

SPECIFICATIONS

Town of South Bruce Peninsula: Proposed New Town Hall

Town of South Bruce Peninsula

Architect's Project Number: 2404

Owner:

Town of South Bruce Peninsula

315 George Street, Wiarton, Ontario, N0H 2T0

Architect:

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Drawing

Issue

New Town Hall – Town of South Bruce Peninsula

Architect's Project Number: 2404

October, 2025

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Architectural Drawings are entitled “**Proposed Renovations to: Town of South Bruce Peninsula, New Townhall Offices**, 369 William Street, **Warton, ON**”. Architect's Project number is 2404. Architectural drawings are 36" x 48" in size, prepared by G. M. Diemert Architect Inc. and they are listed below:

Drawing No.	Title	Issue No.....	Issue Note	Date
A-002	Site Plan, OBC Matrices & Details	1	Issued for Tender	2025.10.28
A-003	Site Plan Enlarged	1	Issued for Tender	2025.10.28
A-004	Landscape Plan	1	Issued for Tender	2025.10.28
A-005	Site Plan – Demolition	1	Issued for Tender	2025.10.28
A-010	Foundation & Ground Floor Plans - Demolition	1	Issued for Tender	2025.10.28
A-011	2 nd Floor & Roof Plans - Demolition	1	Issued for Tender	2025.10.28
A-012	Roof Structure - Demolition	1	Issued for Tender	2025.10.28
A-100	Foundation Plan	1	Issued for Tender	2025.10.28
A-110	Ground Floor Plan	1	Issued for Tender	2025.10.28
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A-301	Existing Building Sections	1	Issued for Tender	2025.10.28
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A-303	Building Sections	1	Issued for Tender	2025.10.28
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A-404	Washrooms – Enlarged Plans	1	Issued for Tender	2025.10.28
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Structural Engineering Drawings are entitled “**Proposed Renovations to: Town of South Bruce Peninsula, South Bruce Peninsula New Town Hall Conversion**, 370 William Street, **Warton, ON**”. Structural Engineer's Project number is 2402330. Structural drawings are 91.44 cm x 60.96 cm in size, prepared by GEI Consultants Canada Ltd. and they are listed below:

Drawing No.	Title	Issue No.....	Issue Note	Date
S1.1	Structural Notes	4	Issued for Tender	2025.10.28
S1.2	Structural Notes & Schedules	4	Issued for Tender	2025.10.28
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S5.1	Section Details	4	Issued for Tender	2025.10.28
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S6.3	Roof Stair Framing	4	Issued for Tender	2025.10.28
S6.4	Front Canopy Structure	4	Issued for Tender	2025.10.28

Mechanical Engineering Drawings are entitled **“Proposed Renovations to: Town of South Bruce Peninsula, New Townhall Offices, 370 William Street, Wiarton, ON”**. Mechanical Engineer's Project number is 2404. Mechanical drawings are 36" x 48" in size, prepared by D.E.I. Consulting Engineers Inc. and they are listed below:

Drawing No.	Title	Issue No.....	Issue Note	Date
M101	Legend & Schedules (1 of #)	3	Issued for Review	2025.10.15
M102	Schedules (2 of #)	3	Issued for Review	2025.10.15
M201	Plumbing & Drainage - Demolition	3	Issued for Review	2025.10.15
M202	Roof Plan - Demolition	3	Issued for Review	2025.10.15
M301	Fire Protection - Renovation	3	Issued for Review	2025.10.15
M401	Ground Floor Plans Plumbing & Drainage - Renovation	3	Issued for Review	2025.10.15
M501	Heating & Ventilation – Renovation	3	Issued for Review	2025.10.15
M601	Roof Plan – Renovation	3	Issued for Review	2025.10.15
M701	Details (1 of #)	3	Issued for Review	2025.10.15

Electrical Engineering Drawings are entitled **“Proposed Renovations to: Town of South Bruce Peninsula, New Townhall Offices, 370 William Street, Wiarton, ON”**. Electrical Engineer's Project number is 2404. Electrical drawings are 36" x 48" in size, prepared by D.E.I. Consulting Engineers Inc. and they are listed below:

Drawing No.	Title	Issue No.....	Issue Note	Date
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E301	Ground Floor Plan Lighting - Renovation	3	Issued for Review	2025.10.15
E401	Ground Floor & Roof Plans Power & Systems - Reno	3	Issued for Review	2025.10.15
E501	Distribution Riser Diagram	3	Issued for Review	2025.10.15
E601	Fire Alarm Riser and Graphic	3	Issued for Review	2025.10.15

Reference Drawings:

Civil Reference Drawings are entitled **“Oxeden Waterworks Contract No. 1 Water Distribution System”**. File number is noted as 8-1821. Title block Issue Note referenced below is provided as the latest issued date for the Consultant's drawing and this date is not the date upon which the words “Record Drawings” had been added. The creation date for the As Built information is not known, but it will coincide with the completion of the Civil work during 1996 or 1997. These drawings are an undocumented size; numbered and entitled as listed below:

Drawing No.	Title	Issue No	Issue Note
4	Bay Street Plan & Profile	6	Nov. 29, 1996, Marked “Record Drawings”

As-Built Structural Reference Drawings are entitled **“Solway's Food Market Addition & Renovations”**. Project number is noted as C4080 and prepared by Gamsby and Mannerow Limited. These drawings are unidentified size; numbered and entitled as listed below:

Drawing No.	Title	Issue No	Issue Note
1	Site Plan	-	Feb. 12, 1999.
2	Foundation Plan & Details	-	Feb. 16, 1999.
3	Floor Plan	-	Feb. 22, 1999.
4	Floor Plans & Details	-	Mar. 05, 1999.
5	Elevations	-	Feb. 22, 1999.
6	Wall Sections	-	Mar. 05, 1999.
7	Wall Sections & Pyramid Framing	-	Mar. 02, 1999.

End of Project Manual Contents.

PART 1 APPLICATION OF THIS SECTION:

- 1.0 The Canadian Construction Documents Committee Stipulated Price Contract, 2020 English version, consisting of the Agreement Between Owner and Contractor, Definitions, and General Conditions of the Stipulated Price Contract, Parts 1 to 13 inclusive, governing same is hereby modified and supplemented as follows within this Section. Where these amendments, supplements, additions, and modifications specifically reference a change to the Agreement, Definitions, or General Conditions, the amendments, additions and modifications described within this Section shall govern.**

PART 2 REVISIONS TO ARTICLES, DEFINITIONS AND GENERAL CONDITIONS:

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

- .1 Amend: Article A, clause 6.3 by adding “and the Consultant” after the word “one party” as follows:
- .2 “6.3 A notice in Writing delivered by one party and the Consultant in accordance with this Contract will be deemed to have been received by the other party and the Consultant on the date of delivery...”
- .3 Add to the first sentence of clause A6-6.5 the words “and the Consultant” after the words “An address for a party...” as follows:

“6.5 An address for a party and the Consultant may be changed by Notice in Writing...”

2.2 CCDC 2-2020 “DEFINITIONS” Pages – add the following definitions:

- .1 Add the following definition:

“Submittals”: *Submittals are documents or items required by the Contract Documents that must be provided to the Owner and the Consultant by the Contractor, including, but not limited to:*

 - *Shop Drawings, samples, models and mock-ups intended to communicate and to indicate details or characteristics, before the portion of the Work that they represent can be incorporated into the Work; and*
 - *As-built drawings and manuals that provide instructions related to the operation and maintenance of the Work, together with various reports, the written results of materials testing, inspection reports, certificates and warranties.”*
- .2 Add the following definition:

“Request for Information”
A Request for Information (also known as an “RFI”) is a document issued by the Contractor to the Consultant which is a written request for clarification of the intent of the Contract Documents in a particular instance. The need for clarification arises when Contractor has formed the opinion that the intent of the Contract Documents is unclear or that information provided in the Contract Documents is insufficient to manage the circumstance referenced within the RFI.”
- .3 Add the following definition:

“As-Built Drawings”
As-Built Drawings are copies of the Contract Documents marked by the Contractor using annotations, dimensions and graphic representations of the actual condition found at the Place of the Work following construction. As-built drawings are prepared by the Contractor as the Work is prosecuted. When the constructed parts of the Project differ in location and material or characteristics from the content of the Contract Documents, the marks and annotations made on the As-Built Drawings by the Contractor shall describe the exact position as constructed of the parts of the Work affected relative to the other constructed building walls, interior partitions and property lines, as the case requires for the parts of the Work that differ from the content of the Contract Documents. The marks and annotations made by the Contractor shall also describe the exact assembly constructed if the assembly differs from the assembly described on the Contract Documents.

The Contractor's marks and annotations shall also describe the following conditions:

- .1 the actual position of the building foundation and the building's enclosing walls, concrete walks and concrete landscape elements, concrete curbs and asphalt paving, service manholes, existing fire hydrants and existing and new fences measured in the field and marked on a separate drawing prepared by a registered land surveyor;*
- .3 the actual location of building services (the location and position HVAC ductwork and associated machines, all drainage piping, water supply piping, including valve positions, electrical devices and electrical conductors enclosed within conduits or positioned in cable trays and hooks or those services that are buried below the floor) within the building's enclosing walls;*
- .4 the actual position of all structural elements relative to the building's enclosing walls and the legal property boundary lines and the installed size of building services originating beyond the legal property boundary for their complete extent from their origin to their connection to the building, together with the position of their appurtenance and structures including, but not limited to, transformers, conduits and duct banks, valves, manholes, backflow preventers and cleanouts, all of which shall have been measured as they had been constructed in the field."*

PART 3 GENERAL CONDITIONS:

3.0 General:

- .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.*

3.1 GC 1.1 CONTRACT DOCUMENTS

- .1 Add to the end of the sentence in subparagraph 1.1.2.2 the following text:
"...except where the Consultant shall be indemnified as a third-party beneficiary as provided in subparagraphs 9.2.7.4, 9.5.3.4, 13.1."*
- .2 Add to 1.1.6 a new sentence to the end of paragraph 1.1.6.3:
"1.1.6.3 No part of any specification document, illustration of the Work or annotation on any drawing, will be construed to place responsibility on the Owner or the Consultant to settle disputes whether these arise among the Sub-Contractors and Suppliers or between any Sub-Contractors and any Supplier and the Contractor."*
- .3 Add new sentence 1.1.12:
"1.1.12 The copies of the Contract Documents provided by the Owner to the Contractor will be in the form of non-editable, electronic (digital) files using a portable document format (PDF), only."*
- .4 Add new paragraph 1.1.13:
"1.1.13 The Contractor shall review the Contract Documents and this review shall be diligent and continuous throughout the duration of the Contract Time and the review shall comply with the standard of care described in paragraph 3.9 PRECEPTS GOVERNING THE PERFORMANCE BY THE CONTRACTOR."*
- .5 Add new paragraph 1.1.14:
"1.1.14 Should the Contractor does discover any error, inconsistency or omission in the Contract Documents, the Contractor shall not proceed with the work affected until the Contractor has received corrected or missing information from the Consultant through implementation of the Request for Information process described below. Neither the Owner nor the Consultant shall bear responsibility for the consequences of any action of the Contractor executed on the basis of oral instructions."*
- .6 Add new paragraph 1.1.15:*

"1.1.15: If, at any time, the Contractor has formed the opinion that the Contract Documents contain errors, inconsistencies, or omissions or if the Contractor has encountered a condition at the Place of the Work that is inconsistent with the Work intended by the Contract Documents or if the Contractor experiences any doubt regarding the meaning or intent of any part of the Contract Documents, the Contractor shall immediately prepare and provide to the Consultant for review and commentary a Request for Information."

.7 Add new paragraph 1.1.16:

"1.1.16: Request for Information (RFI) documents shall:

- .1 be in a format acceptable to the Consultant and*
- .2 the Request for Information shall contain a request for clarification or a request for the issuance of a response to the RFI in a format acceptable to the Consultant or a request for a Supplemental Instruction or for a Proposed or Contemplated Change Order (CCO) or for the issuance of a Change Directive, as the case may require.*
- .3 The Request for Information shall include references to the relevant Contract Documents and*
- .4 each Request for Information shall identify a single, discrete and itemized case or instance."*

.8 Add new paragraph 1.1.17:

"1.1.17: The following are the requirements the management of all documents associated with all Requests for Information:

- .1 The Contractor bears responsibility for maintenance of a record of the Request for Information documents together with the responses associated with each during the full course of the prosecution of the Work. The Request for Information documents produced shall be kept current by the Contractor and retained together with the Consultant's responses and the Contractor shall order and schedule and monitor the status of all Request for Information events and documents throughout the duration of the Contract Time.*
- .2 The Contractor shall issue all Request for Information documents to the Consultant in a timely manner and with due consideration for the requirements of Contractor's Construction Schedule and sufficiently in advance of the planned execution of the affected work so as to cause no delay in the Work or in the work of any Sub-Contractor or in the work of any other contractor. The Contractor shall incorporate the time required by the Consultant to prepare and issue a response to Request for Information documents when determining the issue date of any Request for Information.*
- .3 The Contractor shall review each Request for Information together with the Contract Documents prior to issuance to the Consultant and thereby ensure that information requested within the Request for Information is not within the Contract Documents.*
- .4 The Consultant shall review and respond to each Request for Information within the period of 14 calendar days or such longer period as may be reasonably required, next following the day upon which the Request for Information is received by the Consultant."*

.9 Add new paragraph 1.1.18:

"1.1.18 The Contractor shall maintain and retain in a current state, a complete set of As-Built documents at the Place of the Work and these documents shall be available for review by the Owner and the Consultant at any time during the duration of the Contract Time. To create the As-Built documents, the Contractor shall procure a separate, printed set of current contract documents and store these in a safe and convenient location at the site and identify these documents through clear annotation of the words "AS-BUILT". The Contractor shall mark As-Built information on the documents while the Work is being prosecuted."

3.2 GC 2.2 ROLE OF THE CONSULTANT

.1 Add at the end of paragraph 2.2.8 the following sentence:

"The Owner and the Contractor shall waive any claims against the Consultant arising out of the making of such interpretations and findings made in accordance with paragraphs 2.2.7., 2.2.8. and 2.2.9".

3.3 GC 2.4 DEFECTIVE WORK

.1 Add new subparagraphs 2.4.1.1 and 2.4.1.2:

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

2.4.1.2 The Contractor shall prioritize the correction of any defective work which, in the sole discretion of the Owner, adversely affects the day to day operation of the Owner."

3.4 GC 3.1 CONTROL OF THE WORK

.1 Add new paragraph 3.1.3:

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

3.5 GC 3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

.1 Add new sub-paragraph 3.2.3.5:

"3.2.3.5 Subject to General Condition 9.4 - CONSTRUCTION SAFETY, where GC 3.2 - CONSTRUCTION BY OWNER OR OTHER CONTRACTORS applies, Contractor shall maintain responsibility for compliance with all aspects of the applicable health and safety legislation in the Place of the Work, including all of the responsibilities of the Constructor as that term is defined in the Occupational Health and Safety Act."

3.6 GC 3.4 CONSTRUCTION SCHEDULE

.1 Delete paragraph 3.4.1 and all sub-paragraphs in their entirety and substitute new paragraph 3.4.1 and all sub-paragraphs noted below:

"3.4.1 The Contractor shall prepare a Construction Schedule and the Contractor shall ensure that the process undertaken to execute the Work, monitor the progress of the Work and to prepare amendments to the Construction Schedule will conform to the requirements of the Contract Documents and the following requirements:

- .1 Within a period of 10 calendar days next following the date upon which the Contract has been executed by the Owner and the Contractor, the Contractor shall prepare and submit to the Owner and the Consultant for their review, a schedule for the prosecution of the Work that illustrates and describes the duration of the activities of the Work in sufficient detail to permit an understanding of the total duration of the Contract Time together with the sequence of critical activities and the relationship of the critical activities to other identified activities for the full duration of the Work. Any activity that has or may eventually have an influence on the duration of the Critical Path shall be identified on the construction schedule. The schedule shall be prepared using a method that is in accordance with the Contract Documents or otherwise acceptable to the Consultant and the Owner.*
- .2 The Contractor's proposed construction schedule and any successor schedule documents shall include within the calculated Contract Time and the calculated duration of activities, the effect on productivity and efficiency caused by adverse weather conditions normally anticipated as described within the Contract Documents and therefore, the Owner shall be entitled to assume that the proposed schedule incorporates a reduction in efficiency of exterior work occurring during the winter months of the year.*
- .3 The schedule provided by the Contractor shall be a representation of the Contractor's plan for the prosecution of the Work that illustrates the duration of critical activities and their sequence and their relationship to important, but less critical activities and events which are required to achieve the prosecution of the Work within the duration of the Contract Time. Critical activities are those activities identified by the Contractor that, taken together, constitute the Critical Path, and it is the efficacious*

completion of these activities that the successful prosecution of the Work within the designated Contract Time depends.

- .4 The Contractor shall provide the construction schedule and any successor or revised schedules to the Owner in electronic format and paper copy.*
- .5 Following review of the schedule by the Owner and the Consultant, the Contractor's construction schedule, prepared and amended by the Contractor to include any mutually agreeable amendments, shall become the standard construction schedule. Subsequent amendments to the standard construction schedule found mutually agreeable to the Contractor and the Owner, shall be incorporated within the Contractor's construction schedule and submitted to the Owner and the Consultant. The schedule as submitted shall become an acceptable, amended and successor standard construction schedule. The Owner, Consultant and the Contractor shall utilize the standard construction schedule to evaluate the efficacy of the Contractor's plan of activities as it is implemented during the prosecution of the Work. When it is found that the actual construction time required to complete an activity does not correlate with the time forecasted on the standard construction schedule, the occurrence will be considered as evidence of efficiency or evidence of inefficiency in the Contractor's established plan for the prosecution of the Work as each case requires.*
- .6 The review of the Contractor's proposed schedule and all of the Contractor's successor and amended schedule documents by the Owner and the Consultant shall neither be considered as an endorsement and approval of the schedule and all that it implies nor shall this review signify that the Owner and the Consultant have assumed any amount of responsibility for the feasibility or efficacy of the proposed construction schedule relative to the scope and nature of the Work described within the Contract Documents or for the Project as a whole. The Contractor bears sole responsibility for the feasibility and efficacy of any proposed schedule and any successor and amended schedule documents and the standard construction schedule.*
- .7 The Contractor shall provide the expertise and resources, (such resources including manpower and equipment), as are necessary to maintain the progress of the construction of the Work such that the actual time required to complete construction activities correlates with the sequence and the time period assigned to the activities identified within the standard construction schedule or any successor or revised schedule found mutually agreeable.*
- .8 The Contractor shall review the Work continuously and monitor the progress of the Work continuously and compare the findings of the review and monitoring, accumulated over the period of each week of the duration of the Contract Time, to the standard construction schedule, or any successor or revised schedule found mutually agreeable. The Contractor shall report deviations associated with the comparison of actual progress in the prosecution of the Work to the forecasted progress within the standard construction schedule or successor schedule documents found mutually agreeable, during each site meeting convened throughout the duration of the Contract Time. Further, the Contractor shall prepare necessary amendments to the construction schedule once during each month of the duration of the Contract Time or more frequently as requested by the Consultant or the Owner, and the Contractor shall provide notice to the Consultant and the Owner in writing of any variation from the standard schedule; and*
- .9 if, after applying the expertise and resources required under sub-paragraph 3.4.1.7, the Contractor forms the opinion that the variation found between the standard construction schedule and the actual progress of the prosecution of the Work cannot be recovered by the Contractor, it shall, in the same notice, indicate to the Consultant and the Owner whether the Contractor intends to make an application for an extension of Contract Time as provided in PART 6 of the General Conditions - CHANGES IN THE WORK.*
- .10 Following the achievement of substantial performance of the Contract as signified by the issuance of Form 6 of the Construction Lien Act by the Consultant, the Contractor shall prepare detailed schedule documents that identifies the sequence and duration of all activities required to complete the Work of the Contract and all activities required to correct all deficient Work. Such schedules shall be maintained and monitored as described for the standard construction schedule or successor schedule documents found mutually agreeable.*
- .11 The Contractor is solely responsible for communication of the Project Work plan, the construction schedule, any proposed construction schedules and communication of the production requirements*

associated with the construction schedule found agreeable to the Owner, to all persons and Sub-Contractors providing services or materials required for the prosecution of the work. The Contractor shall also arrange participation both on site and during factory or shop production of the work of Sub-Contractors and suppliers, as required, for the purpose of establishing and maintaining schedules and monitoring progress of the Work."

