.1 Limited Warranty for Manufacturing Defects from the date of purchase for a period of five (5) years. Flooring manufacturer shall warrant the material it ships to be free from defects in materials and workmanship for a period of 5 year and the flooring installer warrants the installation of the flooring to be free of defects in materials and workmanship for a period of one year. The exclusive remedy under this warranty shall be replacement of defective material supplied by Manufacturer. or correction of defective installation by the flooring installer. All implied warranties of merchantability or fitness for intended use are limited to the period of this warranty. This warranty excludes consequential damages.

2 PRODUCTS

2.1 MATERIALS

.1 Sheet Vinyl Flooring: to applicable CSA and ASTM standards sheet vinyl flooring and product design and colours selected by Consultant.

- SHV-1, Sheet Vinyl Homogeneous: unbacked flexible homogeneous single layered 2.0mm thick
- .1 To CSA A126.6 and ASTM F1913 66% vinyl content composed of polymer plus plasticizer plus stabilizer
- .2 Product to be dry buffed for the life of the product.
- .3 Product to be chip visual made up of two (2) colours Acceptable Products: Johnsonite Tarkett iQ Optima Armstrong World Industries Inc.: Medintone
- .2 Primers and adhesives: waterproof, of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.
- .3 Sub-floor filler and leveller: CPD Topcrete SL and CPD P-6842 Primer.
- .4 Metal edge strips:
 - .1 Aluminum extruded, smooth, mill finish stainless steel with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .5 External corner protectors: type recommended by flooring manufacturer.
- .6 Edging to floor penetrations: type recommended by flooring manufacturer.
- .7 Sealer and wax: type recommended by resilient flooring material manufacturer for material type and location.

3 EXECUTION

3.1 SITE VERIFICATION OF CONDITIONS

.1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.

3.2 PREPARATION

- 1. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler. Contractor must assume that all new floor finishes require a preparation of all existing concrete slab square footage impacted by the renovation. A floor leveller product must be used as specified
- .2 Surface must be clean and sound, free of dirt, grease, oil, paint, wax, curing compounds, tile and carpet adhesive and any other foreign matter. Concrete floors must be free of laitance or loose material. Seal any holes in the floor. Information on the appropriate cleaning method is available upon request. After cleaning, the floor should be dust free and dry. It can now be primed. CPD P-6842 Primer must be used with Topcrete SL at all times as per manufacturer's instructions.
- .3 Prime with CPD P-6842 primer. CPD P-6842 controls hydration, acts as a bonding agent and prevents air from forming voids in the liquid CPD Topcrete SL. CPD P-6842 is packaged as a liquid concentrate. Dilute with water at a ratio of 2 parts water to 1 part CPD P-6842. Very porous surfaces may require additional coats. Mix for approximately 1 minute. Pour onto the area to be primed and spread with a broom. CPD P-6842 must be allowed to become tack free (dry) before applying CPD Topcrete SL. CPD P-6842 has an open time of up to 24 hours at 25C (77F). Keep traffic off primed floor.
- .4 Hand Mixing / Hand Pour
 - 1. Tools: Plastic barrel, spreader, smoother and paddle mixer. Also needed: 13mm

heavy duty drill, water source and measuring container.

.2 Crew: Typical application requires 2-3 people. Mix each bag of CPD Topcrete SL with 4.5L of clean cool potable water. Do not over water. Do not use softened water. Mix two bags at a time. Start by placing water into barrel. Add CPD Topcrete SL at a steady rate while mixing with paddle mixer and drill. Mix for 3 minutes min. to achieve a lump-free mix. Pour CPD Topcrete SL from mixing barrel onto area to be levelled. Spread out using spreader tool (set legs of tool to desired thickness). Repeat mixing and pouring until installation is complete. Use smoother for touch ups.

Hint: To avoid low spots between pours, pour into leading edge of previous pour and spread. Application should be continuous until pour is completed.

- .5 Aggregate
 - .1 When areas over 32mm deep are to be levelled an aggregate must be added to control shrinkage. Use clean, dry, washed 6.4-9.5mm pea gravel or dry clean #24 silica sand only. Add a maximum of 11.4 kg to a 22.7 kg bag of CPD Topcrete SL. Add aggregate after CPD Topcrete SL has been mixed with water. For extending where CPD Topcrete SL is being pumped add 11.4kg. of dry clean #24 Silica Sand per mixed bag.

Note: Adding aggregate reduces flow and leaves a rougher surface. Top with a thin layer of unmodified CPD Topcrete SL if a smoother surface is desired. If topped, the aggregate layer must be primed to assure proper bonding with finished layer.

.6 Ensure concrete floors are leveled to manufacturers recommendations on levelness.

3.3 APPLICATION: FLOORING

- .1 Provide a high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to the outside. Do not let contaminated air re-circulate through a district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.
- .2 To minimize emissions from adhesives, use water-based, solvent-free styrene-butadiene-rubber adhesive for linoleum. Butadiene exposure may cause eye and nose irritation, headaches, dizziness, and vomiting.
- .3 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .4 Lay flooring with seams parallel to building lines to produce a minimum number of seams. Border widths minimum 1/3 width of full material.
- .5 Run sheets in direction of traffic. Double cut sheet joints and continuously seal heat weld according to manufacturer's printed instructions.
- .6 Heat weld seams of sheet flooring in accordance with manufacturer's printed instructions.
- .7 As installation progresses, and after installation roll flooring with 45 kg minimum roller to ensure full adhesion.
- .8 Cut flooring neatly around fixed objects.
- .9 Install feature strips and floor markings where indicated. Fit joints tightly.
- .10 Install flooring in pan type floor access covers. Maintain floor pattern.

- .11 Continue flooring over areas which will be under built-in furniture.
- .12 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.
- .13 Terminate flooring at centreline of door leaf in openings where adjacent floor finish or colour is dissimilar.
- .14 Install metal edge strips at unprotected or exposed edges where flooring terminates, level with adjacent surface.

3.4 APPLICATION: BASE

- .1 Install flash cove base and rubber cove base at Resilient Seamless floor as per Room Finish Schedule.
- .2 Lay out base to keep number of joints at minimum.
- .3 Clean substrate and prime with one coat of adhesive.
- .4 Apply adhesive to back of base.
- .5 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .6 Install straight and level to variation of 1:1000.
- .7 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .8 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles.
- .9 Use coved type base as detailed.
- .10 Install toeless type base before installation of carpet on floors.

3.5 CLEANING

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Clean, seal and wax floor and base surface to flooring manufacturer's printed instructions.

3.6 **PROTECTION**

- .1 Protect new floors from time of final set of adhesive until final waxing.
- .2 Prohibit traffic on floor for 48 hours after installation.
- .3 Use only water-based coating for linoleum.

3.7 SCHEDULES

- .1 Provide the following seam layout and pattern unless otherwise indicated to Consultants colour selection.
 - .1 Rooms: Provide maximum width rolls centred in one direction with borders. Do not change direction within room.
 - .2 Welding: to later colour selection
 - .3 Provide patterning as per drawings.
1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 01 61 00 - Basic Product Requirements Section 06 20 00 Finish Carpentry
- .2 .3
- Section 08 11 00 Steel Doors and Frames
- .4 Section 11 16 Aluminum Doors and Frames
- .5 Section 09 29 00 Gypsum Board

1.2 DESCRIPTION

- Section Includes: All labor, materials, tools and other equipment, services and .1 supervision required to complete all interior painting and decorating work as indicated on Finish Schedules and to the full extent of the drawings and specifications.
- .2 The Work shall also include, but not necessarily be limited to surface preparation of substrates as required for acceptance of painting, including cleaning, small crack repair, patching, caulking, making good surfaces and areas, pre-treatment, priming and backpriming to the extent / limits defined under MPI preparation requirements.

1.3 **REFERENCES:**

- The latest edition of the following reference standards shall govern all painting work: .1
 - Architectural Painting Specification Manual by the Master Painters Institute (MPI), .a including Identifiers, Evaluation, Systems, Preparation and Approved Product List, (hereafter referred to as the MPI Painting Manual)
 - Test Method for Measuring Total Volatile Organic Compound Content of .b Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).
 - National Fire Code of Canada. .c

1.4 **QUALITY ASSURANCE:**

- This Contractor shall have a minimum of five (5) years proven satisfactory experience and .1 shall maintain a qualified crew of painters throughout the duration of the work.
- .2 All materials, preparation and workmanship shall conform to requirements of the latest edition of the Architectural Painting Specification Manual by the Master Painters Institute (MPI) (hereafter referred to as the MPI Painting Manual).
- .3 All paint manufacturers and products used shall be as listed under the Approved Product List section of the MPI Painting Manual.
- .4 Standard of Acceptance:
 - Walls: No defects visible from a distance of 1000 mm at 90 degrees to surface. .1
 - .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.

1.5 **PRODUCT DATA**

- Submit product data in accordance with Section 01330 Submittal Procedures. .1
- .2 Submit full records of all products used. List each product in relation to finish formula and include the following:
 - Finish formula designation. .1
 - .2 Product type and use.
 - .3 CGSB number.
 - Manufacturer's product number. .4

- Colour numbers
- .5 .6 Manufacturer's Material Safety Data Sheets (MSDS).
- .7 Maximum VOC classification.
- .8 Eco-Logo certification.
- .3 Submit manufacturer's installation application instructions for each product specified.

1.6 **REGULATORY REQUIREMENTS:**

.1 Conform to work place safety regulations and requirements of those authorities having jurisdiction for storage, mixing, application and disposal of all paint and related hazardous materials.

SUBMITTALS / MOCK-UP: 1.7

- .1 Submit two sets of Material Safety Data Sheets (MSDS) prior to commencement of work for review and for posting at job site as required.
- .2 When requested by the Consultant, prepare and paint a designated surface, area, room or item (in each color scheme) to requirements specified herein, with specified paint or coating showing selected colors, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

1.8 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver and store materials in original containers, sealed, with labels intact.
- .2 Indicate on containers or wrappings:
 - Manufacturer's name and address. .1
 - Type of paint. .2
 - .3 .4 Compliance with applicable standard.
 - Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from site.
- .4 Provide and maintain dry, temperature controlled, secure storage.
- .5 Observe manufacturer's recommendations for storage and handling.
- .6 Store materials and supplies away from heat generating devices.
- .7 Store materials and equipment in a well ventilated area with temperature range 7 to 30 C.
- .8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Consultant. After completion of operations, return areas to clean condition to approval of Consultant.
- .10 Provide minimum one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
- .11 Remove only in quantities required for same day use.
- .12 Fire Safety Requirements:
 - Store oily rags, waste products, empty containers and materials subject to .1 spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Environmental Choice Program
 - .1 Provide paint products certified to meet the requirements of the Environmental Choice Program, Department of the Environment.
 - .2 Submit CSĂ Certification Reports that products proposed for use are certified under the Environmental Choice Program. Water based paints to be certified to ECP-07. All other surface coatings to be certified to ECP-12.
- .2 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .3 Ventilation:
 - .1 Ventilate enclosed spaces in accordance with Section 01510 Temporary Utilities.
- .4 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
- .5 Substrate and ambient temperature must be within limits prescribed in paint standard and by manufacturer to approval of Engineer.
- .6 Maintain minimum substrate and ambient air temperature of 5C for Alkyd and 7C for latex paints. Maximum relative humidity 85%. Maintain supplemental heating until paint has cured sufficiently.
- .7 .Provide temporary heating where permanent facilities are not available to maintain minimum recommended temperatures.
- .8 Apply paint finish only in areas where dust is no longer being generated by related construction operations such that airborne particles will not affect the quality of the finished surface.
- .9 Apply paint only when surface to be painted is dry, properly cured and adequately prepared.
- .10 Provide minimum 270 lx on surfaces to be painted.

1.10 EXTRA MATERIALS

- .1 Submit maintenance materials in accordance with Section 01 78 00 Closeout Submittals.
- .2 Submit one one four litre can of each type and colour of primer finish coating. Identify colour and paint type in relation to established colour schedule and finish formula.
- .3 Deliver to Owner and store where directed.