.2 Add new paragraph 3.4.2:

"3.4.2 If, at any time, the Owner or the Consultant has formed an opinion that the actual progress of the Work had not resulted in the achievement of the completion dates marked on the standard construction schedule or any successor schedule found mutually agreeable, or that it seems inevitable or likely that the Work will be completed later than planned by the Contractor or as indicated on the construction schedule, or if the Contractor has given notice of such to the Owner or the Consultant pursuant to sub-paragraph 3.4.1.9, the Contractor shall implement measures intended to cause the actual progress of the Work to achieve conformance to the construction schedule or successor schedule documents found mutually agreeable. Such measures shall include revisions to the sequence of the Work, extended daily working hours, prosecution of Work during Saturdays, Sundays or Statutory Holidays or the enlargement of the labour force employed at the Place of the Work, all intended to alleviate or minimize the resulting delay. However, in no case shall such measures reduce the scope and quality of the Work or jeopardize the safety of persons employed at the Place of the Work. The Contractor shall produce and present to the Owner and the Consultant a recovery plan demonstrating how the Contractor will achieve the recovery of the schedule."

3.7 GC 3.7 LABOUR AND PRODUCTS

.1 Add new paragraph 3.7.4:

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

3.8 GC 3.8 SHOP DRAWINGS

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

.2 Add a new sentence to 3.8.1 following the words "... as required in the Contract Documents.":

"Prior to the first application for payment, the Contractor and the Consultant shall jointly prepare a schedule of the dates for submission and return of Shop Drawings and any Submittals."

.3 Add "and Submittals" after the words "Shop Drawings" in paragraphs 3.8.1, 3.8.2, 3.8.3, 3.8.5, 3.8.6 and 3.8.7.

.4 Within sentence 3.8.7, Delete the words "...with reasonable promptness so as to cause no delay in the performance of the Work." and replace with "...within 14 calendar days next following the day upon which the Consultant had received the submittal or such longer period as may be reasonably required."

3.9 Add New General Condition "GC 3.9 PRECEPTS GOVERNING THE PERFORMANCE BY THE CONTRACTOR":

.1 Add new General Condition "GC 3.9 PRECEPTS GOVERNING THE PERFORMANCE BY THE CONTRACTOR:

3.9.1 During performance of 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 designated supervisor and project manager, subject to the Owner's approval, in the event of death, incapacity, removal or resignation."*

3.10 GC 4.1 CASH ALLOWANCES

- .1 Delete paragraph 4.1.7 in its entirety and substitute new paragraph 4.1.7:
"4.1.7 At the commencement of the Work, the Contractor shall prepare for review and acceptance by the Owner and the Consultant, a schedule indicating the Contractor's anticipated delivery dates for items subject to payment under Cash Allowances or for items that are to be provided by the Owner and installed, connected or activated by the Contractor. The delivery dates shall be established such that the Contractor will avoid delaying the progress of the Work and attain the milestone dates provided in the construction schedule referenced in GC 3.4."
- .2 Add new paragraph 4.1.8:
"4.1.8 The Owner reserves the right to solicit, or to have the Contractor solicit, competitive bids for the cost of portions of the Work that is to be allocated or expended using the cash allowances."

3.11 GC 5.2 APPLICATIONS FOR PAYMENT

- .1 Add new paragraph 5.2.9:
"5.2.9 The Contractor shall assign a value of \$5,000.00 to As-Built documents and retain this value unexpended until such time as the As-Built documents are received and found acceptable to the Consultant. The Consultant may, in the absence of an identified and assigned value for As-Built documents on the Contractor's application for payment, elect to reduce the value of the Contractor's Application for Payment by recommending the withholding from payment to the Contractor by the Owner, this assigned value and through application of a corresponding reduction in the Certificate for Payments affected."
- .2 Add new paragraph 5.2.10:
"5.2.10 Following receipt of a written notice issued by the Consultant stating that the As-Built documents provided by the Contractor are considered to be acceptable to the Consultant, the assigned value for the As-Built documents may be included as part of the amount due to the Contractor under the Contractor's Application for Payment next following the receipt of such notice."

3.12 GC 5.3 PAYMENT

- .1 Add new paragraph 5.3.1.3:
"the Owner shall make payment to the Contractor on account as provided in Article A-5 of the Agreement – PAYMENT on or before the expiration of a period of 30 calendar days next following the date upon which the Owner had received the Consultant's Certificate for Payment."

3.13 GC 5.5 FINAL PAYMENT

- .1 Delete paragraph 5.5.4 entirely.
- .2 Add paragraph 5.5.4:
*"5.5.4 Subject to the provision of paragraph 10.4.1 of GC 10.4 - WORKERS' COMPENSATION, and any lien legislation applicable to the Place of the Work, the Owner shall, no later than **30** calendar days next following the issuance of the Consultant's final certificate for payment, pay the Contractor as provided in Article A-5 of the Agreement - PAYMENT."*

3.14 GC 6.1 THE OWNER'S RIGHT TO MAKE CHANGES

- .1 Add paragraph 6.1.3:
"6.1.3 Unit prices included in the Contract, or prices pro rata thereto, will be used in the first instance when the Contractor calculates the cost associated with changes."
- .2 Add paragraph 6.1.4:
"6.1.4 Where the cost of additional or modified Work is added to the Contract Price pursuant to GC 6.2 Change Order or GC 6.3 Change Directive, the Contract Price shall be increased by the net actual value of the work that is additional, only, and calculated to including applicable taxes with the exception of Value Added Taxes and valued in accordance with 6.3.7 or as an agreeable stipulated sum to which shall be added an amount expressed as a percentage of the total actual cost before addition of the value added"

tax as a means to compensate the Contractor for the Contractor's overhead cost and the Contractor's profit amount, identified applied separately as follows:

- .1 Contractor's mark-up on work by its own forces: Overhead 5%; Profit 5%*
- .2 Contractor's mark-up on Subcontractor's work: Overhead 5%; Profit 5%*
- .3 Sub-Contractor's mark-up on its own work: Overhead 5%; Profit 5%."*

.3 Add paragraph 6.1.5:

"6.1.5 "Overhead" percentage identified above includes, without limitations, all site supervision and the cost of administration, project management and accounting experienced by the Contractor including:

- .1 the cost of salaries and wages paid to the Contractor's staff and administrative personnel apportioned to the Project,*
- .2 the cost of insurance and bonding associated with the Project,*
- .3 the cost of travel in service of the Project,*
- .4 the cost of financing the Contractor's operations associated with the Project including any financing cost attributable to the Construction Act Holdback;*
- .5 the salaries of superintendents, engineers, timekeepers, accountants, clerks, watch persons and all other site supervision staff above foreperson employed directly on the Work;*
- .6 the cost experienced by the Contractor to coordinate the Work with Sub-Contractors,*
- .7 the cost associated with the use of temporary offices, sheds and other general temporary site support facilities and all utilities used therein; and*
- .8 the cost of licences and permits, except when these are special for the particular item or work of the change.*
- .9 The cost to produce shop drawings, mock-ups and provide samples of materials and products."*

.4 Add paragraph 6.1.6:

"6.1.6 Labour costs shall be the actual, prevailing rates at the Place of Work paid to the workers, plus payroll burdens. Payroll burdens are limited to payments in respect of the employer contribution to workers compensation payments, vacation pay, employment insurance premiums, sickness and accident insurance and pension fund contributions."

.5 Add paragraph 6.1.7:

"6.1.7 Quotations for changes to the Work shall be accompanied by itemized breakdowns together with detailed, substantiating quotations or cost vouchers from Sub-Contractors and Suppliers."

.6 Add paragraph 6.1.8:

"6.1.8 Unit and Alternative Prices included in the Contract include Supply, Installation, Products, equipment, services, materials, labour, Overhead, profit and taxes, but exclude Value Added Taxes."

.7 Add paragraph 6.1.9:

"6.1.9 The Owner, through the Consultant, reserves the right to authorize payment for changes in the Work by means of Cash Allowance Disbursement Authorizations."

.8 Add paragraph 6.1.10:

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

.9 Add paragraph 6.1.11:

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

3.15 GC 6.2 CHANGE ORDER

.1 Add sub-paragraph 6.2.1.1:

"6.2.1.1 The Contractor's presentation shall provide the following, as the minimum amount of information concerning the proposed change:

- .1 The Contractor's method used to calculate the adjustment to the Contract Price including a summary tabulation providing a clear representation of the calculation complete with supporting material which shall include copies of the cost information provided to the*

Contractor by relevant and affected Sub-Contractors written on the Sub-Contractor's letterhead, and

- .2 The Contractor's calculated adjustment in the Contract Time, if any applies, including a summary tabulation providing a clear representation of the calculation complete with supporting material which shall include copies of the information provided to the Contractor concerning adjustment to the Contract Time by the relevant and affected Sub-Contractors written on the Sub-Contractors' letterhead.*
- .3 Quotations submitted by the Contractor and by any Sub-Contractor shall provide a tabulated summary that lists the cost and applicable cost reductions associated with all items of material together with the calculated total number of hours for labour. The hours of labour shall also be summarised according to the status of persons providing the labour together with the applicable dollar value rate applied against each person and hour expended. The tabulated summary shall itemize the individual material items together with the associated labour quantities for any proposed or effected Change Order."*

3.16 GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

- .1 Add new subparagraph 6.4.5:**

"6.4.5 The Contractor confirms that, prior to submission of a Bid associated with the Project, it had carefully investigated the Place of the Work and applied to that investigation the degree of care and skill described in paragraph 3.9.1, given the amount of time provided between the issue of the bid documents and the actual closing of bids, the degree of access provided to the Contractor prior to submission of bid, and the sufficiency and completeness of the information provided by the Owner. The Contractor is not entitled to compensation or to an extension of the Contract Time for conditions which could reasonably have been ascertained by the Contractor by such careful investigation undertaken prior to the submission of the bid."

3.17 GC 6.5 DELAYS

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

"..., but excluding any consequential, indirect or special damages."

- .2 Add new subparagraph 6.5.6.**

"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 that may be related to the delay 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 or 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."

- .3 Add paragraph 6.5.7:**

"6.5.7 The following are the requirements and the processes associated with any claim made by the Contractor pursuant to GC 6.5 DELAYS:

- .1 The Contractor shall report all instances of the necessity to extend Contract Time as soon as the requirement for such an extension is apparent.*
- .2 A delay experienced during prosecution of the Work at the Place of the Work or in manufacturing or supplier facility not at the Place of the Work shall not be attributed to the Owner or the Consultant nor shall it constitute the justification for a claim for additional cost associated with delay in the prosecution of the Work without appropriate written evidence substantiating such a claim. Such evidence shall include, but is not limited to, records of the time expended in performance of the Work associated with all construction personnel providing service at the Place of the Work, records of attendance and performance at the Place of the Work by personnel affiliated with Sub-Contractors and records or receipts demonstrating dates upon which products or supplies are received and a demonstration of the influence of the actual experience at the Place of the Work on the construction schedule found agreeable to the Owner.*

- .3 *Duration of Contract Time may be changed through bilateral agreement, only and the evidence of the agreement shall be a written Change Order.*
- .4 *Extension of Contract time shall neither be construed as a delay nor form the basis for a claim for any cost associated with a delay or with a claim associated with the cost arising from lost productivity without supporting documentation and bilateral agreement ratified by written and executed Change Order.*
- .5 *Change Orders or Change Directives that do not incorporate an extension to the Contract Time or any delays in the prosecution of the Work that are associated with activities that are not identified as critical or as a part of the critical path associated with the Work currently in progress at the Place of the Work, or that are activities having float time within the construction schedule found agreeable to the Owner, shall not be considered to form any part of the Contractor's justification for a claims for additional cost associated with an extension to the Contract Time or loss of productivity.*
- .6 *Insufficiency of labour force to effectively prosecute work in accordance with the standard construction schedule or successor documents found agreeable to the Owner shall not constitute justification of a claim for extra cost associated with loss of productivity or a delay in the prosecution of the Work. The Contractor shall provide necessary crews and hours of labour necessary to achieve milestone goals recorded on schedule documents and to perform Work within planned Contract Time.*
- .7 *Loss of productivity claims shall not be considered by the Owner or the Consultant without the accompanying supporting documents listed as the required documents necessary to support any other claim made pursuant to GC 6.5 DELAYS.*
- .8 *The existence of Contemplated Change Orders and the existence of executed Change Orders, Supplemental Instructions or Change Directives as a collective and aggregated sum of adjustments to the Work, does not constitute justification for loss productivity or as a protracted instance of delay nor does the Contractor's notice regarding a delay associated with any single instruction or Change Order or Change Directive constitute notice for a delay on the basis of on-going delay for the same cause due to the presence of other instructions, Change Orders or Change Directives."*

3.18 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.
- .2 Add paragraph 6.6.7:
"6.6.7 No claim for additional cost experienced by the Contractor and attributed to delay or extension of Contract Time shall be considered by the Owner or the Consultant if it is evident that such a claim arises from the Contractor's failure to conduct the work in accordance with the Contract Documents and all applicable legislation."
- .3 Add paragraph 6.6.8:
"6.6.8 A change of the duration of the Contract Time does not result in a change in Contract Price without acknowledgement of the Owner through executed Change Order."

3.19 GC 8.3 NEGOTIATION, MEDIATION AND ARBITRATION

- .1 Add the following new paragraphs 8.3.9, 8.3.10, 8.3.11, 8.3.12., 8.3.13., and 8.3.14:
"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:
 - a) a copy of the notice of arbitration,
 - b) a copy of supplementary conditions 8.3.9 to 8.3.14 of this Contract, and
 - c) a record of 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:*
 - a) has a vested or contingent financial interest in the outcome of the arbitration;
 - b) gives the notice of election to the Owner and the Contractor before the arbitrator is appointed;
 - c) agrees to be a party to the arbitration within the meaning of the rules referred to in paragraph 8.3.6, and,
 - d) agrees to be bound by the arbitral award made in the arbitration.

- 8.3.11 *If an election is made under paragraph 8.3.10, the Consultant may participate in the appointment of the arbitrator and, 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:*
- a) on application of the Owner or the Contractor, determine whether the Consultant has satisfied the requirements of paragraph 8.3.10, and;
 - b) 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 mutatis mutandis to written notice to be given by the Consultant to any sub-consultant;*
- 8.3.14 *In the event of notice of arbitration given by the Consultant to a sub-consultant, the sub-consultant is not entitled to any election with respect to the proceeding as outlined in 8.3.10 and is deemed to be bound by the arbitration proceeding."*

3.20 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:
"1 errors in the Contract Documents which the Contractor could not have discovered applying the standard of care described in paragraph 3.9.1;"
- .2 Delete paragraph 9.1.2 in its entirety and 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 through an inspection process commissioned by the Contractor through the relevant Utility owners, agencies or Authorities Having Jurisdiction and undertaken in accordance with the degree of care and skill described in paragraph 3.9.1, at the Place of the Work and to suit the scope of work described by the Contract Documents."

3.21 GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

- .1 Add to paragraph 9.2.6 after the word "responsible", the following new words:
"...or whether any toxic or hazardous substances or materials already at the Place of the Work (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the Contractor or anyone for whom the Contractor is responsible, in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damage to the property of the Owner or others,..."
- .2 Add "...and the Consultant..." after the word "Contractor" in subparagraph 9.2.7.4.
- .3 Add to paragraph 9.2.8 after the word "responsible", the following new words:
"...or that any toxic or hazardous substances or materials already at the Place of the Work (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the Contractor or anyone for whom the Contractor is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damage to the property of the Owner or others,..."
- .4 Add to paragraph 9.2.8.4 the words "...and the Consultant..." after the words "...indemnify the Owner..."

3.22 GC 9.5 MOULD

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

3.23 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".

3.24 GC 12.3 WARRANTY

- .1 Delete from the first line of paragraph 12.3.2 the word, "The" and substitute the words:
"Subject to paragraph 3.9.1, the...".

3.25 GC 13.1 INDEMNIFICATION

- .1 Add new clause 13.1.1.3.
"13.1.1. 3. The Contractor shall indemnify and hold harmless the Consultant, its agents and employees from and against claims, demands, losses, costs, damages, actions, suits, or proceedings by third parties that arise out of, or are attributable to the Contractor's performance of the Contract, provided such claims are attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property, and caused by negligent acts or omissions of the Contractor or anyone for whose acts the Contractor may be liable, and made in writing within a period of 6 years from the date of Substantial Performance of the Work as set out in the certificate of Substantial Performance of the Work, or within such shorter such period as may be prescribed by any limitation statute or the province or territory of the Place of Work."

Part 2 - Products and Part 3 - Execution - NOT USED

END OF SECTION

Part 1 General

1.1 ONTARIO BUILDING CODE IMPORTANCE FACTOR:

- .1 This project has a Normal Status and all *Work* shall be supplied and installed in accordance with the requirements of this building designation.

1.2 IDENTIFICATION OF THE OWNER:

- .1 Owner: **Town of South Bruce Peninsula.**
 - .1 315 George Street, P.O. Box 310, Wiarton, Ontario, N0H 2T0.
 - .2 Telephone: 519 534 1400.
- .2 The Place of the Work:
 - .1 370 William Street, Wiarton, Ontario, N0H 2T0.

1.3 BIDDER BRIEFING MEETING

- .1 A meeting date and time will be announced via Addendum.
- .2 This meeting will be mandatory.

1.4 IRREVOCABLE PERIOD:

- .1 *Bids* submitted shall remain open and **irrevocable** for a period of **sixty days (60)** days next following the *Bid Closing* date.

1.5 BID CLOSING AND PLACE FOR SUBMISSION OF BIDS:

.1 *Bid Closing*:

- .1 *Bids* shall be submitted using electronic transmission through the Owner's selected Tender web site prior to the stated time on the day of the *Bid Closing* which will be provided on the web site.
- .2 *Bids* delivered via electronic transmission must have scanned digital copies of the required *Bid* materials (WSIB Clearance Certificate, undertakings to provide bonds and insurance, for example) to be accepted. Original copies of scanned *Bid* materials shall be produced upon request of the Consultant or the Owner within 5 business days next following the date of the request for the originals.
- .3 The *Owner* will open all *Bids* received at a private meeting convened at the place of the *Bid Closing* or using remote meeting software such as Zoom.

1.6 PERFORMANCE BOND AND LABOUR AND MATERIALS PAYMENT BOND

- .1 Performance Bond shall have a value equivalent to 100% of the Bid Price submitted by the Bidder.
- .2 Labour and Material Payment Bond shall have a value equivalent of 50% of the Bid Price submitted by the Bidder.
- .3 Bidders shall submit with the Bid and undertaking prepared by the insurance firm that would provide the stipulated bonds, declaring that, should the Bidder execute the Contract, the insurance firm will provide the requisite Performance Bond and the requisite Labour and Materials Payment Bond. The undertaking and declaration shall be printed on the letterhead of the insurance firm and it shall be signed by a person with authority to bind the insurance firm.

1.7 INSURANCE

- .1 Provide evidence of insurance through submission of an undertaking prepared by an appropriate insurance provided that state that the Bidder, if invited by the Owner to execute the Contract, will be insured for the duration of the Project and that the insurance will meet or exceed the requirements of CCDC 41 for the CCDC 2 Stipulated Price Contract – 2020. The undertaking shall be in the form of a letter

or certificate printed on the insurance firm's letterhead indicating that, if the *Bidder* is to execute a *Contract* with the *Owner*, the insurance firm will provide the required insurance policies.

- .2 Contractor's Comprehensive General Liability Policy Limits, Minimum: **\$10,000,000.00**.
- .3 Insurance forms associated with the Contractor's liability for the construction of the Project under the provisions within the CCDC 2 Stipulated Price Contract - 2020 and within CCDC 41 "Insurance Requirements" shall have aggregate limit for the Project no less than **\$10,000,000.00** and as follows:
 - .1 The actual insurance policy shall name the *Owner*, and G. M. Diemert Architect Inc., DEI Consulting Engineers, GEI Consulting Engineers and Witzel Dyce Engineering Inc. as also insured.

1.8 WORKPLACE SAFETY AND INSURANCE BOARD:

- .1 Bidders shall include a current WSIB Clearance form with the *Bid*.

1.9 CONTRACTOR'S OVERHEAD AND PROFIT:

- .1 Where changes in the *Work* are contemplated or found to be mutually agreeable through execution of Change Orders following the execution of the *Contract*, I/We offer to evaluate them using the estimate and lump sum offer method set forth in the General Conditions of the CCDC 2 – 2020 *Contract*. The Overhead and Profit applied to the value of such changes shall be computed as follows:
 - .1 The Overhead and Profit applied to the value of extra or additional *Work* performed by *Sub-Contractors* shall not exceed **10%** of the total direct cost of the extra or additional *Work*;
 - .2 The Overhead and Profit applied to the value of extra or additional *Work* performed by sub-contractors engaged by a *Sub-Contractor* who is engaged by the *Contractor* shall not exceed **5%** of the total direct cost of the extra or additional *Work* that will be executed by the *Sub-Contractor's* sub-contractor;
 - .3 The Overhead and Profit applied to the value of extra or additional *Work* performed by *Contractor's* own forces shall not exceed **10%** of the value of the total direct cost of the extra *Work* so performed;
 - .4 The Contractor's overhead and profit added to the value of extra work performed by any *Sub-Contractor* shall not exceed **5%** of the total cost of the *Sub-Contractor's* extra work.

1.10 SUBMISSION OF BIDS AND BID CLOSING:

- .1 *Bids* must be submitted using the prescribed *Bid Form* in order to be considered compliant. No other format for a *Bid* is acceptable.
- .2 The *Owner* has no alternative tender submission process other than the process described in the *Bid Documents*.
- .3 **Note that the Bid Documents include the forms and other required information stipulated on the Owner's designated web site.**
- .4 Submission of a *Bid* shall be accomplished through completion of forms and provision through the Owner's designed web site, according to the procedure identified on the web site, prior to the time of day stipulated on the day of the Bid Closing stipulated in the Bid Documents.
- .5 A complete *Bid* that may be considered to comply with the requirements of the *Bid* process established in these Instructions to *Bidders* requires submission of various executed documents together with the executed *Bid Form*. The *Bidder* may be asked to provide the executed *Bid Form* and attachments in their original form, if requested. These forms and documents are described within and required by this Section.

1.11 INTENT

- .1 Intent of this *Bid* call is to obtain an offer to perform *Work* required to complete the *Project* which is described by the Bid Documents and in evidence at the *Place of the Work*. The Contract used will be a CCDC2 - 2020 Stipulated Price Contract complete with Supplementary Conditions provided within the *Bid Documents*.

1.12 RESTRICTIONS ON THE USE OF THE PLACE OF THE WORK

- .1 Restrictions on the Contractor's activities at the *Place of the Work*: the area of the Work is not subject to restrictions on the Contractor's activities.

1.13 REQUIREMENTS ASSOCIATED WITH CONTRACT TIME

- .1 The importance of Contract Time: The schedule for the prosecution of the *Work*: **Time is of the essence of the Contract**. The *Owner* requires that the *Work* is performed within the limits of the duration of construction declared by the *Bidder* on the *Bid Form*.
- .2 The intended *commencement of construction*: The *Owner* requires that the *Contractor* commence the *Work* on the site at the *place of the work* within 14-calendar days next following the date upon which the *Contract* is executed or on a mutually agreeable alternative date. If the *Work* is not commenced at the *Place of the Work* within the bounds of this time constraint or upon the date found mutually agreeable, the date of commencement of the *Work* will be determined according to the definitions provided in the *Contract Documents*.
- .3 Construction Schedules: The Contractor is obliged by the Contract Documents to provide and maintain current construction schedules and to provide the following at least once during each month of the construction duration:
 - .1 The Contractor shall provide construction schedules that indicate a date for Substantial Performance of the Contract within total construction time period marked by the Bidder on the executed Bid form.
 - .2 The Contractor shall not be permitted to unilaterally amend the date for Substantial Performance without justification acceptable to the Owner.
 - .3 The Contractor shall employ all necessary means to maintain current the date for Substantial Performance, including, but not limited to, engagement of additional workers and the provision of longer work days.
- .4 General Conditions associated with Declared *Contract Time*:
 - .1 Through submission of the *Bid*, the *Bidder* declares the duration of the construction time required by the *Bidder* to complete the construction of the *Work* to a state of Substantial Performance of the *Contract* as defined within the Construction Act.
 - .2 The *Owner* requires that this *Work* is completed as quickly as possible and time is of the essence in the prosecution of the *Work*. Through submission of a *Bid*, the *Bidder* acknowledges that the evaluation process undertaken by the *Owner* will include consideration of the time required to attain substantial performance declared on the *Bid Form* by the *Bidder* and the *Bidder* acknowledges that a construction duration length considered to be beneficial to the *Owner* may be sufficient cause for the *Owner* to reject a *Bid* or to accept a *Bid* over other *Bids* regardless of the *Bid Price*.
 - .3 The *Bidder* shall commence the *Work* at the *Place of the Work* within the period of 14 calendar days next following the date upon which the *Owner* and the *Contractor* had each signed the *Contract* or upon an alternative, written, mutually agreeable alternative date. Commencement of Construction at the Place of the Work is defined within the Bid and Contract Documents.
 - .4 The *Bidder* acknowledges, through submission of the *Bid*, that co-ordination of the *Work* undertaken for the *Project*, and the establishment of a sequence of operations and mobilization of all *Sub-Contractors* is the *Contractor's* sole responsibility and that written and graphic documents describing the Construction Schedule shall be drafted and subsequently amended throughout the course of the *Work* and that the schedule will be displayed using a means that clearly illustrates the scope and extent of the *Work* and its entire duration.

1.14 IDENTIFICATION OF BID DOCUMENTS

- .1 The *Bid Documents* are listed within the Project Manual Section 00 01 10 Table of Contents. The Bid Documents also include the following, whether listed in the Project Manual or not:

- .1 All requirements for the submission of the Bid found on the Owner's web site associated with the request for submission of Tenders and the requirements of a complete and appropriate Bid.
 - .2 All Sections of Division 00,
 - .3 the Bid Form and, by implication,
 - .4 the terms of the Contract. The terms "Bid Documents" and "Contract Documents" are defined within the *Bid Documents*.
- .2 The *Bidder* is solely responsible to review lists of documents, whenever they are provided, and the documents received to determine that the *Bidder* possesses all *Bid Documents*.

1.15 DEFINITIONS APPLICABLE TO INSTRUCTIONS TO BIDDERS

- .1 **Addendum or Addenda:** are documents that describe amendments to the *Bid Documents* and they are issued exclusively by the *Owner* or the *Architect* during the *Bid Period*. *Addenda* are the sole and exclusive means through which *Bid Documents* may be altered during the *Bid Period*. A *Bidder's* failure to formally acknowledge the incorporation of the content of an issued *addendum* within the *Bid Price* offered will result in a verdict of non-compliance for the *Bid* submitted. Acknowledgement of incorporation of the content means that the *Bidder* had fully considered the implications of the content of the *addenda*, understood all implications of the *addenda* with respect to the cost of the *Work* and subsequently incorporated all aspects of the *addenda* within the *Bid Price* offered. Acknowledgement of *Addenda* is declared by the *Bidder* when the *Bidder* completes the declaration on the *Bid Form* that indicates that the *Bidder* had received the issued *addenda* which are identified by a number assigned to each addendum according to the numerical sequence in which they had been issued.
- .2 **Alternate:** materials, products or methods used in construction considered to be a Reviewed Alternate and designated as such by the *Architect*. A Reviewed Alternate may be acceptable for use in the *Project* when such use is confirmed through issuance of written *addenda* or by other explicit means provided in writing by the *Architect*. The *Architect's* establishment of the material, Product or method which is the Reviewed Alternate does not relieve the Contractor from the responsibility to adapt or otherwise coordinate all aspects of the *Work* associated with or affected by the incorporation of the Alternate into the *Work*.
- .3 **Architect:** G. M. Diemert Architect Inc. and, for this *Project*, *Consultant* shall have the same meaning.
- .4 **Bid Documents:**
 - .1 Bid Documents include, but are not limited to, the following:
 - .1 All requirements for the submission of the Bid found on the Owner's web site associated with the request for submission of Tenders and the requirements of a complete and appropriate Bid.
 - .2 The requirements, content and amendments to the Bid Documents issued by *Addenda* including all supplementary information or amendments contained within *Addenda*.
 - .3 All Sections of Division 00, which are the Procurement and Contracting Requirements.
 - .4 The Bid Form, and all Appendices to the *Bid Form*, and, by implication,
 - .5 the terms of the stipulated Contract together with specified Supplementary Conditions.
 - .6 The Sections of Division 01 of the Project Manual known collectively as General Requirements,
 - .7 The technical specifications Sections which comprise the Sections of other Divisions of the Project Manual.
 - .8 All drawings and schedules printed on them or attached with the Project Manual
- .5 **Bidder:**
 - .1 the status of *Bidder* is conferred upon one of the following:
 - .1 An individual or
 - .2 A corporation.
 - .2 To achieve the status of *Bidder*, the person or entity must have submitted by means of the process specified by the *Owner* for *Bidding*, a compliant *Bid* (an Offer), consisting of an executed *Bid Form* together with all other documents and declarations required by the *Owner*.

- .3 To achieve the status of *Bidder*, the person or entity submitting a compliant *Bid*, acknowledges that, through submission of the *Bid*, the following has been explicitly expressed by the *Bidder*:
 - .1 The intent to diligently and expeditiously perform the *Work* in accordance with the requirements of the *Bid Documents*.
 - .2 That the execution of the *Contract* is a prerequisite to the *Bidder's* commencement of the prosecution of the *Work*.
 - .3 That one *Bidder*, only, shall execute with the *Owner* the *Contract* to perform the *Work*.
 - .4 That the execution and submission of the issued *Bid Form* together with all of the required supplemental forms, and the submission of information about the *Bidder* and the various declarations required of the *Bidder*, through electronic transmission (also known as "up-loading" or "posting") on the *Owner's* web site, form part of the *Bid Documents* and that appropriate execution and submission of these, together with all requested declarations, is required of a *Bidder* in addition to the requirements specified in this Section.
- .6 ***Bid***: a complete and executed *Bid Form* submitted in accordance with the *Bid Documents* and all requirements of the *Bidding* and submission process instated by the *Owner*, including the requirements of the *Owner's* electronic submission process, together with the provision of all specified supplementary documents identified therein and in accordance with the requirements of this Section, which taken together constitutes an offer to perform the *Work* described in the *Bid Documents* in exchange for stipulated financial remuneration provided by the *Owner* as payment to a *Contractor* made under the terms of a *Contract*.
- .7 ***Bid Closing***: the time of day during the day specified within the *Bid Documents* as the latest possible time for the submission of a compliant *Bid*. *Bid Closing* also incorporates the specific place for submission of the *Bid* or a specific method to submit the *Bid*. Methods used to submit a *Bid* may include delivery by the *Bidder* to a particular place or delivery by the *Bidder* using electronic transmission of the *Bid Form* and all associated documents. The passage of the time of day on the day of the *Bid Closing* marks the expiry of the *Bid Period*.
- .8 ***Bid Form***: The form prescribed by the *Owner* and associated with the *Work* which is provided by the *Owner* to all *Bidders* as a part of the *Bid Documents* or through the *Owner's* stipulated web site, as the case requires, and it is the means through which a *Bid* is submitted to the *Owner* by a *Bidder*. No other form of Offer or *Bid* shall be acknowledged or recognized by the *Owner* as a compliant *Bid*.
- .9 ***Bidding***: Act of submitting a *Bid* in accordance with the requirements of the Instructions to *Bidders* and the *Owner's* established process for submitting *Bids*.
- .10 ***Bidding Period or Bid Period***: The duration of time between the issuance of *Bid Documents* for use by any *Bidder* and the time of day on day of the *Bid Closing*.
- .11 ***Bid Price***: The *Bid Price* is written on the *Bid Form* by the *Bidder* in the appropriate location on the executed *Bid Form* and it is the remuneration, including the value of all specified cash and contingency allowances, that is required by the *Bidder* in exchange for complete and appropriate performance of the scope of the *Work* described within the *Bid Documents*. *Base Bid or Base Bid Price* shall have the same meaning. The *Bid Price* shall **exclude** the Harmonized Sales Tax (HST). HST applicable shall be disclosed by the *Bidder* by inserting the appropriate figure for this tax, if it is required on the *Bid Form* as signified by the provision of a space provided for the insertion of the HST amount on the *Bid Form*. HST forms a part of the *Contract Price* as it is defined within the CCDC 2 Stipulated Price Contract. The *Bidder*, to whom a *Contract* is awarded will invoice HST applicable for each progress draw application.
- .12 ***Building***: Whenever the word "building" occurs in the Contract Documents, it shall be taken to mean all parts of the proposed new *Work* together with any existing portions the *Work* under construction and in particular, the Place of the *Work*.
- .13 ***Business Day***: A "Business Day" is a normal working day and does not include Saturdays, Sundays or statutory holidays. "Business Day" has the same meaning as "Working Day" defined within the Contract.

- .14 **Calendar Day:** A "Calendar Day" is any day of the year including Saturdays, Sundays, statutory holidays.
- .15 **Consultant:** Defined in CCDC 2 Stipulated Price Contract. Refer also to definition within Section 01 00 00 General Requirements.
- .16 **Contract Documents:** Defined in CCDC 2 Stipulated Price Contract. *Contract Documents* that will be listed within the CCDC 2 Contract shall include: the Project Manual, drawings, issued *Addenda*, the *Bid Form* and its appendices and issued Post-Tender *Addenda*.
- .17 **Owner:** Defined in CCDC 2 Stipulated Price Contract.
- .18 **Project:** Defined in CCDC 2 Stipulated Price Contract.
- .19 **Project Manual:** the *Project Manual* is a compilation of all specifications Sections issued during the *Bid Period* including the Sections of Division 00 – Procurement and Contracting Requirements and Division 01 – General Requirements together with all technical specification Sections which have been divided into Divisions and Sections for convenience.
- .20 **Reviewed Alternate:** an item proposed by a supplier, prospective *Sub-Contractor* or *Bidder* as an alternative to a similar item specified within the *Bid Documents* and submitted to the Architect, who subsequently agrees that the product or method has achieved the status of Reviewed Alternate and subsequently confirms this acceptance through issuance of written *Addenda* during the *Bid Period*.
- .21 **Sub-Contractor:** As defined within the CCDC 2 Stipulated Price Contract. Refer to the definition within Section 01 00 00 General Requirements. For this *Project*, a *Sub-Contractor* will also include the invited, pre-qualified *Sub-Contractors* if any pre-qualified *Sub-Contractors* are identified.
- .22 **Unsolicited Alternative:** an "Unsolicited Alternative" is a product, system or method of construction that is not described in the Contract Documents and is a product, material or process suggested by any party other than the Consultant.
- .23 **Work:** As defined within the CCDC 2 Stipulated Price Contract.
- .24 **All capitalized terms or terms written using italic text**, unless otherwise defined, shall have the meanings assigned to them in the *Contract Documents* and within Section 00 21 13 Instructions to Bidders Section; however, **terms need not be capitalized or italicized** to have the meanings assigned within the *Bid Documents* or the *Contract Documents*.

1.16 QUALIFICATIONS OF BIDDERS AND SELECTED SUB-CONTRACTORS:

- .1 Invitation:
 - .1 The *Owner* solicits, through a published invitation using a selected web site, *Bids* from prospective *Contractors* associated with the prosecution of *Work* described on the *Bid Documents*. Unsolicited offers or *Bids* will be rejected.
- .2 The *Owner's* requirements associated with the *Owner's* invitation to participate in the *Bidding* are as follows:
 - .1 *Bidders* shall conform to the *Bidding* process and Bidding requirements that are stipulated within this Section and upon the *Owner's* selected web site used for the submission of *Bids*.
 - .2 *Bidders* are solely responsible to obtain and review the *Bid Documents* to ensure that they possess all *Bid Documents*.
 - .3 *Bidders* shall diligently review the complete contents of all *Bid Documents* and attend at the *Place of the Work* explicitly and sufficiently to enable a complete and comprehensive assessment and evaluation of the conditions at the *Place of the Work* in order to develop, thereby, a comprehensive understanding of the full scope of the *Work* and to ensure that the *Bid Price* offered incorporates full scope of the *Work*.
 - .4 *Bidders* shall, following the identification of the entirety of the requirements of the scope of the *Work*, seek all necessary and appropriately qualified firms and persons to provide the cost associated with discrete parts of the *Work* determined solely by the *Bidder*, and become, thereby, and as appropriate, prospective *Sub-Contractors* associated with the *Bid* submitted such that the *Bid*

- submitted contains a *Bid Price* which includes within it all of the cost associated with a comprehensive and complete scope of the *Work* necessary to construct the entire *Project*.
- .5 *Bidders* shall ensure that the scope of work for all prospective *Sub-Contractors* is appropriately defined, attributed and distributed such that the entire scope of *Work* described within *Bid Documents* is included within the *Bid Price*. The *Bidder* must, at its sole discretion, deem to be appropriate for the *Bidder's* circumstances, the distribution of the responsibility for all parts of the work among the prospective *Sub-Contractors*.
- .3 Prospective *Sub-Contractor* entities that are not invited by the *Owner*:
- .1 The *Owner* does not restrict the participation of any prospective *Sub-Contractor* in the *Bidding*. The *Bidder* may seek offers from any *Sub-Contractor* associated with any portion of the *Work*, provided that the *Bidder* has satisfied itself that the selected *Sub-Contractors* are qualified to perform the work and have sufficient capacity and experience to achieve the *Bidder's* goals set out within the construction schedule and that they can meet the *Bidder's* administrative requirements.
- .2 The *Bidder* is solely responsible for the division of the *Work* into *Sub-Contracts* and to verify that the *Work* embedded in the offers received by the *Bidder* from all *Sub-Contractors* is appropriate and sufficiently complete and comprehensive to complete all of the *Work*.