2 PRODUCTS

2.1 MATERIALS

.1 Qualified products: only paint materials listed on the **Master Painters Institute Approved Products List** are acceptable for use on this project.

- .2 Qualified products: only paint materials listed to meet the requirements of the environmental choice program, Department of the Environment are acceptable for use on this project.
- .3 Paint materials for each coating formula to be products of a single manufacturer.
- .4 Where required, use only materials having a minimum MPI "Environmentally Friendly" E2 or E3 rating based on VOC (EPA Method 24) content levels. Where indoor air quality (odour) is an issue, use only MPI listed materials having a minimum E2 or E3 rating.

2.2 COLOURS

- .2 Consultant will provide Colour Schedule. Notify Consultant 10 working days before colour schedule required.
- .3 Colour schedule will be based upon the selection of three base colours and three accent colours. No more than three colours will be selected per room / or walls and ceilings.
- .4 Selection of colours will be from manufacturers full range of colours.
- .5 Where specific products are available in a restricted range of colours, selection will be based on the limited range.
- .6 Perform all colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials allowed only with Consultant's permission.
- .7 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.
- .8 Unless otherwise specified herein or pre-approved, all paint shall be ready-mixed and pretinted. Re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and color and gloss uniformity. Where thinner is used, addition shall not exceed paint manufacturer's recommendations.

2.3 Gloss / Sheen Ratings:

.1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI values:

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

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

3 EXECUTION

3.1 GENERAL

- .1 Perform all painting operations in accordance with CAN/CGSB-85.100 except where specified otherwise.
- .2 Apply all paint materials in accordance with paint manufacturer's written application instructions.
- .3 Paint all wall surfaces in each room as per finish schedules. Wall surfaces/types may vary in each room. Paint all surfaces as required to meet painting specification for surface type to produce homogenous product.
- .4 General Contractor to finish paint all flush mounted electrical panels to match the adjoining wall colour.

3.2 PREPARATION

.1 Remove electrical cover plates, light fixtures, surface hardware on doors, door stops, bath accessories and all other surface mounted fittings and fastenings prior to undertaking any painting operations. Store for re-installation after painting is completed.

3.3 PROTECTION

- .1 Protect existing building surfaces not to be painted from paint spatters, markings and other damage. If damaged, clean and restore such surfaces as directed.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products, fixtures, finishes and equipment.

3.4 EXISTING CONDITIONS

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Consultant all damage, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Investigate moisture content of surfaces to be painted. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
 - .1 Plaster and wallboard: 12%.
 - .2 Masonry/Concrete: 12%.
 - .3 Concrete Block/Brick: 12%.
 - .4 Wood: 15%.

3.5 CLEANING

- .1 Remove all dust, dirt, and other surface debris.
- .2 Wash surfaces with solution of T.S.P. bleach 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 To prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
- .5 Clean new metal surfaces to be painted by removing rust, loose mill scale, dirt, grease, oil, or other foreign substances.

3.6 SURFACE PREPARATION

1 Prepare all surfaces in accordance with *MPI* requirements. Refer to the *MPI* Painting Manual in regard to specific requirement for the following:

- a) environmental conditions.
- b) pH testing.
- c) acid etching.
- d) rust stain removal.
- e) vertical and horizontal concrete surfaces.
- f) clay and concrete masonry units.
- g) structural steel and miscellaneous metals.
- h) galvanized and zinc coated metal.
- i) aluminum and copper surfaces.
- j) stucco, plaster and gypsum board.
- .2 Sand, clean, dry, etch, neutralize and/or test all surfaces under adequate illumination, ventilation and temperature requirements.
- .3 <u>Remove</u> and securely store all miscellaneous hardware and surface fittings / fastenings (e.g. electrical plates, mechanical louvers, door and window hardware (e.g. hinges, knobs, locks, trim, frame stops), removable rating / hazard / instruction labels, washroom accessories, light fixture trim, etc. from wall and ceiling surfaces, doors and frames, prior to painting. Carefully clean and replace all such items upon completion of painting work in each area. Do not use solvent or reactive cleaning agents on items that will mar or remove finishes (e.g. lacquer finishes). Doors shall be removed before painting to paint bottom and top edges and then re-hung.
- .4 Protect all adjacent interior surfaces and areas, including rating and instruction labels on doors, frames, equipment, piping, etc., from painting operations and damage with drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide such protection.
- .5 Substrate defects shall be made good and sanded by others ready for painting particularly after the first coat of paint. Start of finish painting of defective surfaces (e.g. gypsum board) shall indicate acceptance of substrate and any costs of making good defects shall be borne by the painter including re-painting of entire defective surface (no touch-up painting).

3.7 SURFACE PREPARATION - METAL

- .1 Touch up shop primer to CGSB 85-GP-10M with primer as specified in applicable section. Touch-up to include cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas.
- .2 Prepare galvanized steel and zinc coated steel surfaces to CGSB 85-GP-16M.
- .3 Prepare copper and copper alloys surfaces to CGSB 85-GP-20M.
- .4 Prepare new steel surfaces exposed normally to dry conditions to CGSB 85-GP-14M.
- .5 Prepare previously painted steel surfaces exposed normally to dry conditions to CGSB 85-GP-15M.
- .6 Do not apply paint until prepared surfaces have been accepted by Consultant.

3.8 MIXING PAINT

.1 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.

- .2 Thin paint for spraying according to manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Engineer.
- .3 Do not use kerosene or any such organic solvents to thin water-based paints.

1.2 APPLICATION

- .1 Apply paint to CAN/CGSB-85.100. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Apply each coat of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .3 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .4 Sand and dust between each coat to remove visible defects.
- .5 Finish tops of cupboards, cabinets and projecting ledges, both above and below sight lines as specified for surrounding surfaces.
- .6 Finish inside of cupboards and cabinets as specified for outside surfaces.
- .7 Finish closets and alcoves as specified for adjoining rooms.
- .8 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

1.3 MECHANICAL ELECTRICAL EQUIPMENT

- .1 In finished areas: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment. Colour and texture to match adjacent surfaces, except as noted otherwise.
- .2 Do not paint over nameplates.
- .3 Keep sprinkler heads free of paint.
- .4 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .5 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.

1.4 **RESTORATION**

- .1 Clean and re-install all hardware items that were removed before undertaken painting operations.
- .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 Engineer. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

4 PAINT SCHEDULE

4.1 INTERIOR PAINTING

- Formula 1 (Latex): eggshells for gypsum board, plaster, hardboard walls. Gloss level 5 1. One coat latex primer sealer. MPI #149 1.
 - 2. Two coats Semi-gloss enamel. MPI #54
- .2 Formula 2 (Latex): Gloss Level 2 for gypsum board, plaster, hardboard ceilings.
 - One coat latex primer sealer MPI #149 .1
 - Two coats interior latex MPI #44 .2
- .3 Formula 4 (Latex): Semi-Gloss for concrete block and concrete walls. Gloss level 5 One coat latex block filler MPI # 4. .1
 - Two coats latex semi-gloss. MPI # 141 .2
 - Shower walls and ceiling: MPI # 141 .3
- .4 Formula 5 (Latex): Semi-Gloss for primed ferrous metal and galvanized and zinc coated metal
 - .1 Two coats MPI # 141
- .5 Formula 10 (Latex): Interior painted wood work. Gloss level 3
 - One coat primer sealer, MPI #17 .1
 - .2 Two Coats Light Industrial Eggshell, MPI# 151,
- .6 Formula Polyurethane for woodwork to receive stain Gloss Level 4
 - one coat wood filler MPI#91. .1
 - .2 one coat solvent based stain MPI#90.
 - .3 one coat polyurethane MPI#57
 - .4 two coats polyurethane MPI#57
- .7 Formula (Latex): G5 Level for hollow metal doors and frames:
 - primer sealer touch up .1
 - .2 two coats latex semigloss CAN/CGSB 1.195.
- .8 Formula 5 (Alkvd): G5 for primed ferrous metal:
 - two coats semigloss enamel CAN/CGSB 1.57. .1
- .9 Formula 6 (Alkyd): G% for galvanized and zinc coated metal:
 - one coat cementitious primer CAN/CGSB 1.198. .1 .2
 - two coats semigloss enamel CAN/CGSB 1.57.

END OF SECTION

PART 1 – GENERAL

1.1 RELATED SECTIONS

- .1 Section 06 40 00 Architectural Woodwork
- .2 Section 01 78 00 Closeout Submittals
- .3 Section 06 10 00 Rough Carpentry.
- .4 Section 06 20 00 Finish Carpentry.
- .5 Section 09 90 00 Painting.

1.2 **REFERENCES**

- .1 Aluminum Association (AA)
 - .1 DAF 45, Designation System for Aluminum Finishes.
- .2 American National Standards Institute (ANSI)
 - .1 ANSI A135.4, Hardboard Standard.
 - .2 ANSI A208.1, Particleboard.
 - .3 ANSI A208.2, Medium Density Fiberboard for Interior Use.
- .3 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102, Surface Buring Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC-S706, Standard for Wood Fibre Insulating Boards for Buildings.

1.3 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.

.2 Indicate location, type, size, panel arrangement, backing, hardware, anchor or mounting details, frame or trim and accessories.

1.4 WARRANTY

.1 Tackboards shall be guaranteed for a period of 10 years from the date of Substantial Performance against defects due to normal usage and wear.

1.5 PROJECT CONDITIONS

- .1 Field measure prior to preparation of shop drawings and fabrication to ensure proper fit.
- .2 Comply with manufacturer's recommendations for climatizing area for interior moisture and temperature to approximate normal occupied conditions.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delay.
- .2 Delivery: Deliver materials in original, unopened, undamaged containers with identification labels intact.
- .3 Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

PART 2 – PRODUCTS

2.1 TACKBOARDS

- .1 The following manufacturers have been approved for the work of this Section:
 - .1 Architectural School Products Ltd.
 - .2 Global School Products
 - .3 Martack Specialties
 - .4 Forbo Tackboards by CP Distributions
- .2 Tackboards shall be supplied by one manufacturer.
- .3 Acceptable material: Prestige 2 Magnetic Cork Bulletin Board, Black frame Aluminum or as per consultants approval.
 - .1 Magnetic Tackboard 1220mm x 915mm- Quantity required 6
 - Rooms 103, 109, 122, 111, 121, and 118.
 - .2 Magnetic Tackboard 2440mm x 1220mm- Quantity required 7 Rooms 102, 104, 110, 117, 120, 123, and 125.

PART 3 – EXECUTION

3.1 INSTALLATION / ERECTION

- .1 Coordinate with Owner for locations.
- .1 Erection of materials to be carried out by competent craftsmen supervised by a foreman with at least 2 years experience in this specialized field.
- .2 Overhead work such a ceiling grids, plumbing, electrical services, communications systems, painting, etc., to be in an advanced stage of completion in order not to impede this sub-contractor. Mill work units forming integral part of the tackboard installation to be located and affixed to the walls before commencing tackboard installation. See drawings for location of all trackboards to be installed directly to millwork
- .3 Erection of material shall be carried out in a substantial manner to ensure a rigid, straight, square, plumb and horizontal lines level.
- .4 All aluminum trims to be attached in such a manner that all fastenings shall be concealed. Fastening to be accomplished by the use of #10 x 25.4 mm (1") steel wood screws attached to the walls by the use of rawl plugs.
- .5 Install all tackboards where in full accordance with the manufacturer's recommendations, anchoring all components firmly in place for long life under hard use.

3.3 CLEANING

- .1 Proceed in accordance with Section 01 74 00 Cleaning.
- .2 At completion of work, clean surfaces and trim in accordance with manufacturer's recommendations, leaving all materials ready for use.

END OF SECTION

PART 1 – GENERAL

1.1 RELATED SECTIONS

.1 Conform to Sections of Division 1 as applicable.

1.2 RELATED WORK

.1 Phenolic toilet partitions: Section 10 21 13, Toilet Partitions.