1.17 GENERAL CONDITIONS ASSOCIATED WITH THE *BID PRICE*:

- .1 *Bids* submitted shall include the cost of the following:
- .1 the full cost for all *Work* and services described, illustrated, implied and implicit within the *Bid Documents* together with the cost of all *Work* necessary to accommodate conditions affecting the *Work* at the place of the *Work*, including the *Bidder's* profit, overhead cost, administrative and supervisory services necessitated by the scope of the *Work*.
- .2 The value of all specified cash and contingency allowances and, through submission of the *Bid*, the *Bidder* agrees that the value of these allowances is also included in the *Bid Price* written on the submitted *Bid Form*.

1.18 PERMITS, FEES AND UTILITY CONNECTIONS:

- .1 The Building Permit fee will be paid by the *Owner* and the *Owner* will make application for the Building Permit.
- .2 The *Bidder* shall incorporate within the *Bid Price* the cost of the fees and the cost of administrative work, including preparation of application forms, communications and correspondence and preparation of drawings and servicing details associated with the following activities:
- .1 Application for plumbing permit from the Municipal Building Department.
- .2 Applications and fee payments or deposits associated with mud-tracking through the Municipality.
- .3 The cost and administration of applications and documents associated with disposal at the Municipal landfill site or any site selected by the *Contractor*, where ever they are located.
- .4 Electrical System and Utility requirements also included in the *Bid Price*:
- .1 The *Bidder* shall make application and include within the *Bid Price* the fee associated with Electrical Safety Authority project application, the cost of the authority's review of the submitted documents, the cost attributable to the requirement to notify the Authority of the necessity for inspection and the cost or fee associated with all inspection services mandated by the Authority.
- .2 The Electrical Safety Authority plan examination fee must be separately managed by the *Bidder* according to the Electrical Engineering Specifications.
- .3 Review electrical engineering documents and Section 01 21 00 for specific inclusions within the scope of cash allowances.
- .3 *Bidder* shall ensure that all cash and contingency allowances had been included within the *Bid*, including any allowances specified within mechanical and electrical Sections.

1.19 BIDDER'S RESPONSIBILITY TO ENSURE RECEIPT OF COMPLETE DOCUMENTS AND INCORPORATE CASH ALLOWANCES WITHIN THE BID PRICE

- .1 The *Owner* will not pay a cost that is additional to the *Bid Price* first offered or in addition to the *Contract Price* finally found mutually agreeable, as the case might be according to the time a claim made by the *Contractor* or the *Bidder*, for an additional cost when the claim asserts any of the following instances:
 - .1 The claim for additional cost arises from the *Bidder's* discovery that *Bid Documents* or any information distributed during the *Bid Period* are not in the *Bidder's* possession and that the increase in cost proposed is alleged to arise due to *Work* that had not been included in the calculated *Bid Price* submitted at the time of *Bid Closing*.
 - .2 That the claim for additional cost arises due to the cost of *Work* described on *Bid Documents* issued during the *Bid Period* that are not in the *possession of a prospective Sub-Contractor*.
 - .3 The claim made by a *Bidder* asserts that the *Bidder* or any one of the *Bidder's Sub-Contractors* had omitted from the *Bid Price* submitted a cash allowance specified within the *Bid Documents*. This includes cash allowances specified within mechanical and electrical Sections of the Specifications.
 - .4 The *Owner* will not pay additional cost associated with any claim made by a *Bidder* or any of the *Bidder's Sub-Contractors* that a part of the *Work* had been omitted from the calculation of the *Bid Price* offered on an executed *Bid Form* when such *Work* is clearly identified within the *Bid Documents*.
 - .5 The *Owner* will not pay additional cost when a *Bidder* asserts that the additional cost is associated with *Work* that is omitted but reasonably expected to occur in the normal course of construction in similar circumstances and during construction of similar assemblies or site works as a consequence of the *Work* clearly described on *Bid Documents*.
- .2 In the instance of the occurrence of any of the circumstances listed above, the *Owner* may elect to negotiate a mutually agreeable resolution to the issue with the *Bidder* or to reject the *Bid* involved in the circumstance regardless of the *Bidder's* status as a notified *Bidder* or its status as a *Bidder* with whom the *Owner* had commenced negotiation intended to result in a mutually agreeable *Contract Price*. In the event of such a rejection, the *Owner* may elect to notify an alternative *Bidder*, cancel the *Project* or proceed to negotiate the terms of a potential *Contract* with an alternative *Bidder*.

1.20 BIDDER'S SUB-DIVISION OF THE WORK:

- .1 The *Bidder* is solely responsible for establishment of the division of *Work* among *Sub-Contractors*.
- .2 Despite receipt of *Bid Documents* or portions of the *Bid Documents* by any prospective *Sub-Contractor* for specific parts of the *Work* through any means including, but not limited to, the *Sub-Contractor's* request of documents from the *Owner* or the *Consultant*, the *Bidder* is solely responsible to ensure that all *Sub-Contractors* have received the complete sets of all *Bid Documents*; that they have correctly responded to the terms of the *Bid Documents* and the terms or requirements of the *Bidder*; that all *Sub-Contractors* or the *Bidder* have included all aspects of their respective parts of the *Work* within their collective offers and in particular, that all cash and contingency allowances had been included within the *Bid*.

1.21 REQUIREMENT TO REVIEW THE BID DOCUMENTS AND LIMITATIONS ON THEIR USE

- .1 *Bidders* are solely responsible for the development of a full and comprehensive understanding of the *Work* illustrated, specified and implied by the entirety of the *Bid Documents* and *Bidders* shall seek clarification of the content of the *Bid Documents* when the intent of the documents is not clear.
- .2 *Bidders* are solely responsible to report discrepancies found within the *Bid Documents* to the *Consultant*.
- .3 No AutoCAD or similar design and drafting, editable, digital files or information will be provided during the *Bid Period*. No Word or similar editable text files will be provided during the *Bid Period*.
- .4 The *Consultant* retains copyright over all *Bid Documents* prepared by the *Consultant*. The content of all documents associated with the *Project* and all information contained therein shall be considered to be

the intellectual property of the *Consultant* and *Bidders* shall treat all documents as confidential, produced solely to assist *Bidder* and their *Sub-Contractors* in the establishment of a *Bid Price* and for no other purpose.

- .5 *Bid Documents* are made available for the purpose of obtaining offers for this *project*, only. Their use does not confer license or grant for any other purpose.
- .6 All *Bid Documents* issued remain the property of the entity that had prepared the document and these must be returned immediately upon request or, if in electronic or digital form, deleted completely from all of the *Bidder's* electronic file systems and portable data storage devices together with all remote data storage or portable information storage device or system when the Contract has been awarded. In this instance, remote storage systems include internet-based storage services also known as "cloud" storage systems, USB port storage devices, flash drives, portable hard disk drives, laptop and desk top computers operated by the *Bidder* or the *Bidder's* employees, compact disks and any other digital storage media.
- .7 The *Bidder* is solely responsible to ensure that all prospective *Sub-Contractors* or *sub-contractor Bidder* had received complete sets of all *Bid Documents*; that they had correctly interpreted the terms of the *Bid Documents* and the terms or requirements of the *Bidder*; that all *Sub-Contractors* or the *Bidder* have included all aspects of their respective parts of the *Work* within their collected offers and in particular, that all cash and contingency allowances had been included within the *Bid Price* offered.
- .8 Availability:**
 - .1 *Bid Documents* can be obtained by General Contractor *Bidder* via electronic transmission through the Owner's identified web site, only.
 - .2 No paper copies of *Bid Documents* will be available to *Bidders*.
 - .3 *Bid Documents* are made available for the purpose of obtaining *Bids* associated with the construction of this *project*. The *Bidder's* use of the *Bid Documents* does not confer license or grant for other purposes.
- .9 Examination Requirements:**
 - .1 Upon receipt of *Bid Documents* and prior to commencing a review of the *Bid Documents*, the *Bidder* or *sub-contractor* shall verify that all documents listed with Tables of Contents are present.
 - .2 Immediately notify *Owner* upon discovery of discrepancies among documents or that documents listed had been omitted from the *Bid Documents*.

1.22 QUERIES:

- .1 Each *Bidder* is solely and independently responsible for requesting clarification of the content of the *Bid Documents* for any aspect of the *Work* when the *Bidder* has formed an opinion that the *Bid Documents* are ambiguous or do not accurately represent conditions found on the site to the extent that their *Bid Price* would be affected by the absence of additional information that amends or supplements the *Bid Documents* and further, for the following purposes:
 - .1 to request additional information,
 - .2 to propose alternative or additional methods of construction,
 - .3 to propose alternative or additional materials together with the associated means to perform the suggested alternative *Work*.
- .2 *Bidder* shall request clarifications in writing to the *Consultant* no fewer than 5 business days prior to tender closing.
- .3 Direct queries or proposals for alternatives to:**

Mr. Grant Diemert, OAA
Mr. Bryce Jaekel, Intern Architect
G.M. Diemert Architect Inc.
Suite 201, 957 Fourth Avenue East, Owen Sound, Ontario N4K 2N9
Tel.: 519-376-1975 E-mail: gdiemert@gmda.ca or bjjaekel@gmda.ca.

.4 Informal Communication by the Owner or Consultant:

- .1 Informal communication by the Owner or Consultant includes any remark or commentary made verbally or in writing that is not included in written and issued Addenda.
- .2 Electronic messages received by any *Bidder* that contain text or graphic content that provides or implies that the *Owner* or the *Consultant* consent to a potential change in the *Bid Documents*, or electronic messages with content that acknowledges or implies the efficacy of potential amendments to the *Bid Documents*, become binding as acceptable amendments to the *Bid Documents* when such text or graphic content is confirmed as an amendment to the *Bid Documents* through publication of written *addenda* occurring during the *Bid Period*, only.
- .3 Verbal discussion or verbal descriptions of potential adjustments to the *Bid Documents* and replies to queries provided verbally by the *Owner* or the *Architect* are binding as adjustments to the *Bid Documents* when such verbal content is confirmed through issuance of written *addenda*, only.

1.23 SOLICITED ALTERNATIVES ISSUED BY THE OWNER AND PROPOSED ALTERNATIVES OFFERED BY BIDDERS AND DURING THE BID PERIOD:

- .1 Any product or construction method that is the subject of a Separate Price, an Identified Price, an Itemized Price or a Unit Price or that is described by the *Owner* or the *Consultant* within an *Addendum* is considered to be a Solicited Alternative.
- .2 Unsolicited, proposed, alternatives are alternative construction methods, products or materials suggested by *Bidders*, a *Bidder's Sub-Contractor* or a supplier of products when the items under discussion are not previously reviewed and acknowledged as appropriate for use in the *Project* by issued *Addenda*.
- .3 Correspondence prepared by the *Owner* or the *Consultant* and transmitted to *Bidders* or to prospective Sub-Contractors or to prospective suppliers might contain discussion which is not also contained within formally issued *addenda*. In this instance, the correspondence shall not constitute an amendment to the *Bid Documents*.
- .4 Solicited Alternative and Separate Pricing:
 - .1 When *Bidders* are required to provide prices associated with Alternative or Separate Prices on the *Bid Form*, the *Owner* reserves the right, in its sole discretion, to accept or to reject any of the Alternative or Separate Prices.
 - .2 In order to determine the lowest *Bid Price*, the *Owner* will evaluate compliant *Bids* with consideration for the *Bid Prices*, only, and not the lowest price derived through combination of the *Bid Price* and those Alternate and Separate Prices accepted by the *Owner*.
- .5 When a request to use an unsolicited alternative is made by any party, the *Owner* or the *Consultant* may, in its sole discretion, approve the inclusion within the *Bid Price* the cost of the unsolicited alternative material or construction method through issuance to known *Bidders* of an *Addendum* that expressly permits the use of the alternative material or process in the calculation of the *Bid Price*. In the absence of an *Addendum* that clearly supports the use of the unsolicited alternative, the unsolicited alternative may not be included in the calculation of the *Bid Price*.
- .6 A request made by a *Bidder* or any other entity to the *Owner* or the *Consultant* to consider any alternative material or construction method does not oblige the *Consultant* or the *Owner* to issue an *Addendum*.
- .7 Unsolicited proposals for alternative materials or construction methods made that are not incorporated within written *Addenda* are considered to be rejected and these shall not be included within the *Bid Price*.
- .8 *Bidders* and others interested in making unsolicited suggestions for alternative products or construction methods shall adhere to the following conditions:

- .1 Unsolicited requests associated with the consideration of the use of alternative methods or products made fewer than five calendar days prior to the *Bid Closing* will not be considered by the *Owner*.
- .2 In order for any unsolicited alternative material or process to be considered, those submitting the request shall provide complete information regarding the revisions as follows:
 - .1 Provide product data, dimensions specifications and performance characteristics that enable comparison to specified items.
 - .2 Provide details associated with other *Work* which would be required to accommodate each unsolicited alternative.
 - .3 Provide details within the request of any changes required in the *Work* to accommodate the unsolicited alternative.

1.24 ADDENDA:

- .1 *Addenda* may be issued during the *Bid Period* and all *addenda* issued become a part of the *Bid Documents* and all *Work* indicated and implied in them shall be included in the *Bid Price*.
- .2 *Addenda* will become part of *Contract Documents* unless mutually agreeable changes are negotiated between the *Owner* and any *Bidder* and these changes result in the omission of an *addendum* or *addenda* from the *Contract Documents*.
- .3 *Bidders* shall consider all *addenda* carefully and diligently distribute and interpret to prospective *Sub-Contractors* the content and implications of all aspects of the *addenda* on the *Work*. The *Bidder* shall calculate the cost of the *Work* described within *addenda* together with the cost of *Work* implied by the *addenda* which may be reasonably inferred as a requirement for the *Work* that arises from the content of the *Addenda* and incorporate this cost within the *Bid Price*.
- .4 Verbal answers are binding when confirmed by written *Addenda*, only.
- .5 *Addenda* will be issued by the *Owner*, only, and no other entity.
- .6 *Addenda* will be issued by the *Owner* through electronic transmission to *Bidders* utilizing the *Owner's* web site identified for use by *Bidders*. *Bidders* shall acknowledge receipt of *Addenda* and incorporation of *Addenda* within their *Bid Price* using procedures outlined on the *Owner's* web site identified for use by *Bidders*. *Bidders* are solely responsible to ensure that all *addenda* issued are received and subsequently distributed to *Sub-Contractors*.

1.25 ORDER OF PRECEDENCE FOR BID DOCUMENTS:

- .1 In case of any inconsistency of conflict found among the various parts of the *Bid Documents*, the provisions of the *Bid Documents* shall take precedence and govern in the following order:
 - .1 The instructions to *Bidders* and other requirements provided by the *Owner* on the web site identified for use by *Bidders*.
 - .2 The sections of Division 00 within the Project Manual.
 - .3 The CCDC 2 Stipulated Price Contract as amended by Section 00 08 12 Supplementary Conditions.
 - .4 The General Conditions of the CCDC 2 Contract as amended by Section 00 08 12 Supplementary Conditions;
 - .5 *Post-Tender Addenda*.
 - .6 *Addenda* issued during the *Bid Period*.
 - .7 The submitted and executed *Bid Form*.
 - .8 The provisions of Division 01 Sections of the *Project Manual*.
 - .9 The Technical Specifications Sections following Division 01 within the *Project Manual*.
 - .10 The Drawings and the Schedules incorporated on the drawings or within the *Project Manual*.
 - .11 Detailed drawings govern over more general drawings. Refer to Section 01 00 00 General Requirements for these provisions.

1.26 ATTENDANCE AT THE PLACE OF THE WORK AND ASSESSMENT OF CONDITIONS AT THE PLACE OF THE WORK:

- .1 *Bidders* shall not rely upon the *Owner* or the *Consultant* to provide photographs, measurements or to reveal any aspect of the *Project* beyond the information provided in the *Bid Documents*. Attendance at the site by a prospective *Bidder* is a prerequisite for a compliant *Bid*.
- .2 All *Bidders* shall attend at the *Place of the Work* to conduct a diligent, and comprehensive, assessment of the conditions found at the *Place of the Work*. The assessment of the *Place of the Work* shall consist of attendance at the *Place of the Work*, prosecution of careful and extensive study and review of the *Place of the Work*.
- .3 All *Bidders* shall review site for conditions which may affect the execution of the *Work* and consider all such conditions in the calculation of the *Bid* and *Contract Price*.
- .4 The *Bidder* shall undertake necessary recording and documentation of conditions found together with the concurrent review of *Bid Documents* and examine and comprehend and correlate the information shown within *Bid Documents* with the conditions found at the *Place of the Work*.
- .5 The *Place of the Work* is accessible during the entire course of the *Bid* period through prior arrangement of a visit with the *Owner's Designee*.
- .6 The *Owner* must be notified of any intended visit to the *Place of the Work* associated with the *Bid* and the anticipated time of day for the visit must be stipulated by the *Bidder* or the *Sub-Contractor*.
- .7 The *Owner* reserves the right to dictate the day upon which any visit will occur and the time of day and its duration.
- .8 The *Owner* reserves the right to establish operating hours and these may be changed without prior notice.
- .9 It is the *Bidder's* sole responsibility to accommodate the *Owner's* schedule with respect to arrangement of visits to the *Place of the Work*.
- .10 *Bidder* shall provide all necessary aids required for access (ladders, scaffold, lifts, etc.) all measuring instruments, all flash lights or trouble lighting, all survey equipment and the means to record site conditions found including cameras, and any other assist or recording device required to perform their review of the entire property to the extent required or implied by the *Work* shown within the *Bid Documents*.
- .11 Investigation and discovery or assessment methods resulting in minor destruction to the site or interior finishes and surfaces is appropriate and permitted provided that the investigation method utilized and the component of the building damaged (wall, ceiling, and floor finishes and materials, for example) is approved by the *Owner* and provided that the work described in the *Bid Documents* will cover or correct the destroyed surfaces.
- .12 Prior to conducting any investigation that will result in damage to the existing finishes, obtain *Owner's* consent for such *Work* and, if necessary, explain to the *Owner's* designee, how the damaged area is necessarily rectified within the context of the *Work*. Provide proof of appropriate insurance and supervision prior to undertaking destructive investigative work.
- .13 *Bidders* are solely responsible for ensuring that all *Sub-Contractors* associated with their *Bid* have conducted extensive, significant and appropriate reviews of the site and available services together with a complete review all available *Bid Documents*. In this context, *Bidder* shall ensure that all *Sub-Contractors* associated with their *Bid* had also received all pertinent information generated, discovered, inferred or otherwise deemed prudent or important to the *Work* of the sub-contractor by the *Bidder* during the *Bidder's* review of the *Bid Documents* and the *Bidder's* assessment of the site.
- .14 The *Bidder* shall be solely responsible for the coordination of the parts of the *Work* and the assignment of the scope of *Work* associated with all *Sub-Contractors*. The *Bidder* shall, in this context, ensure that the content, findings and considerations arising from site assessment activity together with a

comprehensive review of the *Bid Documents* are incorporated appropriately within the respective parts of the *Work* for each *Sub-Contractor*.

1.27 ACKNOWLEDGEMENT OF SITE CONDITIONS:

- .1 Through attendance at the site, the *Bidder* acknowledges its understanding that circumstances found within the existing building and on the surrounding site influence the scope of the *Work* delineated and described on the *Bid Documents* and that the *Bidder* has determined the number and nature of accommodations that must be made to complete the *Work*.
- .2 Through submission of a *Bid*, the *Bidder* acknowledges the implications of the conditions found at the *Place of the Work* and their influence on the *Bid Price* has been considered, calculated and incorporated into the *Bid Price* submitted.
- .3 In the absence of other visits to the *Place of the Work* conducted by any particular *Bidder*, the attendance at a mandatory meeting convened by the *Owner* at the *Place of the Work*, which is made a prerequisite to the submission of a compliant *Bid*, shall constitute attendance at the *Place of the Work* by that *Bidder*. As a consequence, the mandatory meeting at the site convened prior to the submission of *Bids* shall demonstrate to the *Owner* that, for each *Bidder* in attendance at the mandatory site meeting, all aspects of the existing conditions that influence the *Bid Price* had been carefully considered by the *Bidder* attending the mandatory visit to the *Place of the Work*.

1.28 DISPOSAL OF WASTE

- .1 Review local regulations governing removal and disposal of construction debris and include all costs for this activity in the *Bid Price*.
- .2 Note: the Municipality associated with the *Place of the Work* has strict prohibitions on the dumping of certain materials and a requirement to separate waste.
- .3 It is the responsibility of the *Bidder* to ensure that all persons acting for the *Bidder*, including all *Sub-Contractors* note, respect and follow all such prohibitions.
- .4 No additional cost will be awarded to any *Bidder* or a *Contractor* who submits a claim for additional cost due to the cost of waste disposal.

1.29 BID FORM REQUIREMENTS:

- .1 Complete all parts of the *Bid Form*.
- .2 The *Bid Form* must be signed under seal, executed and dated in a clear and legible manner using type written words and numerals or handwriting using ink. Signatures and all other hand-written entries shall be written using ink. All applicable blank spaces in the *Bid Documents* must be completed by the *Bidder*.
- .3 Provide company name, email address, mailing address and telephone number.
- .4 Signatures on *Bid Forms*: *Bid Form* shall be signed by *Bidder* as follows:
 - .1 Signatories must be capable of binding the company.
 - .2 Sole Proprietorship: Signature of sole proprietor in presence of witness who will also sign. Insert words "Sole Proprietor" under signature.
 - .3 Partnership: Signature of all partners in presence of witness who will also sign. Insert word 'Partner' under each signature.
 - .4 Limited Company: Signature of duly authorized signing officer(s) in normal signatures. Insert officer's capacity in which signing officer acts, under each signature. If *Bid* is signed by officials other than President and Secretary of company, or President-Secretary-Treasurer of company, copy of by-law resolution of Board of Directors authorizing them to do so must also be submitted.
 - .5 Joint Venture: Each party of joint venture must execute *Bid* in manner appropriate to such party as described above, similar to requirements of Partnership.

- .5 *Bids* that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations or irregularities of any kind may, *Owner's* sole discretion, be declared non-compliant.
- .6 All submitted *Bids* and their supporting documents become the property of the *Owner* and will not be returned.

1.30 DELIVERY AND SUBMISSION OF BIDS:

- .1 *Bidders* are solely responsible for the delivery of *Bid Forms* to the prescribed location prior to the deadline stipulated.
- .2 *Bid Submission Format*:
 - .1 Submit *Bids* using the web site commissioned and identified by the *Owner* for this purpose.
- .3 For *Bids* delivered via up-load to the *Owner's* selected Bids & Tenders web site:
 - .1 *Bidders* submitting *Bids* in electronic format shall:
 - .1 prepare *Bids* on the original form provided using handwriting or computer software to apply text and numerals.
 - .2 Print the form and apply an appropriate, original signature and the date on which the form was signed.
 - .3 Scan the printed form to convert it to a digital PDF file.
 - .4 Scan all supplementary forms and correspondence associated with the *Bid* to produce PDF files for the entire submission.
 - .5 Submit the PDF files as instructed on the web site.
 - .2 *Bidders* shall retain original signed *Bid Form* for the full duration of the period during which all *Bids* are considered to be irrevocable.
 - .3 *Bidders* shall immediately produce the original *Bid Form* and deliver to the *Owner* via hand or via pre-paid courier, upon request by the *Owner* or the *Consultant*.
 - .4 Should the original *Bid Form* be found to differ from the electronically transmitted *Bid Form*, the *Owner*, in its sole discretion, may declare the *Bid* non-compliant.
 - .5 In the event that the lowest compliant *Bid* transmitted to the *Owner* via email is found to differ from the original *Bid Form* provided by the lowest compliant *Bidder*, the *Owner* may, in its sole discretion, consider the lowest compliant *Bid* noncompliant. The *Owner* may, should this occur, enter discussion or negotiation with the second lowest compliant *Bid*.

1.31 UNACCEPTABLE OR UNBALANCED TENDERS:

- .1 Each price written on the *Bid Form* shall be a reasonable price. That is, any calculations made or displayed on the *Bid Form* or implied by the submitted information and all numerical values must be discernable and found to agree or compute appropriately. Under no circumstance will an unbalanced *Bid* be considered. The *Owner* will be the sole judge of such matters, and should any *Bid* be considered to be unbalanced, then the *Owner* will reject it.
- .2 The *Owner* solicits *Bids* from those prospective *Contractors* who had attended the mandatory site meeting convened by the *Owner*. Unsolicited *Bids* received shall be rejected.
- .3 *Bids* received after the *Bid Closing* shall be rejected.
- .4 *Bids* received in a format other than the *Bid Form* distributed with the *Bid Documents* or provided on the web site identified by the *Owner* for use by the *Bidders* shall be rejected.
- .5 *Bids* received without signatures on the *Bid Form* shall be rejected.
- .6 *Bid Forms* exhibiting apparent errors that affect the *Bid Price* shall be rejected.
- .7 *Bid Forms* that exhibit erasures, overwriting, strikeouts, correction fluid or mathematical errors that are not crossed-out, initialed and corrected using ink will be rejected. *Bid Forms* exhibiting corrections appropriately made must be legible to be accepted.

- .8 *Bids* received with an apparent arithmetical or transcription error not associated directly with the total *Bid Price* before application of taxes (including project identification, irrevocable period length, etc.) on any part of the submission shall be provisionally accepted. Should the *Bidder* be unable to deliver to the *Owner* a revised, corrected *Bid Form* within the three business days next following the *Bid Closing*, the *Bid* will be rejected.
- .9 *Bids* that are considered to be based upon an unreasonable time duration for the attainment of *Substantial Performance* of the *Contract* may, at the *Owner's* sole discretion, be declared non-compliant.
- .10 A *Bid Price* that is 30% or more lower than the median value of the *Bid Price* found on the *Bid* which exhibits the median value of the *Bid Price* of all *Bids* the set of the compliant *Bids* received, may be rejected as unreasonably low.
- .11 Regarding the construction duration between the commencement of construction and the attainment of *Substantial Performance of the Contract* declared by *Bidders*, a *Bid* that includes an estimated total time required to attain *Substantial Performance* that has 25 percent fewer weeks of duration than the duration marked on the *Bid* which exhibits the median value of the total number of weeks of construction duration taken from the set of all compliant *Bids* received, may be rejected as an unreasonably short duration.
- .12 *Bids* with Supplementary Documents which are improperly prepared may, at the *Owner's* sole discretion, be declared non-compliant.
- .13 *Bids* submitted with Agreements to provide Bonds or Insurance that are not correctly completed (including, but not limited to, Project identification, irrevocable period length, applicable percentage amounts or time periods, for example) may be considered to be provisionally compliant at the *Owner's* sole discretion and provided that this error constitutes the sole error in the *Bid*. If such *Bids* are considered to be provisionally compliant, the *Owner* must receive from the affected *Bidder*, an acceptable Undertaking to Provide Insurance or and acceptable Agreement to Bond from the *Bidder* within the three business days next following the date upon which the *Bidder* had been notified of the infraction by the *Owner* or the *Consultant* in order that the *Bid* may be accepted by the *Owner*.

1.32 POST BID NEGOTIATIONS AND SUPPLEMENTAL BIDDING

- .1 The *Owner* may negotiate contract terms with the *Bidder* which had offered the lowest *Bid Price* at the *Owner's* sole discretion, whether the *Bid* is compliant or not.
- .2 The *Owner* may elect to request that one or more *Bidders* provide an extension to the irrevocable period associated with their *Bids*. *Bidders* may grant or refuse this request. The refusal of the *Owner's* request for such an extension by any *Bidder* signifies to the *Owner* that the *Bidder* which refuses the extension will withdraw the *Bid* offered follow the expiration of the irrevocable period and the *Bid* will become invalid (the Offer will expire) when the irrevocable period has lapsed.
- .3 If the *Owner* has requested an extension to the irrevocable period from the *Bidder* with the lowest *Bid Price* marked on a compliant *Bid*, and that *Bidder* with lowest compliant *Bid Price* refuses the grant the request, the *Owner* may elect to reject the affected *Bid* and commence negotiation with another *Bidder* which had submitted a compliant *Bid*. The negotiation may include a request to extend the irrevocable period.
- .4 If a *Bidder* agrees to offer to the *Owner* an extension of the irrevocable period for the *Bid* submitted, such an extension will be implemented through written agreement acknowledged through signatures by both parties on a written agreement or through exchange of electronic messages between both parties that make clear the intent of each party to grant and accept the extension, as the case requires.
- .5 The *Owner* may elect to amend aspects of the *Bid* or the *Project* including any part of the *Bid Documents* and seek amended offers from any *Bidder* or more than a single *Bidder*.
- .6 Where the amount by which the *Bid* price must be reduced is less than 15% of the lowest compliant *Bid*, the *Owner* may negotiate terms with the lowest compliant *Bidder*, only, through request for alternative

pricing associated with identified changes in the scope or quality of the *Work* together with receipt of a corresponding change to the *Bid Price*. In this instance, the *Owner* may issue a Post-Tender *Addendum* to the *Bidder* in order to formally define specific amendments to the *Bid Documents* and to facilitate the formalisation of the amended *Bid Price* derived following the amendments to the *Bid Documents*.

- .7 Where the amount of the *Bid Price* offered by the lowest compliant *Bidder* must be reduced by more than 15% of the *Bid Price* offered, the *Owner* may invite up to three of the next lowest compliant *Bidders*, only, to provide revisions to their *Bid Price* that will be associated with changes to the scope or quality of the *Work* within the *Bid Documents* under a new *Bid Call* during which the selected *Bidders*, only, will participate. In this instance, the *Owner* may issue a Post-Tender *Addendum* to facilitate the new *Bid* call and to seek amended *Bids* associated with the proposed amendments to the *Bid Documents* from the group of *Bidders*.
- .8 Where agreement about the potential *Contract Price* is reached between the *Owner* and a *Bidder*, any adjustments to the *Contract Documents* not previously incorporated within Post-Tender *Addenda* shall be documented as a Post-Tender *Addendum* and the *Contract*, based on the negotiated reduced price, may be executed with the lowest *Bidder* participating when the potential *Contract Price* is found to be mutually agreeable.

1.33 POST BID MATERIALS:

- .1 The *Owner* may elect to notify or advise one or more *Bidders* that they are considered as favorable *Bidders* with respect to the *Work* required by the *Bid Documents*. A *Bidder* receiving this notification is a "notified *Bidder*". This notification may occur prior the Post-Bid Negotiations and Supplemental *Bidding* period or following this period.
- .2 Prior to formal acceptance of the *Bid*, issuance of a letter of intent by the *Owner* or execution of the CCDC 2 Stipulated Price Contract, the *Owner* may request that a *Bidder* provide the following:
 - .1 Company information, information regarding the qualifications and experience of the Superintendent proposed or information, resumes and recorded experience of proposed *Sub-Contractors* and
 - .2 response to any other reasonable request, including the request to provide additional performance information for products used in determining the *Bid Price*.
 - .3 The *Bidder* shall provide itemized prices and other price breakdown information requested by the *Owner*.
 - .4 The notified *Bidder* shall, if requested, provide a cost breakdown organized by the Division of the specifications format such that the final total equals the *Bid Price* offered.
 - .5 Provide certificates of insurance, WSIB Clearance Certificate, copies of executed Bonds.
- .3 The notified *Bidder* may be requested to respond to post-Bid *Addenda* and to adjust the *Bid Price* offered accordingly.
- .4 The notified *Bidder* may be required to prepare and submit construction schedules and other submittals indicated in the *Bid Documents* while the *Consultant* is preparing the *Contract* and, if necessary, prior to executing the *Contract* with the *Owner*.
- .5 The *Bidder* shall submit all post-Bid materials, including itemized prices and price breakdown information while the final *Contract* is being prepared by the *Consultant* and, if necessary, prior to executing the *Contract* with the *Owner*.

1.34 NO INCREASE IN RATES OR COST OF SUPPLY OF MATERIAL:

- .1 Following the execution of the CCDC *Contract*, no claim for increase in the rates used to calculate the cost of labour or used to calculate the procurement of materials or services experienced by the *Contractor* and associated with any aspect of the *Work* for the *Project* will be recognized or paid by the *Owner*.
- .2 No claim associated with amendment to prices provided in the *Contract* or on the *Bid Form*, as applicable, will be entertained, acknowledge or paid by the *Owner*.

- .3 The *Bidder* shall not be entitled to make any claim on the grounds of misrepresentation, or on the grounds that they were given any promise or guarantee by the *Owner* or the *Consultant*, their agents or employees or any other persons during the *Bid Period* or during the Post-Bid negotiation activity.

1.35 OWNER'S PRIVILEGE:

- .1 The *Owner* is not obliged to execute a *Contract* with any *Bidder*, award a *Contract* or pay to any *Bidder* any cost or financial loss that any *Bidder* may claim to be attributable to the invitation to Bid, the *Bidding Period*, the Instructions to Bidders, the *Bidding* process or the post-Bid Closing negotiations.
- .2 The *Owner* shall not pay to any *Bidder* the cost associated with the preparation of a *Bid*. For further clarity, the *Owner* shall not pay to any *Bidder*, the value of cost incurred or experienced by any *Bidder*, for any reason, including, but not limited to, the cost incurred due to any or all of the following events:
 - .1 The cost of printing of the *Bid Documents* for any reason or by any person or entity associated with any *Bidder*.
 - .2 The cost of distribution of the *Bid Documents* by any means, including, but not limited to, the cost of travel to effect delivery of the *Bid Documents*, or the charges levied for delivery by courier firms.
 - .3 The expense incurred by the *Bidder* for any aspect of the *Bid Process*, whether for the cost of labour, materials or for subscriptions and cost of application fees. The *Owner* shall not pay to any *Bidder*, the cost that is attributable to the cost incurred by the *Bidder* while compiling or calculating the *Bid Price*, the cost of receiving prices or communications or the cost of deposits, applications or license to use products, and any other cost imposed by prospective *Sub-Contractors*, or suppliers, and the cost associated with the procurement of undertakings or agreements to provide Bonds and Insurance or the cost to obtain WSIB Clearance Certificates or the cost to utilize the *Owner's* web site designated for use by the *Bidders*.
 - .4 The cost incurred to attend at the *Place of the Work* and to investigate thoroughly the *Place of the Work*.
 - .5 All of the cost of any and all of the *Bidder's* labour invested to produce the *Bid*, including labour invested by the *Bidder* and the *Bidder's* employees, the owners and shareholders of the *Bidder's* corporation that may be incurred by the *Bidder* during the preparation of the *Bid* and during the conduction of post-Bid negotiations and during the period proceeding the execution of the *Contract*.
- .3 Without limiting the generality of the foregoing, the *Owner*, in its sole and absolute discretion:
 - .1 reserves the right to accept or reject any or all of the *Bids*;
 - .2 reserves the right to evaluate, accept or reject any *Bid*, whether it is completed properly or compliant or not and whether it contains all required information or not or whether it is otherwise non-compliant and the *Owner* is not bound by any *Bidder* with a duty to evaluate, accept or reject any *Bid*.
 - .3 The *Owner* reserves the right to negotiate with a selected *Bidder* changes, amendments, or modifications to the *Bid*, without offering other *Bidders* the opportunity to amend their *Bids*.
 - .4 The *Owner* has no duty to explain any decision to any *Bidder*.
 - .5 The *Owner* may, at its own discretion, release the name of the selected *Bidder* at a time found to be appropriate by the *Owner*.
- .4 The *Bidder* is solely responsible to pay all cost associated with the preparation of the *Bid*, including any cost associated with the negotiations following the *Bid Closing*.
- .5 If the *Owner* receives a single *Bid*, the *Owner* reserves the right to reject the *Bid* and re-tender the *Work* at a later date or to negotiate changes to one or more of the *Bids* offered, or to accept a *Bid* at its sole discretion.
- .6 Through submission of a *Bid*, the *Bidder* acknowledges that the *Owner* may prioritize criteria associated with evaluation of *Bids*, including the projected construction time, over the value of the *Bid Price* as a means to select or reject any *Bid*.

- .7 If during any negotiation period with any *Bidder*, the *Owner* decides to reject a *Bid* without further negotiation, the *Owner* has no obligation to pay any cost associated with or incurred by any *Bidder* during such negotiations or during the preparation of amended, supplemental or new *Bids* for the *Work* or amended scope of the *Work*.
- .8 The *Owner* may, at any time, cancel the *Project* whether or not any *Bid* had been received and whether or not any negotiation or supplemental *Bidding* had occurred or is underway at the time cancellation.
- .9 If the *Owner* cancels the *Project*, all *Bids* are considered rejected immediately.
- .10 The *Owner* is not obliged to pay any *Bidder* any cost or to compensate any *Bidder* for a financial loss or a financial loss associated with lost opportunity or a loss of productivity that may have been incurred or experienced by any *Bidder* whose *Bid* had been rejected or that may occur as a result of the cancellation of the *Project*.
- .11 *Bidders* expressly waive any right to make any claim against the *Owner* for any matter arising from the *Owner* exercising its rights as stated above.

1.36 ACCEPTANCE:

- .1 Following review of all submittals and any other information pertinent to the *Bid* process, the *Owner* may issue a Letter of Intent or the *Owner* may instruct the *Consultant* to prepare the CCDC 2 *Contract* and the *Owner* may notify a selected *Bidder* of an intention to accept the *Bid* or the modified *Bid Price* negotiated and found mutually agreeable following the *Bid Closing*.
- .2 The *Owner* reserves the right to reject the *Bid* or the amended and negotiated *Bid Price* of the notified *Bidder* up to and including the day upon which the *Owner* is to execute the *Contract* with the notified *Bidder* without penalty or other obligation to the selected *Bidder*.
- .3 If, at the termination of the period during which all *Bids* are irrevocable, no *Bidder* has been selected or no *Contract* with a *Bidder* has been executed, all *Bids* shall be considered rejected.
- .4 The *Owner* is entitled to reject all *Bids*. The *Owner* may do so without any obligation of any kind to the *Bidder* or to any notified *Bidder*. All *Bidder* acknowledge this through the act of submitting a *Bid*.