1.3 REFERENCES

- .1 ASTM A167-91, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 ASTM A525M-91b, Specification for General Requirements for Steel sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process Metric.
- .3 ASTM A526M-90, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
- .4 ASTM B456-91a, Specification for Electrodeposited Coating of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- .5 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
- .6 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking.
- .7 CAN/CGSB-12.5-M86, Mirrors, Silvered.
- .8 CGSB 31-GP-107Ma-90, Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.
- .9 CAN/CSA-B651-M90, Barrier-Free Design.
- .10 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 Submittal Procedures.
- .2 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.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Carefully wrap and package accessories to ensure protection during shipping and storage.
- .2 Store accessories inside building in location directed and in well identified package as to contents.

1.6 EXTRA MATERIALS

.1 Provide special tools required for accessing, assembly/ disassembly or removal for toilet and bath accessories in accordance with requirement specified in Section 01 78 00 – Closeout Submittals.

1.7 WARRANTY .1 Subm

Submit warranty against defects in accordance with GC 12.3 but for (5) five years.

PART 2 – PRODUCTS

2.1 MANUFACTURED UNITS

.1

- Owner will supply and install the following washroom accessories:
 - .1 Soap dispenser
 - .2 Paper Towel dispenser
 - .3 Toilet Paper dispenser
 - .4 Garbage cans
- .2 Contractor will supply and install all other washroom accessories as listed below in this section.
- .3 Acceptable manufacturers: Hadrian, Fiat, Bobrick, Bradley and Watrous or approved alternate.
 - .1 For the purposes of this specification, Bobrick model numbers have been specified. Equal products manufactured by Hadrian, Fiat, Bradley or Watrous, will be accepted as approved by consultant.
- .4 Grab bars (GB1, GB2):

.1

- Provide the following grab bars as indicated on drawings.
 - .1 Grab Bar 1 (GB1) Minimum 600mm in length, wall mounted horizontally behind water closet as indicated on drawings. Mounting height between 840mm to 920mm above finished floor and, where the water closet has a tank, be wall mounted 150mm above the tank.
 - .2 Grab Bar 2 (**GB2**) Continuous L-shaped with 750mm long horizontal and vertical components, location as indicated on drawings. Grab bar shall be wall mounted with horizontal component 750mm above the finished floor and the vertical component 150mm in front of the water closet.
- .2 Grab bars shall be minimum 18 gauge thick, between 35 to 40mm diameter tubular stainless steel, slip-resistant surface with welded concealed flanges and peened surface on straight lengths.
- .3 Grab bars shall have concealed non-corrosive anchorage systems of types approved by Consultant.
- .4 Grab bars shall be anchored to anchorage system with concealed stainless steel fasteners. Grab bar material and anchorage shall withstand a load of 300 lbs. (1.3 kN) applied vertically or horizontally.
- .5 Grab bars shall have a clearance of 50mm from the wall.
- .5 Mirrors: Mirror shall have a one-piece stainless steel channel frame, 13mm x 13mm x 9.5mm with 90 deg. mitred corners; all exposed surfaces shall have bright polished finish. Mirror shall be polished stainless steel 600 x 900 mm, tempered glass. Corners shall be protected by friction-absorbing filler strips. Back of all glass mirrors shall be protected by full-size, shock-absorbing, water-resistant, non abrasive, 3/16" thick polyethylene padding Galvanized steel back shall have integral horizontal hanging brackets located near top for mounting on concealed wall hangers. .1 Acceptable product: Model B-1658 as manufactured by Bobrick.
- .6 Clothes Hooks:
 - .1 Acceptable: Bobrick B-677 Towel Pin
- .7 Shower Rod & Curtain: 25mm dia, x length required, stainless steel c/w stainless steel curtain hooks, concealed fasteners. Curtain: .2 mm antibacterial opaque vinyl shower curtain, of length and width as required.
- .8 Recessed soap holder in Shower Stall; Bobrick, B-4390.
- .9 Shelf Universal Washroom: Stainless steel Bobrick B295x24

.9 Benches: Gymnasium & Health Equipment BE-19AS

2.2 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.

2.3 FINISHES

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

PART 3 – EXECUTION

3.1 INSTALLATION

- .1 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, marble, stone or concrete: use bolt with lead expansion sleeve set into drilled hole.
 - .4 Toilet/shower compartments: use male/female through bolts.
- .2 Install grab bars on built-in anchors provided by bar manufacturer. Supply templates, details and instructions for building in anchors in toilet compartments. Provide through bolt fastening of grab bars in toilet compartments. Ensure code-compliant clearances between grab bars and walls.
- .3 Use tamper proof screws/bolts for fasteners.
- .4 Fill units with necessary supplies shortly before final acceptance of building.
- .6 Locate accessories where indicated on the drawings and/or as directed by the Consultant.

- .7 Install toilet and bath accessories in accordance with the Ontario Building Code, CSA B651-12 and manufacturer's instructions.
- .7 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 CLEANING

- .1 Proceed in accordance with Section 01740 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 RELATED SECTIONS

.1 Section 06 10 00 – Rough Carpentry.

1.2 REFERENCES

- .1 ASTM International (ASTM)
 - .1 ASTM A167-99 (2009) Standard Specification for Stainless and Heat Resisting Chromium Nickel Steel Plate, Sheet, and Strip
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-44.40-2001, Steel Clothing Locker.

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit detailed shop drawings of metal lockers.
 - .1 Provide layout plans and elevations of banks of lockers.
 - .2 Clearly indicate type and class of locker, materials, thickness of metals, fabricating and assembly methods, assembled banks of lockers, trim, shelves, tops, end panels, filler panels, doors, hardware, numbering, locking assemblies, ventilation method, installation methods and finishes.
- .3 Submit samples of locker components, finishes and fastening devices.
- .4 Submit colour charts showing full range of manufacturer's standard colours for selection by the Consultant.
- .5 Maintenance Data:
 - .1 Submit manufacturer's written instructions for cleaning and operation of lockers for inclusion in 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 lockers only after closing-in of building.
- .4 Handle products to prevent bending, racking or otherwise damaging lockers. Protect refinished surfaces from marring. Damaged products shall not be installed and shall be removed from project site.

1.7 WARRANTY

.1 All lockers shall be warranted for defects in materials and workmanship for a period of five (5) years from the date of Substantial Performance.

PART 2 – PRODUCTS

.1

2.2 MANUFACTURERS

- Approved manufacturers subject to compliance with this specification:
 - .1 Hadrian Manufacturing Inc., Burlington, Ontario 905-333-0300.
 - .2 Canadian Locker Company Limited, Scarborough, Ontario, 800- 494-9073
 - .3 General Storage Systems Ltd., London, Ontario 800-265-9055
 - .3 Shanahans (WG Wood sales) Richmond Hill, Ontario 800-813-9862

.4	ASI Watrous Group, Pickering, Ontario 905-420-5542
.5	Other manufacturers may be approved subject to approval of product specifications and details by the Consultant
.6	Model of locker to be equal to Hadrian "Emperor" locker

2.1 MANUFACTURED UNITS

- Lockers: to CAN/CGSB-44.40, Type 1-Single tier full-height locker Class 2. Hadrian "Gladiator Athletic"
 - .1 Single Tier 15" Wide
 - .2 Tops: Sloped
 - .3 Exposed ends: Solid

2.2 MATERIALS

.1

- .1 Locker parts shall be made of mild cold rolled sheet steel free from surface imperfections and contaminants
- .2 Assembly fasteners shall be zinc plated flat head screws with hex nuts. Rivets (Advel #1661-0613) 3/16".

2.3 DOORS

- .1 Doors perforated double-pan of a 16-gauge outer panel welded to an 18-gauge inner panel to form a rigid box construction. Outer panel double flanged on all four edges and the inner panel single flanged on all four edges. Provide doors with structural and sound deadening 1" cell honeycomb core bonded to inner surfaces and separated from the perforated door section with 20-gauge full width channels.
- .2 Ventilated door at upper and lower sections with staggered $\frac{1}{2}$ wide by 1" high oval perforations.
- .3 Door to be flush with the frame and include a recessed handle and recessed number plate.
- .4 Hinged on the right to swing from left to right.
 - .1 Full-length heavy-duty 16-gauge continuous steel piano hinge securely welded to the frame and fastened to the door with screws or rivets.
- .5 Number Plate
 - .1 High strength black laminated plastic number plate 2½" wide x 1 " high with white numbers not less than 7/16" high. Plates to accommodate up to four digits, be nestled in a recess flush with door surface and shall be fastened to the door with two rivets. Unless otherwise specified, lockers will be numbered consecutively from 1 up.
- .6 Standard latch system

2.4 INTERIOR EQUIPMENT

.1 Include one shelf and three single prong coat hooks. Hooks to be zinc plated steel with ball point heads and are attached with two fasteners.

2.5 FINISH

.1 All steel parts to be thoroughly machine cleaned, phosphatised and finished with a highperformance epoxy powder coating, baked on to provide a uniform, smooth, protective finish. Colors shall be selected from standard color card. Hadrian

PART 3 – EXECUTION

3.1 INSTALLATION

- .1 Assemble and install lockers in accordance with manufacturer's written instructions.
- .2 Securely fasten lockers to grounds and nailing strips.
- .3 Install wall trim around recessed locker banks.
- .4 Install filler panels (false fronts) where indicated and where obstructions occur.
- .5 Install locker numbers.

END OF SECTION

PART 1 – GENERAL

1.1 SCOPE

- .1 Summary: Contractor to Supply, install, and connect as per manufacturer's instructions to ensure complete and operational functions of equipment listed below.
- .2 Delivery, handling and installation of all equipment shall be included in the contractors base bid work.
- .4 Review drawings and rooms for extent of work along with all relevant mechanical and electrical drawings.

1.2 RELATED SECTIONS

- .1 Section 06 40 00 Architectural Woodwork
- .2 Division 21, 22, 23, 25, 26, 27, and 28 to provide mechanical and electrical rough ins for this equipment as shown on drawings.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Packaging, Shipping, Handling and Unloading
 - .1 Packaging: Products shall have packaging adequate enough to protect finished surfaces from soiling or damage during shipping, delivery and installation.
 - .2 Delivery: equipment delivery shall only take place after painting, utility rough-ins and related activities are completed that could otherwise damage in installation areas.
 - .3 Handling: Care, such as the use of proper moving equipment, experienced movers, etc., shall be used at all times to avoid damaging the food service equipment. Until installation takes place, any wrapping, insulation or other method of protection applied to products from the factory will be left in place to avoid accidental damage.

1.4 PROJECT SITE CONDITIONS

- .1 Building must be enclosed (windows and doors sealed and weather-tight);
- .2 An operational HVAC system that maintains temperature and humidity at occupancy levels must be in place;
- .3 Adjacent and related work shall be complete;
- .4 Ceiling, overhead ductwork and lighting must be installed;
- .5 Site must be free of any further construction such as "wet work";
- .6 Required casework must be installed accurately and the project must be ready for equipment installation.

PART 2 – PRODUCTS

2.1 MANUFACTURER

.1 Owners preferred list of equipment to be purchased is as proposed in item 2.2 Summary of

Required Equipment. See also cut sheets of all equipment appended to this section.

.2 Substitutions: Must meet all specification requirements and have prior approval. Any approvals for substitutions will only be considered post tender. Request for substitutions during the tender period will not be reviewed or considered during tender.