1.37 REQUIREMENTS AT TIME OF EXECUTION OF THE CONTRACT AND PRIOR TO COMMENCEMENT OF WORK:

- .1 The successful *Bidder* will be required to submit the following documentation, in a form satisfactory to the *Owner*, at the time of the execution of the contract.
 - .1 Executed Performance Bond.
 - .2 Executed Labour & Materials Payment Bond.
 - .3 Certificates of Insurance executed in accordance with CCDC 41 and the *Contract Documents*.
 - .4 Workplace Safety and Insurance Board Clearance Certificate.
- .2 Prior to Commencement of Construction:
 - .1 Execute the CCDC 2 Stipulated Price Contract.
 - .2 Posting at the *Place of the Work* the Building Permit issued by the Municipality of the *Place of the Work*.
 - .3 Acceptance by the *Owner* of the *Contractor's* Health and Safety Policy, security and privacy conditions and sign appropriate declarations.
 - .4 Complete training regarding use of the *Owner's* facility.

1.38 COMMENCEMENT OF WORK:

- .1 The contractor shall commence *Work* in accordance with their own schedule, but no later than 14 business days next following the execution of the CCDC 2 *Contract*.

Part 2 Products - NOT USED**Part 3 Execution - NOT USED END OF SECTION**

Part 1 General

1.1 DESIGNATED SUBSTANCE STUDY:

- .1 Contractor Notification – Materials containing hazardous materials exist at the *Place of the Work* and the scope of *Work* illustrated or specified within the Bid and Construction Documents for this Contract will affect some of these materials.
- .2 A report describing nature and location of Designated Substances and Hazardous Materials is hereby added to the Bid and Contract Documents. The report is as follows:
- .3 ***“Designated Substance Study 370 William Street – Wiarton, ON”*** prepared by GM BluePlan Engineering Limited, 1260-2nd Ave. E, Unit 1, Owen Sound, ON, N4K 2J3.
- .4 The report consists of the following pages:
 - .1 Page i: Table of Contents.
 - .2 Pages 1 through 9, inclusive: the body of the report – refer to report's table of contents.
 - .3 Appendix 'A' – Site Photographs: 6 coloured photographs.
 - .4 Appendix 'B' – Laboratory Certificates of Analysis – 9-pages of reports of results of material testing produced by Paracel Laboratories Ltd.

1.2 CONTRACTOR NOTIFICATION:

- .1 Materials containing hazardous materials exist within the building that constitutes part of the Place of the Work for this Contract.
- .2 WORKING WITH THESE MATERIALS CAN BE DANGEROUS.
- .3 The Owner identifies the hazardous materials and the location of the hazardous materials within the Place of the Work for this Project within the attached report. Certain operations associated with this Contract could disturb the hazardous materials. This report is attached with this specification to provide Bidders with information that may assist with the preparation of Bids.
- .4 All *Work* or any process that results or could result in a disturbance of or a material change to materials that contain DESIGNATED SUBSTANCES must be undertaken by an Abatement Contractor who maintains the appropriate insurance coverage and who meet the requirements set out in the applicable legislation.
 - .1 Activities that may disturb materials containing Designated Substances include, but are not limited to the following:
 - .1 *Work* or processes that disturb materials identified as containing Designated Substances.
 - .2 Any work or process that requires the removal, and any other process resulting in the disturbance of the identified hazardous materials.
- .5 The Contractor and its Sub-Contractors shall not remove, handle or destroy materials containing designated substances without using proper procedures in accordance with the Regulation governing identification, discovery, presence and handling of the particular designated substance.
- .6 Through receipt of this notification, the Contractor agrees no part of the work will result in a disturbance of materials that contain designated substances unless such work is accomplished under the requirements of applicable legislation and that the Contractor (and all Sub-Contractors through the Contractor) agree to follow all procedures specified under the applicable legislation.
- .7 **The disclosure of the presence of designated substances in the materials listed in the report does not relieve the Contractor of his obligation to monitor the progress of the work for the presence of additional materials that he suspects could contain asbestos or other hazardous materials and to adhere to all applicable legislation governing the discovery, presence and handling of hazardous materials, including mould.**

1.3 PHASE TWO ENVIRONMENTAL SITE ASSESSMENT:

- .1 Contractor Notification – Soil on the site at the Place of the Work contains hazardous materials and the scope of *Work* illustrated or specified within the Bid and Construction Documents for this Contract will affect some of these materials.
- .2 A report describing nature and location of the material is hereby added in the form of a Phase Two Environmental Assessment to the Bid and Contract Documents. The report is as follows:
- .3 ***“Designated Substance Study 370 William Street – Wiarton, ON”*** prepared by GM BluePlan Engineering Limited, 1260-2nd Ave. E, Unit 1, Owen Sound, ON, N4K 2J3.
- .4 The report consists of the following pages:
 - .1 Page i: Table of Contents.
 - .2 Pages 1 through 11, inclusive: the body of the report – refer to report's table of contents.

- .3 Figures – 3 pages of figures are attached and referenced throughout the report.
- .4 Tables - 3 pages of Tables are attached.
- .5 Appendix 'A' – Site Photographs: 5 pages of coloured photographs.
- .6 Appendix 'B' – Laboratory Certificates of Analysis – 40-pages of reports of results of material testing.
- .7 Appendix 'C' – Borehole and Testhole Logs – 12 pages.

END OF SECTION

Part 1 General

1.1 APPLICATION OF THIS SECTION:

- .1 Language in this Section using the imperative is directed to the Contractor.
- .2 Owner's Name:
 - .1 **Town of South Bruce Peninsula.**
 - .2 Owner's Address: 315 George St, Wiarton, Ontario, N0H 2T0.
- .3 Address and telephone number for the Place of Work in Wiarton, Ontario:
 - .1 370 William Street, Wiarton, Ontario, N0H 2T0; telephone: 519 534 1260
- .4 The Contractor shall be solely responsible to determine the scope of work that is associated with each Sub-Contract.
- .5 The Project is referenced as "New Town Hall for Town of the South Bruce Peninsula" and "Proposed Town Hall Renovation" on various documents bearing the Architect's Project Number 2404.
- .6 The form of Contract will be a CCDC 2 Stipulated Price Contract - 2020.

1.2 ONTARIO BUILDING CODE IMPORTANCE FACTOR:

- .1 The Owner has determined that this project has a Normal Importance Factor and all Work shall be supplied and installed in accordance with the requirements of this Importance Factor designation.

1.3 INTENT:

- .1 General:
 - .1 The intent of the Contract Documents is to describe the Work associated with the *Project* described by the Contract Documents and in evidence at the *Place of the Work*. The Contract used will be a CCDC2 - 2020 Stipulated Price Contract complete with Supplementary Conditions provided within the *Contract Documents*.
 - .2 Limitations to the Contractor's Activities Imposed on the *Place of the Work*: the area of the Work is not subject to restrictions on the Contractor's activities that are permitted under applicable legislation.
 - .3 The schedule for the prosecution of the *Work*: Time is of the essence of the Contract. The *Owner* requires that the *Work* is performed within the limits of the duration of construction declared by the *Contractor* on the executed *Contract*.
 - .4 The intended *Commencement of Work*: The *Owner* requires that the *Contractor* commence the *Work* on the site at the *place of the work* within 14-calendar days next following the date upon which the *Contract* is executed or on a mutually agreeable alternative date. If the *Work* is not commenced at the *Place of the Work* within the bounds of this time constraint or upon the date found mutually agreeable, *Commencement of the Work* will be determined according to the definitions provided in the *Contract Documents*.
 - .5 Project Site - Lot Identification:
 - .1 Roll Number: 410258000213100 within the geographic Town of Wiarton, Part of Park Lot 2 to Part of Park Lot 6, Part of Claude St., RPO number 3R2256, Part 1, Town of the South Bruce Peninsula, County of Bruce, Ontario.
 - .6 Contract Time:
 - .1 Time is of the essence of this Contract.
 - .2 The Owner requires that the Work is performed expeditiously and without delays within the limits of the duration of construction established in the Contract together with amendments found mutually agreeable and ratified by Change Order during the course of the prosecution of the *Work*.

- .3 Modifications to the Contract Time may be made through written Change Order, only, and in accordance with the Contract Documents.
- .7 Commencement of construction:
 - .1 The Owner requires that construction commence following the Contractor's receipt of written notice to proceed issued by the Owner.
 - .2 The Owner requires that the Contractor commence the Work on the site at the Place of the Work within the time period established within the Construction Schedule as the mutually agreeable date.
 - .3 If the Work is not commenced by any Contractor or Sub-Contractor at the Place of the Work within the bounds of the agreeable period identified above or when otherwise found mutually agreeable in writing, the date of the commencement of the Work will be determined at the Consultant's sole discretion, according to the definitions provided in the Contract Documents.

1.4 CONTRACTOR'S OVERHEAD AND PROFIT

- .1 Where changes in the *Work* are contemplated or found to be mutually agreeable through execution of Change Orders following the execution of the *Contract*, the Contractor shall evaluate the Change in the Contract Price associated with them using the estimate and lump sum offer method set forth in the General Conditions of the CCDC 2 – 2020 *Contract*. The Overhead and Profit applied to the value of such changes shall be computed as follows:
 - .1 The Overhead and Profit applied to the value of extra or additional *Work* performed by *Sub-Contractors* shall not exceed **10%** of the total direct cost of the extra or additional *Work*;
 - .2 The Overhead and Profit applied to the value of extra or additional *Work* performed by sub-contractors engaged by a *Sub-Contractor* who is engaged by the *Contractor* shall not exceed **5%** of the total direct cost of the extra or additional *Work* that will be executed by the *Sub-Contractor's* sub-contractor;
 - .3 The Overhead and Profit applied to the value of extra or additional *Work* performed by *Contractor's* own forces shall not exceed **10%** of the value of the total direct cost of the extra *Work* so performed;
 - .4 The Contractor's overhead and profit added to the value of extra work performed by any *Sub-Contractor* shall not exceed **5%** of the total cost of the *Sub-Contractor's* extra work.

1.5 DEFINITIONS

- .1 Definitions provided in other Sections shall be read together with these definitions and they shall apply to the Contract Documents within the context of their use.
- .2 **Addendum or Addenda:** are Contract Documents that describe amendments made to the Bid Documents during the Bid Period. Addenda issued during the Bid Period are Contract Documents unless they are specifically omitted from the Contract Documents listed within the Contract or removed through issuance of Post-Tender Addenda.
- .3 **Alternate:** materials, products or methods found to be acceptable for use in the Project by the Consultant when such use is confirmed through issuance of written Addenda, Supplemental Instruction, Change Directive or Change Order. The Architect's establishment of the material, Product or method which is the Reviewed Alternate does not relieve the Contractor from the responsibility to adapt or otherwise coordinate all aspects of the Work associated with or affected by the incorporation of the Alternate into the Work.
- .4 **Approved Alternate:** Approved Alternate shall mean Reviewed Alternate. A Reviewed Alternate includes materials, products or methods used in construction are not specified by the Consultant or marked on the Consultant's drawings but do constitute those alternative materials, methods or processes that become, through review by the Consultant, a **Reviewed Alternate**. The status of **Reviewed Alternate** is

conferred upon the alternative product, system, method or material by the *Architect*. A Reviewed Alternate may be acceptable for use in the *Project* when such use is confirmed through issuance of written *addenda* or by other explicit means provided in writing by the *Architect* which may include a Supplemental Instruction or a Change Order. The Architect's establishment of the material, product or method which is the Reviewed Alternate, does not relieve the Contractor from the responsibility to adapt or otherwise coordinate all aspects of the Work associated with or affected by the incorporation of the Alternate into the Work.

- .5 **Approved Equal:** the term "Approved Equal", used in any context shall mean "Reviewed Alternate".
- .6 **Architect:** G. M. Diemert Architect Inc. and, for this *Project*, "*Consultant*" shall have the same meaning.
- .7 **Authorities Having Jurisdiction:** are agencies that have within their constituted and jurisdictional powers the right to enforce the laws of the Place of the Work.
 - .1 Authorities Having Jurisdiction include, but are not limited to, representatives of the following agencies:
 - .1 Electrical Safety Authority (ESA).
 - .2 Grey Sauble Conservation Authority and Niagara Escarpment Commission.
 - .3 The Ministry of Environment, Province of Ontario.
 - .4 The Municipal Building Department represented by the Chief Building Official of the Municipality or the Chief Building Official's designated representatives.
 - .5 The Municipal Fire Department represented by the designated Fire Prevention Officer.
 - .6 The Municipal Engineering and Public Works Departments including all of the associated sub-classifications and Departments (Water Department, for example).
 - .7 The Municipal Police Department.
 - .8 Ontario Ministry of Labour;
 - .9 Technical Standards and Safety Authority (TSSA).
 - .2 The Contract Documents stipulate that some discrete aspects of the Work must be undertaken in the presence of or completed or amended in accordance with the instructions or direction provided by Authorities Having Jurisdiction. In such cases, the Contractor shall execute the Work under supervision by the appropriate Authority and as directed by that Authority.
- .8 **Bid Documents:** Bid Documents are:
 - .1 The Contents of the *Project Manual*, including, but not limited to, the Sections of Division 00, the Supplementary Conditions of the Contract, the documents issued by the Owner during the Bidding Period, including any issued addenda and for greater certainty, Bid Documents include, but are not limited to, the following sets of documents:
 - .1 The Procurement and Contracting Requirements and related directives published by the Owner on a web site designated by the Owner for use by the Bidders. Bidders must attend at the web site designated by the Owner for use by the Bidders and register. All documents listed or available on the Owner's designated web site are considered to be issued by the Owner to all prospective Bidders; however, prospective Bidders must register as Bidders or "Plan Takers" on the web site and attend at the mandatory meeting convened at the Place of the Work in order to have a Bid submitted considered to be compliant.
 - .2 Instructions to Bidders and lists of requirements for Bidding and Procurement and all other documents authored by the *Owner* and issued by the *Contractor* during the *Bid Period*;
 - .3 The entire contents of the Project Manual including Division 00, and Division 01 General Requirements, and all of the published Divisions following Division 01 which comprise the technical specifications Sections.

- .4 All drawings and the schedules published thereon which are listed within the Project Manual;
 - .5 The Owner's prescribed *Bid Form*, Appendices to the *Bid Form* and the declarations on the *Bid Form*; and
 - .6 Issued *Addenda* including all supplementary information or amendments contained within *Addenda*.
- .2 **Bidder:** the status of *Bidder* is conferred upon one of the following:
- .1 An individual or
 - .2 A corporation.
- .3 To achieve the status of *Bidder*, the person or entity must have submitted by means of the process specified by the *Owner* for *Bidding*, a compliant *Bid* (an Offer), consisting of an executed *Bid Form* together with all other documents and declarations required by the *Owner*.
- .4 To achieve the status of *Bidder*, the person or entity submitting a compliant *Bid*, acknowledges that, through submission of the *Bid*, the following has been explicitly expressed by the *Bidder*:
- .1 The intent to diligently and expeditiously perform the *Work* in accordance with the requirements of the *Bid Documents*.
 - .2 That the execution of the *Contract* is a prerequisite to the *Bidder's* commencement of the prosecution of the *Work*.
 - .3 That one *Bidder*, only, shall execute with the *Owner* the *Contract* to perform the *Work*.
 - .4 That the execution and submission of the issued *Bid Form* together with all of the required supplemental forms, and the submission of information about the *Bidder* and the various declarations required of the *Bidder*, through electronic transmission (also known as "up-loading" or "posting") on the *Owner's* web site, form part of the *Bid Documents* and that appropriate execution and submission of these, together with all requested declarations, is required of a *Bidder* in addition to the requirements specified in this Section.
- .9 **Bid:** a complete and executed *Bid Form* submitted in accordance with the *Bid Documents* and all requirements of the *Bidding* and submission process instated by the *Owner*, including the requirements of the *Owner's* electronic submission process, together with the provision of all specified supplementary documents identified therein and in accordance with the requirements of this Section, which taken together constitutes an offer to perform the *Work* described in the *Bid Documents* in exchange for stipulated financial remuneration provided by the *Owner* as payment to a *Contractor* made under the terms of a *Contract*.
- .10 **Bid Closing:** the time of day during the day specified within the *Bid Documents* as the latest possible time for the submission of a compliant *Bid*. *Bid Closing* also incorporates the specific place for submission of the *Bid* or a specific method to submit the *Bid*. Methods used to submit a *Bid* may include delivery by the *Bidder* to a particular place or delivery by the *Bidder* using electronic transmission of the *Bid Form* and all associated documents. The passage of the time of day on the day of the *Bid Closing* marks the expiry of the *Bid Period*.
- .11 **Bid Form:** The form prescribed by the *Owner* and associated with the *Work* which is provided by the *Owner* to all *Bidders* as a part of the *Bid Documents* or through the *Owner's* stipulated web site, as the case requires, and it is the means through which a *Bid* is submitted to the *Owner* by a *Bidder*. No other form of Offer or *Bid* shall be acknowledged or recognized by the *Owner* as a compliant *Bid*.
- .12 **Bid Form:** The form prescribed by the *Owner* and associated with the *Work* which is provided by the *Owner* to all *Bidders* as a part of the *Bid Documents* or through the *Owner's* stipulated web site, as the case requires, and it is the means through which a *Bid* is submitted to the *Owner* by a *Bidder*. No other form of Offer or *Bid* shall be acknowledged or recognized by the *Owner* as a compliant *Bid*.

- .13 **Bidding:** Act of submitting a *Bid* in accordance with the requirements of the Instructions to *Bidders* and the *Owner's* established process for submitting *Bids*.
- .14 **Bidding Period or Bid Period:** This is the span of time that exists between the issuance of *Bid Documents* for use by any *Bidder* and the time of day stipulated for the *Bid Closing* on day of the *Bid Closing*.
- .15 **Bid Price:** The *Bid Price* is written on the *Bid Form* by the *Bidder* in the appropriate location on the executed *Bid Form* and it is the remuneration, including the value of all specified cash and contingency allowances, that is required by the *Bidder* in exchange for complete and appropriate performance of the scope of the *Work* described within the *Bid Documents*. *Base Bid* or *Base Bid Price* shall have the same meaning. The *Bid Price* shall **exclude** the Harmonized Sales Tax (HST). HST applicable shall be disclosed by the *Bidder* by inserting the appropriate figure for this tax, if it is required on the *Bid Form* as signified by the provision of a space provided for the insertion of the HST amount on the *Bid Form*. HST forms a part of the *Contract Price* as it is defined within the CCDC 2 Stipulated Price Contract. The *Bidder*, to whom a *Contract* is awarded will invoice HST applicable for each progress draw application.
- .16 **Building:** Whenever the word "building" occurs in the Contract Documents, it shall be taken to mean all parts of the proposed new *Work* together with any existing portions the *Work* under construction and in particular, the Place of the *Work*.
- .17 **Business Day:** A "Business Day" is a normal working day and does not include Saturdays, Sundays or statutory holidays. "Business Day" has the same meaning as "Working Day" defined within the Contract.
- .18 **Calendar Day:** A "Calendar Day" is any day of the year including Saturdays, Sundays, statutory holidays.
- .19 **Care and Control of the Place of the Work:**
 - .1 The Contractor assumes a duty of care and control of the Place of the *Work* when any part of the Place of the *Work* is being prosecuted and not formally assumed in ownership by the *Owner*. For all areas of the Project and at all times during the prosecution of the *Work*, this duty imposes upon the Contractor the following responsibilities:
 - .1 To perform the services required under the executed Contract.
 - .2 To provide competent supervision of the *Work* at all times.
 - .3 To anticipate the requirements of the *Work* sufficiently in advance of the required date or time for the execution of the parts of the *Work* in order to enable the Contractor to effectively support the prosecution of the *Work* in accordance with the Construction Schedule and the plan formed by the Contractor for the execution of the *Work* and to enable effective implementation of measures under the Contractor's control that will advance the progress of the *Work*.
 - .4 Ensure the safety of all persons at the Place of the *Work*;
 - .5 Post of notices, erect barriers and employ personnel to implement measures intended to ensure the safety of persons.
 - .6 Employ personnel dedicated to the management of safety procedures and to the supervision of persons on the site.
 - .7 Alert the *Owner* and any persons in the vicinity of the *Work* to dangers present.
 - .8 Ensure compliance at the Place of the *Work* with all applicable legislation associated with construction.
 - .9 Ensure the security of the Place of the *Work* and prevent unauthorized access to the site by all unauthorized persons together with the maintenance of access routes provided to the *Work* and those areas outside of the work area that are made insecure by virtue of the work in progress.
 - .10 Prevent damage to the *Owner's* property caused by exposure to the effects of temperature, humidity, wind, collapse of earth, ground water ingress, dust or moisture, collapse of structures, propagation of mould and to prevent damage attributable to the prosecution of the *Work*.

- .11 Erect or establish temporary means to prevent damage to the Owner's property including shoring and other temporary support, hoardings, dust-tight partitions, temporary walls and doors and enclosures intended to support the provision and containment of temporary heat intended to ameliorate the effects of temperature on the Work.
- .12 Erect waterproof shelters over parts of the Work that are sensitive to moisture, rain or snow and ice. Erect such shelters to prevent ingress of precipitation into buildings (existing or new) when the building contains materials that could propagate mould or suffer degradation due to wetting, including and in particular, the wetting of gypsum board or other finishes.
- .20 **Commencement of Construction:**
 - .1 "*Commencement of Construction*" shall be defined as the commencement of any of the following activities occurring following receipt by the *Contractor* of the *Owner's* written authorization to commence construction at the *Place of the Work*:
 - .1 Preparation and execution of Contracts formed between the Contractor and the selected *Bidders* and any *Sub-Contractor*.
 - .2 The examination of the *Place of the Work*, including establishment of measurements and marking out of parts of the Work by the Contractor or the Contractor's Sub-Contractors.
 - .3 The Contractor's survey of the Place of the Work and layout of exterior Work on the site.
 - .4 Preparation and submission of any shop drawing.
 - .5 Commencement of any of the Work of the Contract on the site.
- .21 **Consultant:** the word "*Consultant*" is defined within Contract executed by the *Contractor* and the Owner and the definition of *Consultant* is supplemented by this Section. "*Consultant*" and "*Architect*" are interchangeable; however, for this Contract, the *Architect* shall be the *Consultant* and he shall render decisions final with respect to the interpretation of the requirements of the *Contract Documents*. Whenever the word "Architect" or "*Consultant*" occurs in the Contract Documents, it shall mean G.M. Diemert, Architect Inc. in the first instance and reference to Engineering Consultant or Engineer shall also mean G. M. Diemert Architect Inc. who may designate responsibility for aspects of the *Consultant's* duties to Engineering Consultant referenced.
- .22 **Contract Documents:** Defined in executed Contract and the following Documents are Contract Documents whether listed within the Contract or not:
 - .1 The executed Bid Forms and related Appendices and Supplementary Information.
 - .2 Addenda issued during the Bid Period.
 - .3 The entire contents of the Project Manual,
 - .4 Drawings and schedules listed within the Index of Drawings found in the Project Manual,
 - .5 Addenda issued during the Bid Period,
 - .6 Issued Post-Tender Addenda together with
 - .7 Amendments to the Contract Documents and the Bid Price resulting from issued Post Tender Addenda.
- .23 **Contractor:** The word "*Contractor*", wherever it is used within the Bid and Contract Documents, has the meaning stipulated within the executed Contract and the words "*Contractor*" and "*General Contractor*" when used in the Contract Documents have the same meaning and these terms are interchangeable. "*GC*" is an abbreviation of "*General Contractor*". The Contractor bears responsibility for the Work of *Sub-Contractors*.
- .24 **Direction and Approval:** whenever in the Contract Documents, the words "approval", "direction", "directed" and "request" are used, the words shall mean that the Contractor has an obligation to seek direction or approval of intended actions from the *Consultant*, an *Authority Having Jurisdiction* or the

Field Engineer or an independent testing agent as the case requires. Where no reference is provided to the *Field Engineer*, or an *Authority Having Jurisdiction* or an independent testing agent, direction shall be provided by the *Consultant*. Such direction shall be received prior to executing the referenced work.

- .25 **Exposed to View:** Wherever in the Contract Documents the term “exposed to view” is used, it shall refer to surfaces, material, spaces, cavities, devices and services that are within the line of vision of persons from any accessible viewpoint when the observer is seated on the finished floor surface or seating furniture or standing on any surface that permits standing, both within and without the building and this includes elements and surfaces visible within cabinets, closets or shelving units in locations visible during normal use of such facilities. All such surfaces shall be finished. This provision excludes elements within service rooms including mechanical, electrical, water, sprinkler valve rooms, garages with exposed structure as a ceiling finish, garbage rooms and janitorial rooms and any room where a false ceiling is not illustrated, noted or intended to conceal structure, equipment, building services, hardware, fastenings and appurtenances. Where there is any doubt about the interpretation of this phrase to any part of the Work, the Contractor shall seek clarification or interpretation or instruction from the Architect before proceeding with the affected Work.
- .26 **Field Engineer:** the field engineer is an engineering firm engaged by the *Owner* or the *Contractor* under the terms of a separate contract formed to effect the engagement of the *Field Engineer* to perform testing of materials, verification of soil bearing conditions, verification of the Contractor's layout and survey work, welding inspection, bolt torque testing, testing associated with roofing and mechanical and electrical systems and other special inspections required during the course of the execution of the Work of the Contract. The designation of Field Engineer also applies to a testing or inspection agency designated to perform specific tests or inspections, regardless of how the agency is paid for the testing or inspection services. Where the Contract Documents require inspection, testing or supervision of aspects of the work by the Field Engineer, the Contractor shall seek the necessary review, inspection, supervision, approval and direction from the Field Engineer or the entity referenced or implied. The Contractor shall also report in writing, the results of any such review, inspection, testing or direction to the Architect and the Owner.
- .27 **Include:** whenever in the Contract Documents the word "include" is used in any form, the items of Work listed following shall not be interpreted to be restricted to those items listed, only. “Include” shall mean reference to all components or processes necessary for the proper and intended installation indicated implied or referenced. The meaning of “Include” shall also be extended to the words “Included”, “including” and other derivations of the word “include”.
- .28 **Indicated or Shown:** whenever in the Contract Documents the words "indicated" or "shown" are used in any form, they shall apply as meaning "illustrated on drawings" or “listed within schedules” or “described within the Specifications” or as described or illustrated within Shop Drawings.
- .29 **General Requirements:** “General Requirements” includes all work, services, Products, Construction Equipment and materials, whether or not listed within the Contract Documents, which are needed to organize the Place of the Work, provide Temporary Work and these include all work required to maintain, service, operate and complete the Services, the Work and the construction of the Project, including all costs, charges and expenses attributable to the Project and found necessary to complete the Contract. These General Requirements also include and all other tasks, products and services which may be necessary to facilitate and complete the construction of the Project and which are not part of the scope of work of the Subcontractors or Suppliers.
- .30 **Landlord:** when the term “Landlord” is used within the Contract Documents, it shall mean the Owner.
- .31 **Make Good:**
 - .1 “Make Good” shall all mean that the Contractor shall perform remedial Work associated with referenced assemblies or surfaces that existed prior to the installation of new Work together with all

- new Work required to prepare existing surfaces for new finishes or to prepare them for restoration, as the case requires.
- .2 Taken together, this new and remedial Work constitutes the actions “make good” and the full extent of the Work and actions and processes that must be employed shall not be, and are not intended to be, fully described or illustrated within the Contract Documents. Rather, the required actions, processes, materials and labour involved in the new and remedial Work implied by the use of the term are contingent upon the conditions found in the Place of the Work before the commencement of the Work together with the new Work that affects the referenced existing condition.
 - .3 Existing conditions shall be considered by the Contractor together with the scope and the nature of new Work to develop a full scope of remedial Work required to “make good” any material.
 - .4 The full scope of all remedial Work required to “make good” any material is required and implicit in the Work of the Contract as though it were fully specified, described and illustrated in order to effect a complete installation of the Work. No additional cost shall be paid by the Owner to the Contractor in exchange for any such remedial Work; such Work shall be included within the Contract Price.
 - .5 The complete installation must incorporate any and all Work that is customary according to the nature of existing and adjacent surfaces and assemblies affected by the Work of the Contract. The customary Work is required to the extent necessary to fully integrate the new Work with existing conditions.
 - .6 The Work referenced shall be performed without any additional cost to the Owner.
 - .7 The Contractor shall ensure that the Work so indicated is executed in such a way as to create a uniform texture, finish or other characteristics inherent to the products used or performed in such a way to result in matching the characteristics of the existing conditions.
 - .8 The final determination of the acceptability of such materials and surfaces shall rest with the Consultant.
 - .9 Actions implicit in the use of these words:
 - .1 Review existing conditions at the Place of the Work prior to commencement of Work and consider the scope of new Work that affects existing conditions in light of such findings. Consider the characteristics and the nature of the existing conditions and enact Work to suit the situation in order to restore existing assemblies and surfaces to their condition found prior to commencement of the Work.
 - .2 Perform Work required to integrate the new and existing into a unified whole using means indicated by the nature of the Work of the Contract and the affected surfaces considered together.
 - .3 Evaluate the situation in each individual case and make judgements regarding necessary actions required to retain adjacent assemblies or surfaces and materials in their current state and determine which actions are required to prepare existing elements for new specified finishes or treatments and execute as indicated to achieve results implied or described or illustrated in the Contract Documents.
 - .4 Evaluation shall incorporate a full consideration of the nature of the new installation together with full consideration of the altered existing surfaces and the condition of surfaces not affected by the Work.
 - .5 Perform all Work required to restore existing surfaces affected by the Work to the extent required to leave them in a condition as found prior to commencement of the Work or to the extent required to effect appropriate integration of new and existing materials.
 - .10 Words with the same meaning are: “repair”, “repaired”, “made good” or “replaced” or “replace”.

- .32 **Match Existing:** shall mean that new Work required by the Contract Documents shall resemble existing materials and assemblies as closely as feasible in colour, finish, function and quality. In the case of individual assemblies and parts, "match existing" shall mean that the new parts shall be identical to the referenced existing assembly in all respects including, but not limited to, manufacturer, make, model, product number and performance specification. Words with the same meaning include "made to match existing" and other similar phrases.
- .33 **Occupied, Occupancy and Occupy:**
- .1 Within the Contract Documents, "Occupancy" may refer to Ontario Building Code (OBC) Classification of the use under the OBC definition of Occupancy within a limited context including on the OBC Building Code Matrix provided on the *Architect's* drawings. This use of the terms is distinct from the following uses of the terms.
 - .2 During the Construction of the Building and with reference to construction work in progress up to the date upon which landlord (Owner) assumes control for all or part of the building, the following meanings to the words "Occupy", "Occupancy" and "Occupied" apply:
 - .1 Throughout the Contract Documents, the word "occupied" refers to rooms, spaces and areas interior or exterior to the building that are used as intended and accessible to the Owner (and the general public, tenants, building and site users, etc. as the case might be). Areas under construction are therefore, not occupied.
 - .2 Areas used to temporarily store Owner's materials and equipment or furnishings are considered to be occupied including those areas used for such storage when the need arises for the Owner to vacate spaces under construction or to facilitate phasing of the construction or during a move into the building of the Owner's fixtures, fittings and equipment.
 - .3 Areas under construction are under the care and control of the Contractor regardless of the duration of time required by the scope of the Contractor's work in any area. When any area is under the care and control of the Contractor, it shall be separated from occupied areas using fencing, hoarding, dust-tight barriers and other means found mutually agreeable for the case.
 - .4 Areas used to store Owner's materials and equipment shall be separated from the Contractor's Work by the Contractor using access control barriers, dust-tight partitions and temporary security measures found mutually agreeable.
 - .5 The Contractor has a duty of care and control of the entire extent of the Work while it is in progress, wherever it occurs at the Place of the Work, including, but not limited to, areas controlled by the Contractor to effect access to the work or used by the Contractor for storage of materials and equipment. The duty to care and control includes areas in the Contractor's control to which the Owner may have temporary, limited and controlled access to the parts of the Work in progress for any previously arranged and mutually agreeable reason.
 - .6 With the exception of the special case associated with the Ontario Building Code, throughout the Contract Documents, the word "occupancy" refers to the use of the rooms, areas or spaces interior or exterior to the building for a particular purpose by the Owner and as such, it is intended to imply that the space is "occupied" or used by the Owner.
 - .3 Occupancy also refers to the condition of the space when it is completed and when it would be "occupied". Therefore, the expression "ready for occupancy" means that the work is completed in accordance with the Contract and the conditions associated with Substantial Performance of the Contract are met.
- .34 **OHSA:** "OHSA" is an acronym that means the "Occupational Health and Safety Act (Ontario)" as amended, and all regulations passed under it.
- .35 **Owner:** the *Owner* is a signatory to the executed Contract with a Contractor and supplemented as follows: Reference to "Owner's Designee" shall refer to the Owner as represented by a designated

person who acts on behalf of the Owner. The Owner may assign alternative designees from time to time.

- .36 Project Schedule:** Project Schedule is defined within the Contract and it has the same meaning given to the term "Construction Schedule" or "Schedule" within the Contract Documents.
- .37 Place of the Work:** Defined within the executed Contract.
- .38 Project:** Defined in Contract.
- .39 Project Manual:** the Project Manual is the compilation of all specifications Sections including all sections of Division 01 issued to the Contractor or listed within the Table of Contents Section 00 01 10 together with all technical specification sections which have been divided into Divisions and Sections for convenience.
- .40 Provide:** Whenever in the Contract Documents the words "provide" is used in any form or combination, the word shall mean that the Contract Price includes the Work referenced in its entirety: that is, both the cost of all material and the cost of all labour required for the completion of the Work specified and to which the reference is made. Material and labour also include, but are not limited to:
- .1 The supply and application of construction aids, lifts, ladders, scaffold, measuring devices and necessary tools and equipment,
 - .2 The required labour and
 - .3 The materials intended for installation and
 - .4 All required boring, drilling, cutting, anchors, hangers, mounting brackets, accessories and hardware or fasteners and the delivery and connection of building services required to operate the items referenced.
 - .5 All provisions shall be by the General Contractor and the General Contractor may assign this work to a Sub-Contractor.
 - .6 The Contractor, at no additional cost, shall provide miscellaneous items of hardware required to perform all installations whether the item to be installed is provided by the Contractor or not. This includes, but is not limited to, all required drilling, coring, fasteners, adhesives, sealant, primers, cleaning, surface preparation, measurement, cutting, touch-up Work or finish paint and all labour required to complete the installation.
- .41 Relocate:**
- .1 "Relocate" may apply to one or more assemblies or a series of similar assemblies and all parts of the referenced assembly shall be handled as described herein or as indicated according to the nature of the assembly. For example, a light fixture has as part of its assembly, a lens, housing, lamp, electrical connection, ballast, etc. as applicable, and it may also have mounting brackets or hangers. All parts of the referenced assembly must be carefully removed, stored and reinstated in a new location in order to meet the terms of the definition of "relocate".
 - .2 "Relocate" as defined herein applies also to the phrase "remove and relocate".
 - .3 Each instance of "relocate" named shall be effected according to the nature and requirements of the assembly and in such a way as to effect appropriate use and operation of the assembly within the new circumstance present at the new location for the assembly or arising due to the repositioning of the assembly.
 - .4 Whenever the word "relocate" is used, it shall mean that the following actions associated with the referenced item or element or assembly, herein after referred to as "assembly", are required:
 - .1 Examine all circumstances associated with the assembly and employ all necessary means to remove it and all its constituent parts and elements necessary to its connection or operation, without damage.

- .2 Effect removal of the item or element in such a way and with sufficient care to permit the use of the same item or element in a new location, free of defects or damage that is not present in or on the assembly as it existed prior to the "relocate" actions.
 - .3 Store the removed item or element in a protected, secured and controlled environment suited to the preservation of the item or element and such that its state as encountered in the Project prior to the commencement of any part of the Work associated with the Project is preserved.
 - .4 Install all required services necessary for the operation of the assembly in the new location including, but not limited to, electrical power supply and associated conductors and devices, plumbing Work required to deliver water supply and to affect appropriate drainage and venting and ductwork, grilles, diffusers and dampers and controls at the new location.
 - .5 Prepare the new location with appropriate cutting, demolition, excavation, concrete Work, masonry Work, rough carpentry, framing, levelling, shimming, preparation of openings and all other Work required by other Sections that is necessary to the operation or incorporation of the assembly in the new location.
 - .6 Install the assembly in the new location when that location is suitably prepared to receive it.
 - .7 The installation shall include, without additional cost to the Owner, all new materials and labour required to effect an appropriate installation in the new position including, but not limited to, connection to a power supply and any associated new or existing conductors, junction and device boxes and new or existing and repositioned controls; connection to associated services (plumbing supply pipes and valves, drainage, waste and venting pipe, electrical conductors, junction boxes and devices boxes, duct work, fresh and supply or return air inlets or exhaust outlets) related parts, mounting brackets, all associated new or repositioned hardware, braces, suspension and mounting brackets and supports, wood blocking, fasteners, anchors and all other elements indicated according to the nature of the assembly including preparation of existing surfaces for new priming and finishing required under the Contract.
 - .8 Words that have the same meaning as "relocate" include "reinstalled", "reinstated".
- .42 **Remove:** whenever the word "remove" is used, it shall mean that the Contractor is instructed to dismantle, disconnect, demount, disassemble, demolish, cut, abrade, scrape, abrasive blast, wash or chemically alter surfaces and objects or to otherwise delete the specified item or material and that, in so doing, the Contractor shall leave other and existing Work that is not part of the specified action intact and not adversely affected. Implicit in the execution of any instruction to "remove" is the responsibility to limit the Work to the minimum extent required to achieve an efficacious result in the final result of all Work. The final determination of the acceptability of "remove" actions shall rest with the Consultant.
- .43 **Report:** When the word "report" is used in the context of an instruction, the Contractor shall provide both written and verbal descriptions associated with the case referenced and these reports shall be provided to the Consultant.
- .44 **Reviewed Alternate:** A Reviewed Alternate is an item or a process reviewed for use in the Project by the Consultant and a process or material achieves this status when the review of the item or process is acknowledged by the Consultant in writing together with any exceptions, special instructions or other annotations as the case may be. The inclusion of the reviewed alternative item or process within the Work is permitted following issuance of written Addenda during the Bid Period or, during the prosecution of the Work, through issuance of written Supplemental Instruction, Change Directive or Change Order. The status of an Unsolicited Alternative as a Reviewed Alternative is the same as the status of a reviewed Shop Drawing or Product Data Sheet submitted under the Submittals Procedures Section 01 33 00. Refer to Section 01 25 00 Substitutions.