2.2 SUMMARY OF REQUIRED EQUIPMENT

No	Quantity	Equipment	Location of Equipment
1	1ea	DISHWASHER, UNDERCOUNTER Bosch 300 Series Stainless Steel Model SHSM63W55N	102 Lunch Room
2	3ea	MICROWAVE OVEN Menumaster_Medium Model No. MCS10DSE Menumaster® Commercial Microwave, 1000 Watt	102 Lunch Room
3	2ea	TOASTER OVENS Panasonic Toaster Oven FlashXpress with Double Infrared Heating NB-G110P	102 Lunch Room
4	1ea	FULL SIZE FRIDGE Frigidaire 20.0 Cu. Ft. Top Freezer Refrigerator Model FGHT2055VD, Stainless Steel	102 Lunch Room
5	1ea	WASHING MACHINE Frigidaire model FFTW4120SW High Efficiency Top Load Washer	115 Custodial / PPE Storage
6	1ea	LAUNDRY DRYER Frigidaire model CFRE4120SW High Efficiency Free Standing Electric Dryer	115 Custodial / PPE Storage
7	2ea	BOOTS AND MITT DRYER GearDryer Wall Mount 12	105 Male Change Room and 106 Female Change Room

PART 3 – EXECUTION

3.1 INSTALLATION

- .1 Install equipment in accordance with manufacturer's instructions.
- .2 In addition to requirements of the equipment manufacture, install equipment in positions shown on drawings, align and set level with levelling devices.
- .3 Work in close cooperation with allied trades installing plumbing, ductwork, wiring and other services.
- .4 Coordinate connection of mechanical and electrical services.
- .5 Adjust equipment for smooth and proper operation.

END OF SECTION

24" Scoop Handle Dishwasher

300 Series - Stainless Steel SHSM63W55N





SHSM63W55N Stainless Steel

Also available in:

White	SHSM63W52N	
Black	SHSM63W56N	

The 3rd rack provides the perfect space for silverware and large utensils while its V shape leaves room below for taller items.

Features & Benefits

44 dBA: Quietest dishwasher brand in the US.

A 3rd rack adds versatility and offers 30% more loading area.

FlexSpace[™] Tines fold back to fit your larger pots & pans.

RackMatic[®] offers 3 height levels, for 9 possible rack positions.

Speed60[®] gets your dishes dirty to dry in about an hour.

General Properties	
Number of wash cycles	5
Number of options	4
dBA	44
Third rack	Standard 3rd Rack
Rack adjustability	Rackmatic [®]
Tub material	Stainless Steel
Control type	Buttons
Concealed heating element	Yes
Leak protection system	24/7 AquaStop®
Water softener	No
Five-level wash	Yes
ChildLock	No
Special features	InfoLight®, Extra Dry Option
Efficiency	
Water usage per cycle	3.5
Energy efficiency class	Tier 1
ENERGY STAR® qualified	Yes
Total annual energy consumption (kWh)	269
Total annual water consumption (g)	623.5
Capacity	
Number of place settings	16

Technical Details	
Watts (W)	1440 W
Current (A)	12 Amps
Volts (V)	120 V
Frequency (Hz)	60 Hz
Power cord length	N/A
Minimum water pressure (lb/sin)	14
Length outlet hose (in)	79"
Dimensions & Weight	
Overall appliance dimensions (HxWxD) (in)	33 7/8" x 23 9/16" x 23 3/4"
Required cutout size (HxWxD) (in)	33 7/8" x 23 5/8" x 24"
Adjustable feet	Yes
Net weight (lbs)	91 lbs
Accessories–Optional	
Drain Hose Extension Kit	SGZ1010UC
Dishwasher Accessory Kit	SMZ5000
Anti-Tarnish Silverware Cassette	SMZ5002UC
Powercord with Cold Plug	SMZPC002UC



For help and assistance with Bosch accessories please visit: www.bosch-eshop.com/eshop/bosch/us or call 1-800-944-2904 Mon-Fri 5am to 6pm PST Sat 6am to 3pm PST Notes: All height, width and depth dimensions are shown in inches. BSH reserves the absolute and unrestricted right to change product materials and specifications, at any time, without notice. Consult the product's installation instructions for final dimensional data and other details prior to making cutout. Applicable product warranty can be found in accompanying product literature or you may contact your account manager for further details.

Warranties: Bosch warrants that the Product is free from defects in materials and workmanship for a period of three hundred and sixty-five (365) days from the date of purchase. The foregoing timeline begins to run upon the date of purchase, and shall not be stalled, tolled, extended, or suspended, for any reason whatsoever. This Product is also warranted to be free from cosmetic defects in material and workmanship (such as scratches of stainless steel, paint/porcelain blemishes, chip, dents, or other damage) to the finish of the Product, for a period of thirty (30) days from the date of purchase or closing date for new construction. This cosmetic warranty excludes slight color variations due to inherent differences in painted and porcelain parts, as well as differences caused by kitchen lighting, product location, or other similar factors. This cosmetic warranty specifically excludes any display, floor, "As Is", or "B" stock appliances.

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24" Scoop Handle Dishwasher

300 Series - Stainless Steel SHSM63W55N



Installation Details



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Installation Details



For help and assistance with Bosch accessories please visit: www.bosch-eshop.com/eshop/bosch/us or call 1-800-944-2904 Mon-Fri 5am to 6pm PST Sat 6am to 3pm PST Notes: All height, width and depth dimensions are shown in inches. BSH reserves the absolute and unrestricted right to change product materials and specifications, at any time, without notice. Consult the product's installation instructions for final dimensional data and other details prior to making cutout. Applicable product warranty can be found in accompanying product literature or you may contact your account manager for further details.

Warranties: Bosch warrants that the Product is free from defects in materials and workmanship for a period of three hundred and sixty-five (365) days from the date of purchase. The foregoing timeline begins to run upon the date of purchase, and shall not be stalled, tolled, extended, or suspended, for any reason whatsoever. This Product is also warranted to be free from cosmetic defects in material and workmanship (such as scratches of stainless steel, paint/porcelain blemishes, chip, dents, or other damage) to the finish of the Product, for a period of thirty (30) days from the date of purchase or closing date for new construction. This cosmetic warranty excludes slight color variations due to inherent differences in painted and porcelain parts, as well as differences caused by kitchen lighting, product location, or other similar factors. This cosmetic warranty specifically excludes any display, floor, "As Is", or "B" stock appliances. For more information on our entire line of products, go to www.bosch-home.com/us or call 1-800-944-2904

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Project #:_

MENUMASTER Commercia

Item #:

Medium Volume



Model MCS10DSE shown

Medium Volume This category of microwave is ideal for...

- **Applications:**
- Coffee shops
- Ethnic restaurants
- Concessions
- Dessert stations

All ACP, Inc. commercial ovens are backed by our Culinary Center. Call us with any question regarding food preparation, menu development and cooking times. 866-426-2621.



Menumaster Commercial Microwave Model MCS10DSE

Power Output

- 1000 watts of power.
- Four power levels.

Easy to Use

- User friendly ten minute dial timer lights up for at-a-glance monitoring.
- Timer automatically resets to zero if door is opened during heating. User option allows manual reset to zero.
- See-through door and lighted interior for monitoring without opening the door.
- 1.2 cubic ft. (34 liter) capacity accommodates a 14" (356 mm) platter, prepackaged foods and single servings.
- Stackable to save valuable counter space.

Easy to Maintain

- Stainless steel exterior and interior for easy cleaning and a commercial look.
- Constructed to withstand the foodservice environment.
- Non-removable air filter protects oven components.
- Backed by the ACP, Inc. 24/7 ComServ Support Center, 866-426-2621.
- ETL Listed.





AIA File #:



Menumaster Commercial Microwave Model MCS10DSE | Medium Volume



Installation clearance: 2" all sides

Drawings available from KCL CADlog - techs@kclcad.com

Specifications

Commercial microwave shall have a user-friendly 10 minute dial timer with illuminated digits and an end of cycle audible signal. Timer shall automatically reset if the door is opened during heating with user option to manually reset to zero. There shall be a four power levels and one cooking stage. Microwave output shall be 1000 watts distributed by one magnetron with a rotating top antenna to provide superior even heating throughout the cavity. Durable door shall have a tempered glass window and a grab and go handle with a 90° + opening for easy access. An interior light shall facilitate monitoring without opening the door. The large 1.2 cubic ft. (34 liter) cavity shall accommodate a 14" (356 mm) platter. Interior ceramic shelf shall be sealed and recessed on oven bottom to reduce plate-to-shelf edge impact. Oven shall have a stainless steel exterior and interior and be stackable to save counter and shelf space. The air filter shall be permanently affixed to the front of the oven. Microwave oven shall comply with standards set by the U.S Department of Health and Human Services, UL923 for safety and NSF4 for sanitation.



Warranty

Warranty Certificate for this product on the ACP, Inc. website at:

www.acpsolutions.com/warranty



Service All products are backed by the ACP, Inc. 24/7 ComServ Support Center.



Specifications			
Model	MCS10DSE	UPC Code 728	8028129472
Configuration	Countertop		
Control System	Dial		
Max. Cooking Time	10:00		
Power Levels	4		
Time Entry Option	Yes		
Microwave Distribution	Rotating anter	nna, top	
Magnetron	1		
Stackable	Yes		
Stage Cooking	1		
Interior Light	Yes		
Door Handle	Grab & Go		
Signal	End of cycle		
Exterior Dimensions	H 13 %" (352)	W 22″ (559)	D*19″ (483)
Cavity Dimensions	H 8½″(216)	W 14 ½″ (368)	D 15″ (381)
Door Depth	32 ¾" (832), 90	°+ door open	
Usable Cavity Space	1.2 cubic ft. (3	4 liter)	
Exterior Finish	Stainless steel		
Interior Finish	Stainless steel		
Power Consumption	1550 W, 13 A		
Power Output**	1000 W** Micr	rowave	
Power Source	120V, 60 Hz, 1	5 A single phase	
Plug Configuration / Cord	NEMA 5-15	5 ft. (1.5m)	
Frequency	2450 MHz	·	
Product Weight	41 lbs. (18.6 kg	g.)	
Ship weight (approx.)	47 lbs. (21.3 k	g.)	
Shipping Carton Size	H 17″ (432)	W 25 ½″ (660)	D 19 ¾" (502)
UPS Shippable	Yes		

Specification #:

Measurements in () are millimeters * Includes handle

** IEC 60705 Tested



225 49th Ave. Dr. SW Cedar Rapids, IA 52404 U.S.A. Form # MCO0954 Rev. 8/12

ACP commitment to quality may mean a change in specification without notice.

Product of the U.S.A.

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Printed in the U.S.A.



Toaster Oven NB-G110

MODEL NUMBER	Model Number	NB-G110P
DESIGN/SIZE	Color	Silver
	Inner Cooking Tray	Square, 9" Diameter
PERFORMANCE	Heating Element	Double Infrared (Near/Far)
	Pre-set Programming	6.0
	Light	Yes
	Drip Rack / Baking Tray	Yes
	Crumb Tray	Removeable
	Crust Control	Light / Medium / Dark
	Temperature Setting	250°F - 500°F
	Digital Timer	Yes
	Reminder Beep	Yes
POWER	Supply	120V AC, 60 Hz
DIMENSIONS	W x D x H (in.)	13 x 12 x 10-1/4
	Unit Weight (lbs.)	7.5

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Frigidaire Gallery



Yes

Clear

Clear

LED

2

1 3

2

1 2

Yes

Clear

Clear

Glass

LED

2

1

No

Yes

Yes

Food

No

Yes

Yes

Top Center of Fresh

Smudge-Proof®

Glass

Automatic

Refrigerator Air Filter

Crisper Color

Door Bin Color

Humidity Controls

Number of Adjustable Gallon Door Bins

Number of Other Door Bins

Total Number of Door Bins Number of Adjustable Shelves

Number of Fixed Shelves

Number of Crispers

Automatic Defrost

Door Bin Color

Interior Lighting

Shelf Material

Ice Maker

Controls Air Filter Indicator

Ice Maker Ready

Control Location

Digital Display

Door Ajar Alarm

Sabbath Mode

Exterior Exterior Finish

Baskets / Bins Color

Number of Fixed Door Bins

Number of Adjustable Shelves

Freezer

Interior Lighting

Shelf Material

Top Freezer Refrigerator

20.0 Cu. Ft. Top Freezer Refrigerator

FGHT2055VF, FGHT2055VD

Available Colors : Stainless Steel, Black Stainless Steel

Version : 04/21

Door Swing	Reversible
Door Finish	Smooth
Rear Rollers	Yes

Dimensions and Volume

Height With Hinge	66 3/8"
Height Without Hinge	65 7/8"
Width	30"
Width of Cabinet	30"
Depth of Cabinet	28 1/4"
Depth With Door	32"
Depth With Door 90° Open	58 5/8"
Depth With Door and Handle	32"
Fresh Food Capacity	14.7 Cu. Ft.
Freezer Capacity	5.4 Cu. Ft.
Total Capacity	20 Cu. Ft.

Electrical Specifications

Amps @ 120 Volts	2 Amps
Minimum Circuit Required	15 Amps

General Specifications

Leveling Legs	Yes
Product Weight	174 lbs
Prop 65 Label	Yes
Refrigerant Type	R-600A
Warranty - Labor	1 Year
Warranty - Parts	1 Year

Certifications and Approvals

ADA Compliant	Yes
Performance Certifications and Approvals ENERGY STAR Certified	Ves
Safety Cortifications and Approvals	105

Safety Certifications and Approvals

UL Listed

Yes

Note: For planning purposes only. Always consult local and national electric, gas and plumbing codes. Refer to Product Installation Guide for detailed installation instructions on the web at <u>frigidaire.com</u> / <u>frigidaire.ca</u> Specifications subject to change. Accessories information available on the web at <u>frigidaire.com</u> / <u>frigidaire.ca</u>

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Frigidaire Gallery

20.0 Cu. Ft. Top Freezer Refrigerator

FGHT2055VF, FGHT2055VD

Version : 04/21



* When installing refrigerator adjacent to wall, cabinet or other appliance that extends beyond front edge of unit, 20" minimum clearance recommended to allow for optimum 140° door swing, providing complete crisper access and removal. (Absolute 3" minimum clearance will ONLY allow for 90° door swing which will provide limited crisper access with restricted removal.)

Note: For planning purposes only. Always consult local and national electric, gas and plumbing codes. Refer to Product Installation Guide for detailed installation instructions on the web at <u>frigidaire.com</u> / <u>frigidaire.ca</u> Specifications subject to change. Accessories information available on the web at <u>frigidaire.com</u> / <u>frigidaire.ca</u>

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FRIGIDAIRE.

AVAILABLE

COLORS

FFTW4120SW

he



SIGNATURE FEATURES

MaxFill™ Gives You The Maximum Water For The Ultimate Clean MaxFill™ ontions allows for th

MaxFill™ options allows for the maximum water level for the selected cycle.

Quick Wash Cycle Washes clothes fast

Large Capacity Fit more in every load

12 Wash Cycles Features 12 wash cycles to meet all of your washing needs such as Delicate, Hand Wash and Heavy Duty Frigidaire 4.7 Cu. Ft. I.E.C. High Efficiency Top Load Washer

MORE EASY-TO-USE FEATURES

Multiple Cycle Options Personalize your wash with options such as Favorite Cycle and Max Fill .

5 Soil Levels Includes: Extra Heavy, Heavy, Medium, Light and Extra Light

Stainless Steel Drum The stainless steel drum with agitator offers durability with longlasting performance

Electronic Controls Easy to use electronic controls with digital read out and cycle status lights

Fabric Softener Dispenser Conveniently add fabric softener at the beginning of the wash cycle

CERTIFICATIONS CSA Certified

FFTW4120SW Frigidaire 4.7 Cu. Ft. I.E.C. High Efficiency Top Load Washer

FRIGIDAIRE

General	Specifications
General	specifications

Chime On / Chime Off	Yes	
Leveling Legs	Yes	
Product Weight	109.25 lbs	
Prop 65 Label	Yes	
Warranty - Labor	1 Year	
Warranty - Parts	1 Year	
Power Type	Electric	
Size	4.1 Cu. Ft.	
Installation Type	Free-Standing	
Collection	Frigidaire	
Electrical Specifications		
Connection Location	Left Top	
Minimum Circuit Required	15 Amps	
Voltage Rating	120 V	
Exterior		
Water Inlet Location	Left	
Safety Certifications and Approvals		
CSA Listed	Yes	
UL Listed	No	
ENERGY STAR Certified	No	
High Efficiency	Yes	
Dimensions and Volume		
Height	43 5/16"	
Width	27"	
Depth	28 1/8"	
Washer Drum Capacity I.E.C.	4.7 Cu. Ft.	
Temperature Settings		
Cold	Yes	
Tap Cold	Yes	
Warm	Yes	
EcoWarm	Yes	
Hot	Yes	
Soil Levels		
Soil Level Selections	Yes	
Extra Light	Yes	
Light	Yes	
Heavy	Yes	
Extra Heavy	Yes	

Bleach Dispenser	Yes	
Detergent Dispenser	Yes	
Eabric Softener Dispenser	Yes	
Prewash Detergent Dispenser	No	
Vashar Options	110	
Future Direct		
	Yes	
vasner		
	No	
Drum Material	Stainless Stee	
Maximum Spin Speed	680 RPM	
Water Level Adjustment	Yes	
Controls		
Child Lock	Yes	
Cycle Status Lights	Yes	
Delay Start	Yes	
Estimated Time Remaining	Yes	
Power On/Off	Yes	
Vasher Cycles		
Active Wear	Yes	
Bulky	Yes	
Clean Washer	Yes	
Colors	Yes	
Cycle Count	12	
Delicates	Yes	
Fast Wash	Yes	
Hand Wash	Yes	
My Favorite	Yes	
Normal	Yes	
Rinse and Spin	Yes	
Soak	Yes	
Whites	Yes	
nergy Data		
Integrated Water Factor	6.5	
kWh/year	110 kWh	
Modified Energy	1.57	
Water Usage/Year	7,862 Gallons	

Note: For planning purposes only. Always consult local and national electric, gas and plumbing codes. Refer to Product Installation Guide for detailed installation instructions on the web at frigidaire.com / frigidaire.ca. Specifications subject to change. Accessories information publicly and the second statement of Specifications subject to change. Accessories information available on the web at frigidaire.com / frigidaire.ca

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FRIGIDAIRE

AVAILABLE

COLORS

FFRE4120SW



SIGNATURE FEATURES

Large Capacity Fit more in every load

10 Dry Cycles

Features 10 dry cycles to meet all of your drying needs such as Bulky, Active Wear and Sanitize Quick Dry Cycle Dries clothes fast

Multiple Cycle Options

Personalize your drying with options such as My Cycle and Eco Dry

Frigidaire 6.7 Cu. Ft. Free Standing Electric Dryer

MORE EASY-TO-USE FEATURES

5 Dryness Levels Includes: Air Dry, Ultra Low, Low, Medium, and High

Anti-Wrinkle Anti-Wrinkle Option Helps Reduce Wrinkles

Electronic Controls Easy to use electronic controls with digital read out and cycle status lights

Reversible Door Offers versatile installation options

CERTIFICATIONS CSA Certified

frigidaire.com/frigidaire.ca

FFRE4120SW Frigidaire 6.7 Cu. Ft. Free Standing Electric Dryer

FRIGIDAIRE

General Specifications	General	Specifications
------------------------	---------	----------------

Chime On / Chime Off	Yes	
Duct Length	90″	
Leveling Legs	Yes	
Product Weight	113.05 lbs	
Prop 65 Label	Yes	
Warranty - Labor	1 Year	
Warranty - Parts	1 Year	
Power Type	Electric	
Size		
Installation Type	Free-Standing	
Collection	Frigidaire	
Controls		
Child Lock	Yes	
Cycle Status Lights	Yes	
Delay Start	Yes	
Estimated Time Remaining	Yes	
Exterior		
Reversible Door	Yes	
Drying Temperatures		
Air Fluff	Yes	
Low	Yes	
Medium	Yes	
High	Yes	
Maximum	Yes	
Electrical Specifications		
Connection Location	Bottom Center	
Energy Data		
kWh/cycle	2.27 kWh	
kWh/year	641 kWh	

Dimensions and Volume		
Height	42 7/8"	
Width	27"	
Depth	30"	
Dryer Drum Capacity	6.7 Cu. Ft.	
Dryer Cycles		
Cycle Count	10	
Active Wear	Yes	
Air Fluff	Yes	
Bulky	Yes	
Casual	Yes	
Delicates	Yes	
Fast Dry	Yes	
Heavy Duty	Yes	
Normal	Yes	
Timed Dry Time	Yes	
Towels	Yes	
Safety Certifications and Approvals		
CSA Listed	Yes	
ENERGY STAR Certified	No	
Dryer		
Drum Material	Stainless Steel	
Dryness Level Selections	Yes	
Moisture Sensor	Yes	
Dryer Options		
Drum Light	No	
Sanitize	Yes	

Note: For planning purposes only. Always consult local and national electric, gas and plumbing codes. Refer to Product Installation Guide for detailed installation instructions on the web at frigidaire.com / frigidaire.ca. Specifications subject to change. Accessories information available on the web at frigidaire.com / frigidaire.ca

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FFRE4120SW ©Electrolux Major Appliances, Inc.



GearDryer Wall Mount 12



Quantity		1
----------	--	---

ADD TO CART

BUY IT NOW

With 200 CFM of forced airflow, the option to dry with heated or ambient air, and unrivaled versatility— the GearDryer Wall Mount 12 is the premier gear drying, gear warming, and gear storage solution.

Features & Specs:

- Dual fans drive more than 200 CFM of forced airflow directly into mounted gear
- Optional heated or ambient-air drying settings with the press of a button. GearDryer's self-regulating heater delivers an approximate 35°F air temperature increase above the ambient air temperature for effective drying and warming (safe for use on most thermo-molded boot liners)
- Plugs directly into a standard 120-Volt outlet--no professional installation needed
- Select a custom timed setting from 15-minutes all the way up to 24-hours with the turn of the dial
- Modular, Twist-And-Lock Port system. 12 individual ports create endless configuration options for different types of gear from boots, to helmets, to waders, and more
- Easy Wall-Mount installation integrates easily into your garage, mud room, or gear room
- Rolling Wheel Kit/ Freestanding Base Kit Accessory Sold Separately
- Measures 16"W x 6"D x 46"H | Weight: 46lbs

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section, and all related sections.
- .2 The work of this section, and related work specified in other sections shall comply with all requirements of Division 1 General Requirements.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide manual and motorized roller style window blinds as specified herein and as indicated on the drawings.

1.3 RELATED SECTIONS

.1 Gypsum Board Ceilings Section 09 29 00

1.4 QUALITY ASSURANCE

- .1 Installer Qualifications: Installer should be experienced in performing work of this section, and be specialized in installation of work similar to that required for this project.
- .2 Source Limitations: Obtain all roller shade systems in this section from a single supplier.
- .3 Fire Test Response Characteristics: Provide shade cloth which passes NFPA 701, small scale test.

1.5 DELIVERY, STORAGE & HANDLING

- .1 Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- .2 Storage and Protection: Store materials protected from exposure to harmful weather conditions, at temperature and humidity conditions recommended by manufacturer.

1.6 WARRANTY

- .1 Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- .2 Manufacturer's Warranty: Submit manufacturer's standard warranty executed by authorized company official.
- .3 Installation Warranty: One year commencing on Date of Substantial Completion.

1.7 DESIGN CRITERIA

- .1 Fabric for blinds to have flame-spread ratings and degree of flame resistance required by the National Fire Code 1995.
 - .1 Flame Spread Rating: less than 25.

1.8 SUBMITTALS

- .1 Indicate dimensions in relation to window jambs, operator details, head and sill conditions between adjacent blinds corner conditions anchorage details, hardware and accessories details.
- .2 Product Data: Submit manufacturer's product data for specified products.

- .3 Shop Drawings: Submit shop drawings showing product components and typical details. Submit shop drawings in accordance with Section 01 33 00.
- .4 Samples: Submit selection and verification samples for finish, color and texture. Submit one representative working sample of each type blind in accordance with Section 01 33 00.
- .5 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- .6 Certificates: Product certificates signed by manufacturer or dealer certifying materials comply with specified performance criteria and physical requirements.
- .7 Manufacturer's Instructions: Manufacturer's installation instructions.
- .8 Closeout Submittals: Submit the following:
 - 1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
 - 2. Warranty: Warranty documents specified herein.

2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- .1 Solarfective Products Ltd.
- .2 SunProject of Canada Inc.
- .3 Silent Gliss.

2.2 MANUAL AND MOTORIZED ROLLER BLIND

- .1 Soffit-mounted, fully factory assembled, unitized manual shade system. 2.5" tube size, clear anodized aluminum fascias, mounting brackets, bottom bar, end covers, and chain operator. Roller shades to be 4 ply Vinyl Fiberglass (1ply fiberglass / 3ply vinyl) Washable 12oz per sq. yd. F/R to NFPA 701, Shadow free opacity.
- .2 Types:
 - .1 <u>Sunscreen Blind</u>: are required in specified location. fiberglass coated fabric. 12 mils thick. Provide 5% Openness Factor. Fabric type and colour as selected by Consultant.
- .3 Refer to reflected ceiling plans for extent of sunscreen, blackout blinds and double cassette blinds.
- .4 Provide fully factory assembled shade unit consisting of end brackets, shade tube, drive assembly, fascia, drive chain, hembar, and specified fabric.
- .5 Refer to drawings for location of Motorized blinds
- .6 Motorized Blind type shall be Blackout.
- .7 Refer to drawings for window head detail.

3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.2 EXAMINATION

- .1 Site Verification of Conditions: Verify conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.
- .2 Field Measurements: Prior to fabrication, field measure each area which is to receive roller shade installation to establish the exact size and layout of the units as shown on the architectural drawings.
- .3 Site Verification of Environmental Conditions: Verify that the work space is enclosed and weather tight, all wet work is dry and complete, and all adjacent and related work of other trades has been completed. Verify ambient temperature and humidity are continuously maintained at values indicated for final acceptance of the building or occupancy of the space.

3.3 PREPARATION

.1 Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

3.4 INSTALLATION

- .1 Install blinds as indicated and detailed on the drawings.
- .2 Fabrication: Fabricate shades completely in the factory to fit the shade layout as shown on the architectural drawings.
- .3 Manufacturer Installation Instructions:
 - 1. Install shades level and plumb, with anchorage and support as required and as recommended by the manufacturer.
 - 2. The fabric shall hang flat, without buckling or distortion. The edge, when trimmed, shall hang straight without raveling.
 - 3. Site Tolerances: An unguided roller shade fabric shall roll true and straight, without shifting sideways more than 1/8" in either direction due to warp distortion or weave design.
- .4 Adjustment: Installer will adjust shade systems to operate smoothly and free from binding or malfunction throughout entire range.

3.5 CLEANING AND PROTECTION

.1 Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.
.2 Protection: Protect installed product and finish surfaces from damage during construction.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section, and all related sections.
- .2 The work of this section, and related work specified in other sections shall comply with all requirements of Division 1 General Requirements.

1.2 REFERENCES

- .1 Underwriters Laboratory Gate Operator Requirements (UL 325).
- .2 Automated vehicular gates only intended for vehicle traffic. Separate access for pedestrians must be supplied. (UL 325 51.8.4 b)
- .3 ASTM F 2200 Standard Specification for Automated Vehicular Gate Construction.
- .4 ASTM F 1184 Standard Specification for Industrial and Commercial Horizontal Slide Gates.
- .5 CSA standard W55.3-08 (R2013).

1.3 RELATED SECTIONS

.1 Chain Link Fences and Gated

Section 32 31 13

1.4 QUALITY ASSURANCE

.1 Installer Qualifications: Installer should be experienced in performing work of this section, and be specialized in installation of work similar to that required for this project.

1.5 WARRANTY

- .1 Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- .2 Manufacturer's Warranty: Submit manufacturer's standard warranty executed by authorized company official.
- .3 Installation Warranty: One year commencing on Date of Substantial Completion.
- .4 Operator Manufacturer's 5 year warranty against material and manufacturing defects.

1.6 SUBMITTALS

- .1 Shop Drawings:
 - 1. Supply shop drawings of gate, including details of major components.
 - 2. Supply details of gate construction, gate height and post spacing dimensions.
- .2 Certification of Performance Criteria:
 - 1. Upon request the manufacturer of the gate will provide documentation for the following components. Alternate designs built to minimum standards that do not include these additional structural features shall not be accepted.
 - a. Entire gate frame including counterbalance section will include two 5mm adjustable galvanized steel cables per bay to allow gate frame adjustment to maintain square and level orientation.
 - b. Gate truck assemblies have precision ground and hardened bearings. Bearings are sealed and pre-lubricated.

- c. Gate truck assemblies shall be supported by a minimum 5/8" stainless steel bolt with self-aligning capability.
- d. Gate counter-balance length to comply with ASTM standard.
- e. Hanger brackets shall be hot dip galvanized steel with a minimum 3/8" thickness, gusseted for additional strength.
- f. Gate truck assembly self-aligning components shall be made of 316 stainless steel and lubricated with high temperature marine grease to prevent seizing.
- .3 Certifications:
 - 1. Gate in compliance with ASTM F 2200, Standard Specification for Automated Vehicular Gate Construction per section 2.01 C.
 - 2. If gate is automated, gate operator shall be in compliance with UL 325 as evidenced by UL listing label attached to gate operator.
 - 3. Aluminum welding process to conform to CSA W55.3-08 (R2013).

2 PRODUCTS

2.1 CANTILEVER SLIDE GATE MANUFACTURERS:

- .1 The ARMA[™] Cantilever Gate to be manufactured by Countermeasures Security Solutions Inc., 927 Alloy Drive, Thunder Bay, ON P7B 5Z8. Ph. 1.800.371.0735
- .2 Approved substitution All other systems must be submitted to the design team in accordance with substitution requirements as set forth in the general provisions of the specification manual for approval prior to the bid date. Products submitted after the bid date will not be approved.
- .3 Gate manufacturer shall certify gate is manufactured in compliance with ASTM F 2200, Standard Specification for Automated Vehicular Gate Construction.
- .4 Gate Dimensions:
 - .1 ARMA[™] Cantilever Gate dimensions shall be as shown on the detail drawings.
- .5 Gate Construction Details:
 - .1 Gate Frame:
 - 1. The gate frame shall be constructed from 6061 aluminum alloy extrusions. The upper rail shall be a 52mm x 157mm weighing no less than 7.9 kg/m. The lower rail shall be a 51mm x 127mm aluminum structural extrusion weighing no less than 3kg/m.
 - .2 Vertical Members:
 - 1. The vertical members shall be 51mm x 51mm x 3.2mm structural aluminum extrusions weighing not less than 1.65kg /m.
 - 2. All welding of gate frame to conform to CSA W55.3 (R2013
- .6 Gate Mounting:
 - 1. The gate is to be supported from its track by two self-aligning, four wheeled bearing truck assemblies.
 - 2. The lower rail shall be guided by a guide bracket on both posts. Each guide bracket will have a pair of 76mm phenolic guide wheels. Lower guide wheels to have protective covers as per UL325.
 - 3. Gap protectors shall be provided and installed, compliant with ASTM F 2200.
- .7 Diagonal Bracing:

- 1. Diagonal bracing of two 5mm galvanized steel cables installed in each bay throughout the entire gate frame.
- .8 The gate shall be completed by the installation of approved mesh as specified.
 - 1. Chain Link: 2" x 2" x 9 gauge galvanized chain link mesh fabric to extend the entire length of the gate. Fabric attached at each end of the gate frame with standard fencing tension bars and tied at each vertical member with standard fencing ties. ASTM F 2200 requires attachment method that leaves no leading or bottom edge protrusions (cannot exceed 12.7mm).
- .9 Splicing:
 - 1. When splicing of two or more panels is required, the following hardware requirements must be met.
 - 2. Upper main splice bar to be machined from 6061 billet aluminum with final dimensions measuring 305mm x 63.5mm x 31.75mm. Upper main splice bar to be installed with a total of ten 3/8" Ø NC countersunk head fasteners.
 - Upper track alignment brace to be machined from 6061 billet aluminum with final dimensions measuring 152mm x 25.4mm x 25.4mm and secured in place with four ¼" Ø NC countersink fasteners.
 - 4. Lower splice bar to be machined from 6061 billet aluminum dimensions measuring 203mm x 51mm x 12.7mm and be secured in place with four ¼" Ø NC button head fasteners.
- .10 Posts:
 - .1 Support posts shall be a minimum of 88.9mm round SC40. Posts shall be galvanized or coated and supported in concrete footings as specified.
- .11 Finish:
 - .1 Gate to be mill finish aluminum.

2.2 GATE OPERATORS

- .1 Slide Gate Operators:
 - .1 Model: 'LiftMaster' CSL24UL. Or approved equal during tender only.
 - .2 Operation: Gear driven.
 - .3 Meet UL 325, UL 991, ASTM F2200, and CAS C22.2 No. 247.
 - .4 Motor: 24 VDC, continuous duty type, sized to gate conditions.
 - .5 Traveling speed: 12 inches per second.
 - .6 Battery backup: [7Ah.] [33Ah.]
 - .7 Monitoring and controls:
 - .1 Internet connectivity: MyQ technology with 50 channel FHSS.
 - .2 Radio receiver: Security+ 2.0 technology.
 - .3 Monitored retro-reflective photo eyes.
 - .4 Monitored small profile wired safety edge.
 - .8 Accessories:
 - .1 Monitored safety devices: [Reflective photo eyes.] [Thru-beam photo eyes.] [Wireless edge with transmitter and receiver.] [Wireless edge transceiver.]
 - .2 Wired monitored edges: [Small profile monitored edge.] [Large profile monitored edge.]
 - .3 Plug-in loop detector.
 - .4 Wireless commercial keypad.
 - .5 Internet gateway.
 - .6 [CAPXLV] [CAPXM] Smart video intercom.

- .7 Commercial access control receiver.
- .8 Heater kit.

3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Install in accordance with manufacturer's instructions.

3.2 INSTALLATION:

- .1 Installation shall be in accordance with the company's printed instructions unless otherwise shown on the contract drawings.
- .2 The gate and installation shall conform to ASTM F 1184 standards for aluminum cantilever slide gates.
- .3 If the gate is automated, the gate and installation shall comply with ASTM F 2200 and UL 325.
- .4 Gates should be installed as to not fall over more than 45° from its vertical plane when the gate is detached from the supporting hardware.

3.3 SYSTEM INITIATION:

- .1 The gate must be adjusted to ensure that it is working properly.
- .2 The gate must be cycled an adequate number of times to ensure proper operation.
- .3 For an automated gate test and explain safety features:
 - 1. All features and devices are separate components of the gate system.
 - 2. Comply to instructions for all components.
 - 3. Ensure that all instructions for all components of the gate operator are available to end user.
 - 4. Ensure the owner understands the basic operation of the safety features of the automated gate system as per the gate operator manual.

3.4 CLOSEOUT ACTIVITIES

- .1 Test and adjust operators for proper operation.
- .2 Demonstration: Demonstrate operation and programming of operators to Owner.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section, and all related sections.
- .2 The work of this section, and related work specified in other sections shall comply with all requirements of Division 1 General Requirements

1.2 RELATED SECTIONS

.1 Section 01 61 00 - Basic Product Requirements

1.3 REFERENCES

- .1 ASTMA53 90b, Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated Welded and Seamless.
- .2 CAN/CGSB 138.1 M80, Fence, Chain Link, Fabric.
- .3 CAN/CGSB 138.2 M80, Fence, Chain Link, Framework, Zinc Coated, Steel.
- .4 CAN/CGSB 138.3 M80, Fence, Chain Link Installation.
- .5 CAN/CGSB 138.4 M82, Fence, Chain Link, Gates.

1.4 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01330 Submittal Procedures.

2 PRODUCTS

2.1 MATERIALS

- .1 Concrete mixes and materials: to 20mpa after 28 days OPSD-972.130
- .2 Chain link fence fabric: to CAN/CGSB 138.1.
 - .1 Type1, ClassA, medium style.
 - .2 Height of fabric: 1.8m or as indicated.
 - .3 Hot dipped galvanized steel 3.6mm thick (9 gauge) steel wire woven in a 50mm mesh with knuckled finish top and bottom selvage edges.
 - .4 galvanized steel for Posts and Accessories: ASTM F1043, galvanized steel by the thermal fusion process with a 0.2 to 0.3mm thick galvanized steel.
- .3 Posts, braces and rails: to CAN/CGSB 138.2, galvanized steel pipe.
- .4 Bottom tension wire: to CAN/CGSB 138.1
- .5 Tie wire fasteners: to CAN/CGSB 138.1, Table 2(steel wire)
- .6 Tension bar: to ASTMA525M, 5x20mm minimum galvanized steel.
- .7 Gates: to CAN/CGSB 138.4. and as per details as indicated

- .8 Fittings and hardware: to CAN/CGSB 138.2, cast aluminum alloy, galvanized steel or malleable or ductile cast iron. Tension bar bands: 3x20mm minimum galvanized steel or 5x20mm minimum aluminum. Post caps to provide waterproof fit, to fasten securely over posts and to carry top rail. Overhang tops to provide waterproof fit, to hold top rails and an outward inward projection to hold barbed wire overhang. Provide projection with clips or recesses to hold 3strands of barbed wire spaced 100mm apart. Projection of approximately 300mm long to project from fence at 45 above horizontal. Turnbuckles to be drop forged.
- .9 Organic zinc rich coating: to CAN/CGSB- 1.181".
- .10 Grounding rod: 16mm diameter copperwell rod, 3m long to Division 26.

2.2 FINISHES

- .1 Galvanizing:
 - .1 For pipe: 550g/m2minimum to ASTMA90.
 - .2 For other fittings: to CAN/CSA G164.

2.3 DESIGN

.1 Ensure chain link fences / posts / guards to conform to loading requirements of Ontario Building Code Part 4 as required.

3 EXECUTION

3.1 GRADING

.1 Remove debris and correct ground undulations along fence line to obtain smooth uniform gradient between posts. Provide clearance between bottom of fence and ground surface of 30mm to 50mm.

3.2 ERECTION OF FENCE

- .1 Erect fence along lines as indicated and in accordance with CAN/CGSB 138.3.
- .2 Excavate post holes to dimensions indicated.
- .3 Space line posts 1.5m apart, measured parallel to ground surface.
- .4 Space straining posts at equal intervals not exceeding 150m if distance between end or corner posts on straight continuous lengths of fence over reasonably smooth grade is greater than 150m.
- .5 Install additional straining posts at sharp changes in grade and where directed by Consultant.
- .6 Install corner post where change in alignment exceeds 10°.
- .7 Install end posts at end of fence and at buildings. Install gate posts on both sides of gate openings.
- .8 Place concrete in post holes then embed posts into concrete to depths indicated. Extend concrete 50mm above ground level and slope to drain away from posts. Brace to hold posts in plumb position and true to alignment and elevation until concrete has set.

- .9 Do not install fence fabric until concrete has cured a minimum of 5 days.
- .10 Install brace between end and gate posts and nearest line post. Install braces on both sides of corner and straining posts in similar manner.
- .11 Install overhang tops and caps.
- .12 Install top rail between posts and fasten securely to posts and secure waterproof caps and overhang tops.
- .13 Install bottom tension wire, stretch tightly and fasten securely to end, corner, gate and straining posts with turnbuckles and tension bar bands.
- .14 Lay out fence fabric. Stretch tightly to tension recommended by manufacturer and fasten to end, corner, gate and straining posts with tension bar secured to post with tension bar bands spaced at 300mm intervals. Knuckled selvedge at bottom. Twisted selvedge at top.
- .15 Secure fabric to top rails, line posts and bottom tension wire with tie wires at 450mm intervals. Give tie wires minimum two twists.
- .16 Install grounding rods as indicated.

3.3 INSTALLATION OF GATES

- .1 Install gates in locations as indicated.
- .2 Level ground between gate posts and set gate bottom approximately 40mm above ground surface.
- .3 Provide gate latch mechanism (lock by Owner).

3.4 TOUCH UP

.1 Clean damaged surfaces with wire brush removing loose and cracked coatings. Repair damaged areas as per manufacturer's instructions.

3.5 CLEANING

.2 Clean and trim areas disturbed by operations. Dispose of surplus material as directed by consultant.

END OF SECTION

CRITCHLEY HILL Architecture Inc.

ROOM FINISH SCHEDULE

Town of Marathon, New Public Works Facility

ISSUED FOR TENDER

PROJECT NO. 2208

DATE: AUGUST 2022

ROOM			FLOOR				w	ALL			CEILING		REMARKS	
				NORT	гн	SOU	ітн	EAS	ат	WE	ST			
NO.	NAME	MALL	BASE	MAT'L	FIN	MAT'L	FIN	MAT'L	FIN	MAT'L	FIN	WATL	FIN	
100	VESTIBULE	SHV	RB	CMU	PT	CMU	PT	CMU	PT	CMU	PT	GWB	PT	
101	CORRIDOR	SHV	RB	CMU	PT	CMU	PT	CMU	PT	CMU	PT	ACT	SP	
102	LUNCH/MEETING	SHV	RB	GWB	РТ	CMU	PT	CMU	PT	GWB	PT	ACT	SP	
103	TRAINING	SHV	RB	CMU	РТ	CMU	PT	CMU	PT	GWB	PT	ACT	SP	
104	ADMIN	SHV	RB	GWB	РТ	CMU	PT	CMU	PT	CMU	PT	ACT	SP	
105	MALE CHANGE	SSHV	RB	CMU	PT	CMU	PT	CMU	PT	CMU	РТ	MRG	РТ	CT/ PCT FINISH IN SHOWERS. SEE INTERIOR ELEVATIONS AND DETAILS.
106	FEMALE CHANGE	SSHV	RB	СМИ	PT	CMU	PT	CMU	PT	CMU	PT	MRG	PT	CT/ PCT FINISH IN SHOWERS. SEE INTERIOR ELEVATIONS AND DETAILS.
107	WASHROOM	SSHV	RB	CMU	РТ	CMU	PT	СМИ	PT	CMU	PT	ACT	SP	
108	WASHROOM	SSHV	RB	CMU	PT	CMU	PT	CMU	PT	CMU	PT	ACT	SP	
109	OFFICE	SHV	RB	СМИ	PT	CMU	PT	СМИ	PT	GWB	PT	ACT	SP	
110	WATER WORKS SHOP	PC	RB	PMP	SP	CMU	PT	CMU	PT	PMP	SP	STRUCT	PT	
111	OFFICE	SHV	RB	CMU	РТ	CMU	PT	CMU	PT	CMU	PT	ACT	SP	
112	G.N. CHANGE/ EMERGENCY SHOWER	SSHV	RB	СМИ	PT	CMU	PT	CMU	PT	CMU	РТ	MRG	PT	CT/ PCT FINISH IN SHOWERS. SEE INTERIOR ELEVATIONS AND DETAILS.
113	UNIVERSAL WASHROOM	SSHV	RB	CMU	PT	CMU	PT	CMU	PT	CMU	PT	ACT	SP	
114	PPE STORAGE	SHV	RB	CMU	PT	CMU	PT	СМИ	PT	CMU	PT	ACT	SP	
115	CUSTODIAL	SHV	RB	CMU	РТ	CMU	PT	CMU	PT	CMU	PT	ACT	SP	
116	SERVICES/ UTILITY	PC	RB	CMU	PT	CMU	PT	CMU	PT	CMU	PT	STRUCT	PT	
117	TRADES SHOP	PC	RB	CMU	PT	PMP	PT	CMU	PT	CMU	PT	STRUCT	PT	
118	SMALL EQUIPMENT	PC	RB	CMU	PT	CMU	PT	CMU	PT	CMU	PT	STRUCT	PT	
119	WASHROOM	PC	RB	CMU	РТ	CMU	PT	CMU	РТ	CMU	PT	ACT	SP	
120	MECHANICS SHOP	PC	RB	CMU	РТ	CMU	PT	CMU	PT	CMU	PT	STRUCT	PT	
121	OFFICE	PC	RB	GWB	РТ	CMU	PT	CMU	PT	CMU	PT	ACT	SP	
122	TOOL CRIB	PC	RB	CMU	PT	CMU	PT	CMU	PT	CMU	PT	STRUCT	PT	
123	METAL FAB. SHOP	PC	RB	CMU	РТ	CMU	PT	CMU	РТ	CMU	PT	STRUCT	PT	
124	STORAGE	PC	RB	CMU	PT	CMU	PT	CMU	PT	CMU	PT	STRUCT	PT	

ROOM FINISH SCHEDULE

CRITCHLEY HILL Architecture Inc.

ROOM			FLOOR				w	ALL				CEILING		REMARKS
				NORTH		SOUTH		EAS	ат	WE	ST			
NO.	NAME	MALT	BASE	MAT'L	FIN	MAT'L	FIN	MAT'L	FIN	MAT'L	FIN	MATL	FIN	
125	WORKSTATION	PC	RB	CMU	PT	CMU	PT	CMU	PT	CMU	PT	STRUCT	PT	
126	TIRE SERVICE	PC	RB	СМО	PT	CMU	PT	CMU	PT	СМО	PT	STRUCT	PT	
127	STORAGE	PC	RB	СМО	РТ	CMU	PT	CMU	РТ	CMU	PT	STRUCT	PT	
128	SERVICE BAY/ EQUIP. PARKING	PC	RB	СМО	PT	CMU	PT	CMU	РТ	CMU	PT	STRUCT	PT	
129	AUTO WASHBAY/ TRANSPORT SERVICE BAY	PC	RB	PMP	SP	PMP	SP	PMP	SP	PMP	SP	STRUCT	GALV	ALL STEEL STRUCTURE WILL BE GALVANIZED.
200	STAIRS	PC	RB	СМО	PT	CMU	PT	CMU	PT	СМО	PT	STRUCT	PT	
201	TRADE SHOP	PC	RB	CMU	PT	CMU	PT	CMU	PT	CMU	PT	STRUCT	PT	
201A	BOILER ROOM	PC	RB	CMU	PT	CMU	PT	CMU	PT	CMU	PT	STRUCT	PT	
202	MECHANICS SHOP MEZZANINE	PC	RB	CMU	PT	CMU	PT	CMU	PT	CMU	PT	STRUCT	PT	
202A	STORAGE MEZZANINE	PC	RB	CMU	РТ	CMU	PT	CMU	РТ	CMU	PT	STRUCT	РТ	

NOTES AND ABBREVIATIONS

GENERAL NOTES

- 1. See drawings for all finishes not noted within this schedule.
- 2. See reflected ceiling plan for exact location and type of acoustical ceiling per specifications 09 51 00. Elevations of ceilings and bulkheads are noted on drawings.
- 3. For extent of all hollow metal frame and screen painting see door and screen schedule.
- 4. All bulkheads to be type "X" gypsum board unless otherwise noted on drawings or this schedule.
- 5. See drawings for all ceiling heights.
- 6. All Showers will be finished with Ceramic Tile. Refer to interior elevations and details.
- 7. All exposed structure, mechanical, and electrical services (eg. metal deck, columns, beams, girts, steel framed openings, bracing, etc.) to be painted, unless noted otherwise. See also reflected ceiling plans.
- 8. See site plan for all painted bollards.

SCHEDULE ABBREVIATIONS

ABG	ABUSE RESISTANT GYPSUM BOARD	MRG	MOISTURE RESISTANT GYPSUM	SMU	STONE MASONRY UNITS
АСТ	ACOUSTICAL CEILING	PC	POLISHED CONCRETE	STRUCT	EXPOSED STRUCTURE
сми	CONCRETE UNIT MASONRY	РАР	PREFORMED ALUMINUM PANELS	твв	TILE BACKER BOARD
СРТ	CARPET TILE	РСТ	PORCELAIN CERAMIC TILE	TF	TERRAZZO FLOOR
ст	CERAMIC TILE	РМР	PREFINISHED METAL LINER PANEL	WAF	WOOD ATHLETIC FLOORING
DWG	REFER TO DRAWINGS	РТ	PAINT	vст	VINYL COMPOSITE TILE

CRITCHLEY HILL Architecture Inc.

ROOM FINISH SCHEDULE

		WALL										REMARKS		
	NANAF	D 4 A TH	DACE	NORTH		SOUTH		EAS	бт	WEST			FINI	
NO.	NAIVIE		DASE	MAT'L	FIN	MAT'L	FIN	MAT'L	FIN	MAT'L	FIN	MATL	FIN	
EFCB	EPOXY FLOORING COVE BASE		RB	RUBBER BAS	6E			SSHV	SAFETY SH	EET FLOORIN	IG			
EF	EPOXY FLOORING		RST	RUBBER STA	IR TREAD	s								
FP	FIRE RETARDANT PLYWOOD		sc	SEALED CON	ICRETE									
GALV	GALVANIZED		SP	SEE SPECIFIC	CATIONS									
GSF	GYMNASIUM SHEET FLOORING		SHCB	SHEET VINY	FLASH CO	OVE BASE								
GWB	STANDARD TYPE "X" GYPSUM BOARD		SHV	RESILIENT S	HEET FLOC	DRING								

CRITCHLEY HILL Architecture Inc.

PROJECT NO. 2208

120.1

MECHANICS SHOP

DOOR AND FRAME SCHEDULE

Town of Marathon, New Public Works Facility

ISSUED FOR TENDER

Date: August 2022 DOOR FRAME ULC HWDE GLAZING REMARKS NO. ROOM TYPE MAT FIN WIDTH ΗТ TYPE MAT FIN LABEL POWER DOOR OPERATOR & PUSH BUTTON ACTUATORS. В ΗМ РΤ 2-965 2150 1 HМ PΤ PB, CL WEATHERSTRIPPED, C/W SWEEP, THRESHOLD AND CLOSER. PANIC , т 100 VESTIBULE REMOVABLE MULLION POWER DOOR OPERATOR & PUSH BUTTON ACTUATORS. PANIC, В IHM РТ 2-965 2150 1 TBHM PT PB, CL TBIG -100.1 VESTIBULE REMOVABLE MULLION SMOKE SEALED, C/W FIRE RATED SWEEP AND CLOSER. С HM PT 965 2150 1 HМ PΤ 90 MIN CL PGWG 101 CORRIDOR ΡТ 965 2150 РΤ PB, CL TBIG WEATHERSTRIPPED, C/W SWEEP, THRESHOLD AND CLOSER. А IHM 1 TBHM -101.1 CORRIDOR А ΗМ РΤ 965 2150 2 HМ PΤ -Т 102 LUNCH/MEETING А HM ΡΤ 965 2150 3 HМ PΤ т 103 TRAINING в ΡТ 2150 2 РΤ HM 965 HМ Т ADMIN _ 104 А ΗМ РΤ 965 2150 1 HМ PΤ 105 MALE CHANGE -А РΤ 965 2150 1 HМ PΤ 106 FEMALE CHANGE HM --А ΡТ 965 2150 1 РΤ HM HМ -. -107 WASHROOM А РТ 965 2150 1 PΤ HM HM _ 108 WASHROOM -А ΗМ РΤ 965 2150 3 HМ PΤ т 109 OFFICE С РТ 90 MIN CL 110 HM 965 2150 1 HМ PT -SMOKE SEALED, C/W FIRE RATED SWEEP AND CLOSER. WATER WORKS SHOP IHM PT 965 2150 TBHM PΤ PB, CL WEATHERSTRIPPED, C/W SWEEP, THRESHOLD AND CLOSER А 1 -110.1 WATER WORKS SHOP -F SP 3048 3048 SP ---SECTIONAL METAL OVERHEAD DOOR, C/W OPERATOR 10.2 WATER WORKS SHOP ---РΤ А РТ 965 2150 111 OFFICE HM 1 HМ ---G.N. CHANGE/ EMERGENCY SHOWER А HM РТ 965 2150 1 HM PΤ _ -112 POWER DOOR OPERATOR & PUSH BUTTON ACTUATORS. RESTROOM А HМ РТ 965 2150 1 HМ PT 113 UNIVERSAL WASHROOM CONTROL KIT. EMERGENCY CALL KIT. CUSTODIAL / PPE STORAGE А HM РТ 965 2150 1 HМ PT 45 MIN CL SMOKE SEALED, C/W FIRE RATED SWEEP AND CLOSER. 115 -ΡТ РΤ CL SERVICES/ UTILITY А ΗМ 965 2150 1 116 HМ 45 MIN -SMOKE SEALED, C/W FIRE RATED SWEEP AND CLOSER. WEATHERSTRIPPED, C/W SWEEP, THRESHOLD AND CLOSER ON ACTIVE SERVICES/ UTILITY PΤ А IHM PΤ 2-915 2150 1 TBHM CL _ LEAF. ASTRAGAL. BOLT TOP AND BOTTOM ON INACTIVE LEAF. 116.1 117 TRADES SHOP С HМ PΤ 965 2150 1 HМ PT 90 MIN CL SMOKE SEALED, C/W FIRE RATED SWEEP AND CLOSER. -117.1 TRADES SHOP А ІНМ РТ 965 2150 1 твнм PT PB, CL WEATHERSTRIPPED, C/W SWEEP, THRESHOLD AND CLOSER. --117.2 TRADES SHOP F SP SP 3048 3048 -SECTIONAL METAL OVERHEAD DOOR. C/W OPERATOR -----С нм РΤ 965 2150 1 нм PΤ 90 MIN CL SMOKE SEALED, C/W FIRE RATED SWEEP AND CLOSER. -118 SMALL EQUIPMENT твнм PΤ А IHM РТ 965 2150 1 PB, CL WEATHERSTRIPPED, C/W SWEEP, THRESHOLD AND CLOSER 118.1 -SMALL EQUIPMENT -Е SP 2438 2438 SP ---SECTIONAL METAL OVERHEAD DOOR ---118.2 SMALL EQUIPMENT А нм РΤ 965 2150 1 нм PΤ 119 WASHROOM ---А IHM PΤ 965 2150 1 TBHM PT PB, CL TBIG WEATHERSTRIPPED, C/W SWEEP, THRESHOLD AND CLOSER. MECHANICS SHOP -120

твнм

1

РΤ

-

PB. CL

TBIG

WEATHERSTRIPPED, C/W SWEEP, THRESHOLD AND CLOSER

А

IHM

ΡТ

965

2150

DOOR AND FRAME SCHEDULE

CRITCHLEY HILL Architecture Inc.

								_					
120.2	MECHANICS SHOP	G	SP	SP	4267	4267	-	-	-	-	-	-	SECTIONAL METAL OVERHEAD DOOR, C/W OPERATOR
120.3	MECHANICS SHOP	G	SP	SP	4267	4267	-	-	-	-	-	-	SECTIONAL METAL OVERHEAD DOOR, C/W OPERATOR
120.4	MECHANICS SHOP	G	SP	SP	4267	4267	-	-	-	-	-	-	SECTIONAL METAL OVERHEAD DOOR, C/W OPERATOR
120.5	MECHANICS SHOP	G	SP	SP	4267	4267	-	-	-	-	-	-	SECTIONAL METAL OVERHEAD DOOR, C/W OPERATOR
120.6	MECHANICS SHOP	G	SP	SP	4267	4267	-	-	-	-	-	-	SECTIONAL METAL OVERHEAD DOOR, C/W OPERATOR
120.7	MECHANICS SHOP	G	SP	SP	4267	4267	-	-	-	-	-	-	SECTIONAL METAL OVERHEAD DOOR, C/W OPERATOR
121	OFFICE	В	нм	PT	965	2150	1	нм	PT	-	-	-	
124	BATTERY CHARGING/ STORAGE	А	нм	PT	965	2150	1	нм	PT	45 MIN	CL	-	SMOKE SEALED, C/W FIRE RATED SWEEP AND CLOSER.
127	STORAGE	А	НМ	PT	965	2150	1	HM	PT	45 MIN	CL	-	SMOKE SEALED, C/W FIRE RATED SWEEP AND CLOSER.
128	SERVICE BAY/ EQUIP. PARKING	G	SP	SP	4267	4267	-	-	-	-	-	-	SECTIONAL METAL OVERHEAD DOOR, C/W OPERATOR
128A	WASHBAY EQUIP. ROOM	А	нм	PT	965	2150	1	нм	PT	-	-	-	
129	AUTO WASHBAY/ TRANSPORT SERVICE BAY	D	AL	SP	965	2150	1	AL	PT	-	CL	т	WEATHERSTRIPPED, C/W SWEEP, THRESHOLD AND CLOSER.
129.1	AUTO WASHBAY/ TRANSPORT SERVICE BAY	G	SP	SP	4267	4267	-	-	-		-	-	SECTIONAL METAL OVERHEAD DOOR
129.2	AUTO WASHBAY/ TRANSPORT SERVICE BAY	D2	AL	SP	965	2150	1	TBAL	SP		PB, CL	-	WEATHERSTRIPPED, C/W SWEEP, THRESHOLD AND CLOSER. INSULATED INFILL PANELS IN LIEU OF GLAZING.
129.3	AUTO WASHBAY/ TRANSPORT SERVICE BAY	D2	AL	SP	965	2150	1	TBAL	SP	-	PB, CL	-	WEATHERSTRIPPED, C/W SWEEP, THRESHOLD AND CLOSER. INSULATED INFILL PANELS IN LIEU OF GLAZING.
129.4	AUTO WASHBAY/ TRANSPORT SERVICE BAY	G	SP	SP	4267	4267	-	-	-		-	-	SECTIONAL METAL OVERHEAD DOOR
200	STAIRS	С	IHM	PT	965	2150	1	TBHM	PT	-	CL	-	WEATHERSTRIPPED, C/W SWEEP, THRESHOLD AND CLOSER.
201	TRADE SHOP STORAGE	А	НМ	PT	965	2150	1	НМ	PT	-	-	-	
201.1	TRADE SHOP STORAGE	А	нм	PT	2-915	2150	1	НМ	PT	90 MIN	CL	-	SMOKE SEALED, C/W FIRE RATED SWEEP AND CLOSER.
201A	BOILER ROOM	А	HM	PT	965	2150	1	HM	PT	45 MIN	CL	-	SMOKE SEALED, C/W FIRE RATED SWEEP AND CLOSER.
202A	STORAGE MEZZANINE	А	НМ	PT	965	2150	1	НМ	PT	-	-	-	

SCREENS	CREENS												
SC104	ADMIN	-	-	-	915	1200	4	нм	РТ	-	-	т	
SC128	SERVICE BAY/ EQUIP.	-	-	-	915	1200	4	AL	SP	-	-	т	

DOOR AND FRAME SCHEDULE

CRITCHLEY HILL Architecture Inc.

NOTES AND ABBREVIATIONS

GENERAL NOTES

- 1. See drawings for frame and hardware details.
- All interior hollow metal frames shall wrap around type. Partition thicknesses vary. See Hollow Metal Frame throat size schedule. Should noted throat size not exact provide closest available opening to accommodate wrap around condition. Provide custom sizes as required to suit.
- 3. Doors that require access control -D100.1 / D101.1 / D110.1 / D116.1 / D117.1 / D118.1 / D120 / D120.1 and D128. Card Readers and Door Controllers by Division 28.
- 4. Provide Restroom Control Kit and Emergency Call Kit for Universal Washroom D113.
- 5. All exterior hollow metal frame widths shall be 150mm, and set flush in the opening. All frames shall be insulated.
- 6. All door and screens to be sealed around their perimeter on both sides.
- 7. All fire rated hollow metal frames shall be insulated with mineral wool insulation.

-	
AL	NON THERMALLY BROKEN ALUMINUM
CL	CLOSER
РВ	PANIC BAR
нм	NON THERMALLY BROKEN HOLLOW METAL
ІНМ	INSULATED HOLLOW METAL
PGWG	POLISHED GEORGIAN WIRE GLASS
РТ	PAINT
SP	SEE SPECIFICATION
т	TEMPERED GLASS
TBAL	THERMALLY BROKEN ALUMINUM
твнм	THERMALLY BROKEN HOLLOW METAL
TBIG	THERMALLY BROKEN INSULATING GLASS UNITS