.45 Select:

- .1 When the word "Select" is used it is an instruction provided to the Contractor who may delegate responsibility to a Sub-Contractor or a Section to perform the tasks implied by the context of the use of the word.
- .2 The use of the term requires the Contractor to verify, ratify and otherwise confirm or acquire consent to proceed with the Work affected from the Consultant.
- .3 The term "select" signifies that the Contractor or its delegates shall perform the following tasks with diligence:
 - .1 Review and carefully consider all circumstances found at the place of the Work that affect the element referenced;
 - .2 Review and consider all available appropriate products and product literature and manufacturer's instructions and structural or performance limitations associated with various models or available options associated with the element and relate and consider these for the application described, illustrated or specified.
 - .3 Review and consider other material and procedural options available for the affected part of the Work that would achieve the end result illustrated, described or implied by the Contract Documents.
 - .4 Further, the term means that the Contractor or the Section or the Sub-Contractor must make a decision regarding use of materials and methods and select products or material or methods of execution of the Work that will achieve the most efficacious result for the Work referenced.
- .4 The responsibility for the result of the selection lies with the Contractor in every instance, whom may elect to charge the entity that makes the selection with such responsibility. The delegation of responsibility by the Contractor does not diminish the Contractor's responsibility for the Work with respect to the Contract between Owner and Contractor.
- .5 The Contractor acknowledges that the Consultant or the Owner may require that the Work is dismantled or modified if the result of Work executed is not found to be efficacious with respect to the appearance and performance of the Work anticipated by the Contract.
- .6 For any instance of dismantling directed by the Owner or the Consultant, the Contractor shall provide alternative means or material and appropriate labour to implement the revision or remedial Work and the cost associated with the adjustment to the Work shall be paid by the Contractor and not the Owner.

.46 Sub-Contractor: Defined within the executed Contract and the term applies to any person or entity engaged by the *Contractor* to prosecute all or a part of the Work through the use of any form of contract, agreement or purchase order executed or issued, as the case might be, and this definition is supplemented as follows:

- .1 The term "Sub-contractor" shall have the same meaning as the words "Sub-trade" or "Trade" or "Section" when these words are used throughout the Bid and Construction Documents.
- .2 The Sub-Contractor's fundamental responsibilities are as follows:
 - .1 Each Sub-Contractor shall be responsible for accepting as suitable to their purpose and work, the work of other Sub-Contractors or the work of the Contractor, as applicable, upon which the work of the Sub-Contractor depends for its efficacy in construction, fabrication and service, and prior to the commencement of the work of the Sub-Contractor the Sub-Contractor shall render a judgment regarding the quality and the nature of conditions found at the Place of the Work associated with any Work executed by any other party that would adversely influence the results of the Sub-Contractor's Work.

- .2 Should the Sub-Contractor find that the conditions at the Place of the Work are compromised or ill-prepared in any way that is critical to the efficacious implementation of the Sub-Contractor's Work, the Sub-Contractor shall not commence Work and the Sub-Contractor shall communicate the reasons for this to the Contractor.
 - .3 The Sub-Contractor shall, and in accordance with its judgment, be responsible to accept the conditions of the Place of the Work as appropriate for their Work and the commencement of the Sub-Contractor's Work signifies such acceptance.
 - .4 The Sub-Contractor's Work shall not be commenced if the conditions at the site or the characteristics of the Work previously executed is found unacceptable for the Work of the Sub-Contractor. Any such finding shall be reported by the Sub-Contractor to the Contractor in writing and the Sub-Contractor shall not commence Work until the conditions of the Place of the Work are acceptable for efficacious implementation of the Sub-Contractor's Work.
 - .5 The Sub-Contractor shall refuse to commence Work if conditions are inappropriate for the efficacious implementation of their Work and in the event that the Contractor insists on commencement, the Sub-Contractor shall communicate this event to the Consultant immediately and the Sub-Contractor shall not commence Work until the dispute is resolved in such a way as to permit efficacious implementation of the Sub-Contractor's affected Work.
 - .6 No additional cost will be paid to the Contractor for the failure of Sub-Contractors to review adequately the Work of others and upon which the quality of the finished product depends.
 - .7 The terms "Section" or "Trade" or "Division" shall have the same meaning as Sub-Contractor when the Work under Contract is not performed by the General Contractor's own forces.
 - .8 A supplier of materials or equipment is considered to be a Sub-Contractor and "supplier" shall have the same meaning as "Sub-Contractor".
- .47 Supply and Install:** Whenever in the Contract Documents the words "supply" or "supply and install" or "installation" are used in any form or combination, they shall mean that the Contract Price includes the cost of the work referenced in its entirety: that is, both the cost of all material and the cost of all labour required for the completion of the Work specified and to which the reference is made. Material and labour also include, but are not limited to:
- .1 The provision of construction aids, temporary services and utilities, masking, access controls and dust control measures, lifts, ladders, scaffold, measuring devices and necessary tools and equipment,
 - .2 The required labour and
 - .3 The materials intended for installation and
 - .4 All required boring, drilling, cutting, anchors, hangers, mounting brackets, accessories and hardware or fasteners and the delivery and connection of building services required to operate the items referenced.
 - .5 All provisions shall be made by the General Contractor and the General Contractor may assign responsibility for provisions to a Sub-Contractor.
 - .6 The Contractor, at no additional cost to the Owner, shall provide miscellaneous items of hardware, labour and supplemental materials, together with any tools associated with the provisions that are required in order to effect all installations whether the item to be installed is provided by the Contractor or not. The miscellaneous items and labour include, but are not limited to, all required drilling, coring, fasteners and fastening, adhesives and mastics, sealants, primers, cleaning, surface preparation, measurement, cutting, touch-up work or paint or finish and all labour required to complete the installation.
- .48 Tenant:** the term "Tenant" shall mean the Owner.

- .49 **Total Completion:** "Total Completion" is defined within the executed Contract. "Total completion" shall, for the purposes of this Contract, refer to the Project as a whole.
- .50 **Unsolicited Alternative:** an "Unsolicited Alternative" is a product, system or method of construction that is not described in the Contract Documents and is a product, material or process suggested by any party other than the Consultant.
- .51 **WSIB:** "WSIB" is an acronym that means the "Workplace Safety and Insurance Board".
- .52 **All capitalized terms or terms written using italic text,** unless otherwise defined, shall have the meanings assigned to them in the *Contract Documents*; however, terms **need not be capitalized or italicized** to have the meanings assigned within the Contract Documents.

1.6 SINGLE CONTRACT WITH THE CONTRACTOR:

- .1 The *Work* shall be performed under one *Contract* between the *Owner* and the *Contractor* who is also the *Contractor* referenced throughout the Contract Documents.
- .2 Contract Documents and the specified requirements for the Work, the methods referenced, actions, the materials specified, instructions and any language used in the imperative are directed in all instances to the Contractor who may elect to assign the responsibility for the execution of parts of the Work, under his care and direction, to others.
- .3 No assignment of the work by the Contractor to others shall relieve the Contractor from responsibility for the efficacious prosecution of all parts of the work.

1.7 RELATIONSHIP BETWEEN CONTRACTOR AND SUB-CONTRACTORS:

- .1 Refer to executed Contract.
- .2 The Contractor's engagement of Sub-Contractors and suppliers of material and services of any nature shall have as precepts, the following relationships in the Contract between the Contractor and the Owner:
 - .1 The Owner's invitation to participate in the Bidding extended to any prospective Sub-Contractor during the Bidding Period shall not amend or diminish the Contractor's responsibility for the performance of the invited Sub-Contractor and in no way shall the invitation modify or supplement the terms of any contract formed between the Contractor and a Sub-Contractor.
 - .2 The Contractor may delegate responsibility for parts of the Work to Sub-Contractors; however, such delegation shall not diminish the Contractor's responsibility for the entirety of the Work and its prosecution.
 - .3 In addition to all other responsibilities of the Contractor, the Contractor is responsible for the quality of the Work executed by Sub-Contractors and for verification that all conditions in the Place of the Work are acceptable or appropriate for the efficacious execution of the Work of all Sub-Contractors.
 - .4 No additional cost will be paid to the Contractor by the Owner should the Work of any Sub-Contractor be commenced or continued if the conditions at the Place of the Work are found to be ill-prepared or unacceptable for the efficacious implementation of the Work of a Sub-Contractor.
 - .5 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 at the Place of the Work require reasonable minor changes in indicated locations and arrangements as determined by the Consultant, 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 space including maintaining as a minimum, the heights of ceilings indicated on drawings.
- .6 The Contractor shall verify figures shown on the drawings before layout and planning of the Work. The Contractor will be held responsible for any errors resulting from failure to verify figures.
 - .7 In the case of any item of the Work being specified under the heading of more than one Sub-Contractor or supplier, the Contractor, in consultation with the Consultant, shall decide which of the Sub-Contractors or suppliers is to perform the Work. If any item of Work involves the Contractor, in its own right, then the Owner and the Contractor shall decide.
 - .8 The Contractor acknowledges and agrees that the drawings and specifications, proposals, Change Orders, contemplated change notices, Supplemental Instructions, field instructions, and recommendations may be issued on a sequential basis from time to time.
 - .9 Headings of all General Conditions of the Contract and of all sections of the Specifications are inserted for reference convenience only and shall not affect the Work, or the interpretation of the Contract Documents.
 - .10 Syntax: Where the masculine is used in the Contract Documents, it shall be read and interpreted as if the feminine or neuter had been used when the context of the statement so requires, and the rest of the sentence, clause, paragraph or item shall be interpreted as if all changes in grammar, gender, or terminology thereby rendered necessary had been made.
 - .11 Where a conflict arises between documents of equal precedence pursuant to paragraph 1.1.6, the Consultant shall determine which document shall have precedence.

1.8 QUALIFICATION OF SUB-CONTRACTORS:

- .1 Neither the Owner nor the Consultant have prepared in advance of the Bidding Period a list of those Sub-Contractors that are considered to be favourable when compared to any other suitably qualified, prospective Sub-Contractor. Therefore, no Sub-Contractor is pre-qualified and considered thereby, to be an acceptable Bidder to the exclusion of any other appropriately capable prospective Sub-Contractor.
- .2 The Contractor shall engage those Sub-Contractors it has determined are adequately qualified to perform the entire scope of work that is customarily associated with the work within the scope of each Sub-Contractor.
- .3 The selection of prospective Sub-Contractors by the Contractor shall incorporate a diligent review of the prospective Sub-Contractor's statement of qualifications in addition to the review of the Sub-Contractor's Bid.
- .4 The Contractor shall not award a Contract to a prospective Sub-Contractor on the basis of the Bid Price exclusively. Rather, the Contractor shall perform the following services:
 - .1 Establish the criteria for an evaluation process for the Bids and
 - .2 Provide to the Owner with a written evaluation of the Bids received which incorporates due and appropriate consideration of the Bids considered individually and collectively, as may be applicable to the analysis.
 - .3 The Contractor, within the evaluation process for all Bids, shall include, but not limit the considerations to, the following list of considerations:
 - .1 Review the compliance of each Bid received to the requirements for Bidding issued during the Bid Period including the provision of appropriate WSIB documents, insurance and performance assurance requirements.
 - .2 The Contractor shall provide recommendations for the selection of Sub-Contractors with due consideration for the following features of the Bid and the Sub-Contracting firm or person:

- .1 The qualifications of the Bidder and their suitability to perform the work appropriately and according to the standards for quality outlined within the Contract Documents;
- .2 The Bidder's capacity to perform the work expeditiously and
- .3 The Bidder's ability to complete the assigned work prior to the expiration of the duration of construction time declared by the Bidder on the Bid Form and
- .4 The efficacy of the declared duration of sub-contract time provided by the Bidder in the context of the Contractor's ability to achieve the goals provided on the master schedule developed by the Contractor.
- .5 Compare the declared time required to achieve substantial performance made by each Bidder to all other Bidders providing Bids for the same scope of work.
- .6 Evaluate the Sub-Contractor's capacity to provide an appropriate work force for the project together with consideration of the Sub-Contractor's declared construction time required to achieve Substantial Performance of their particular Contract. Report findings to the Owner.
- .7 Insert the Bidders' declared construction times required to achieve substantial performance of their individual Contracts into the Master Schedule developed by the Contractor as the means to demonstrate the attainment of the goals and objectives of the Development Agreement executed between the Owner and the Ministry of Health and Long-Term Care. Ensure that the Owner's commitment can be met with the inclusion of recommended Sub-Contractors.
- .8 Evaluate the qualifications of the Sub-Contractor to perform the work and disclose findings in a report made to the Owner which includes a summary of the prospective Sub-Contractor's relevant experienced gained during performance of similar projects of similar scale and complexity.

1.9 PROJECT CO-ORDINATION

- .1 Coordinate progress of the Work, the Project Schedule, submittals, use of site, temporary utilities and construction facilities with all persons providing services or materials for the work.
- .2 Coordination of the Work includes, but is not limited to, the following general tasks which are the responsibility of the Contractor:
 - .1 Review Contract Documents and advise Consultant of possible conflicts between parts of the Work before commissioning shop drawings, ordering products or commencement of affected Work.
 - .2 Co-ordinate all work in each area and work on which subsequent work depends to facilitate mutual progress of all Sections and to prevent conflict between the parts of the work.
 - .3 Establish schedules associated with all submittals and incorporate the time necessary to prepare submittals, make submissions to the Consultant or other agencies and authorities having jurisdiction and for the time required by the Consultant, agencies or authorities having jurisdiction to complete the review of submissions.
 - .4 Anticipate, plan and execute work, provide services and commission other services and work that must be executed by the Contractor, including, but not limited to, the following, all as may be required in advance of the work that is to be undertaken by any Sub-Contractor to permit the work of the Sub-Contractor to occur within the planned sequence:
 - .1 Acquiring of permits, approvals of Authorities Having Jurisdiction and licenses;
 - .2 Facilitating review of submittals by the Consultant and appropriate and various agencies;
 - .3 Preparation the Place of the Work including completion of other work, cleaning, relocation or movement of materials;
 - .4 Ordering of materials and products, taking receipt of such materials and products and effecting distribution as necessary;

- .5 Procuring and placement of equipment, construction aids, cranes and lifts and
- .6 Installation of access controls and protective or safety barriers and measures.
- .7 Undertaking or commissioning of the necessary measurement and layout tasks, communication of the findings of these tasks as necessary and
- .8 Verification of the condition of the Place of the Work as appropriate for the future installations.
- .5 Ensure that each Sub-Contractor and each Section make known, for the information of the Contractor and for the other Sub-Contractors and Sections, all environmental and surface conditions required for the execution of its work and that each Sub-Contractor and Section makes known the sequence of work that must be executed by other Sections or Sub-Contractors or the Contractor in order to facilitate the effective installation of its own work.
- .6 Ensure that no Section or Sub-Contractor or the Contractor's own forces begin work on surfaces or installations which are considered to be inappropriate for the proper application or installation of subsequent work. No additional payments will be made to the Contractor to pay the cost associated with the rectification of construction that is inadequate or inappropriate when the inadequacy or impropriety is a result of the installation of products or any material when conditions for the installation are not appropriate.
- .7 Commencement of work by a Sub-Contractor or by the Contractor signifies that the persons executing the Work have accepted as appropriate for their work, the condition of the Place of the Work as it was found prior to the commencement of their particular part of the Work. Therefore, when the quality of the final product of the work of any person, Sub-Contractor or the Contractor depends upon the propriety of the pre-existing state of the Place of the Work, no additional payments will be made to the Contractor by the Owner to pay the cost associated with the rectification of materials, surfaces, circumstances and arrangements when the pre-existing conditions had been inappropriate to advance the Work.
- .8 Ensure that setting templates, sleeves, fasteners, inserts, anchors, accessories, connections, access panels and all other information necessary for the location and installation of all parts of the work are provided by each applicable Sub-Contractor or Section during the course of the work as the Work is prosecuted. Ensure complete co-operation between Sub-Contractors and Sections such that all such information and all such components and criteria are known to each Sub-Contractor and Section as is applicable to their work.
- .9 No extra cost will be paid by the Owner to the Contractor due to the failure of the Contractor to co-ordinate work.
- .10 Despite receipt of Bid Documents or Contract Documents portions of either of these by any Sub-Contractor for specific parts of the Work through any means including, but not limited to, the Sub-Contractor's request of documents from the Owner or the Consultant, the Contractor is solely responsible to ensure that all Sub-Contractors have received the complete sets of all Bid and Contract Documents; that they have correctly responded to the terms of the Bid and Contract Documents and the terms or requirements of the Contractor; that all Sub-Contractors or the Contractor have included all aspects of their respective parts of the Work within their collective offers and in particular, that all cash and contingency allowances had been included within the Bid Price and the Contract Price.
- .11 **Mechanical and Electrical Coordination Drawings:** Submit Coordination Drawings for use at the Place of the Work for mechanical and electrical Work below grade on the first level and above ceilings, for all floor levels, including mechanical and electrical rooms. Include building cross sections indicating mechanical and electrical systems fully coordinated with structural drawings and details. Coordination drawings shall be produced by the Contractor and the Contractor shall solicit close

cooperation by the Sub-Contractors. The coordination drawings shall have the following characteristics:

- .1 Show mechanical and electrical work coordinated with architectural finish components such as ceilings, bulkheads, furring, casework and equipment.
- .2 Indicate ductwork, piping, conduit, and equipment in their intended locations, coordinated with all other parts of the Work and highlight potential interference between systems and building components.
- .12 In addition to the foregoing, provide Mechanical and Electrical Coordination as follows:
 - .1 Coordinate Work between Divisions 2 to 14 and 31 to 33 inclusive and Divisions 21 to 28.
 - .2 Coordinate with Project Schedule, including dates for Submittals and for delivery of Products.
 - .3 Conduct coordination meetings between Sub-Contractors, other contractors and other concerned parties as necessary to establish and maintain continuous coordination and the goals and objectives in the Project Schedule and to resolve conflicts in the Work identified by coordination activities.
- .13 Require all Sub-Contractors who, as deemed necessary and prudent by the Contractor, to participate in construction meetings and in coordination meetings and to report on Work requiring adjustment under coordination requirements, together with anticipated adjustments to the Project Schedule or in the Work to resolve interferences between components of the Work.
- .14 Distribute minutes of Coordination Meetings to all attendees and concerned parties in attendance.

1.10 GENERAL INCLUSIONS IN THE WORK AND THE CONTRACT PRICE:

- .1 The *Contractor* is solely responsible for calculating the Contract Price.
- .2 The Sub-Contractor is solely responsible for calculating the Bid Price associated with a discrete portion of the Work assigned to the Sub-Contractor by the Contractor.
- .3 The Contract Price shall include the full cost for all Work and services described, illustrated, implied and implicit within the Contract Documents together with the cost of all Work necessary to accommodate conditions affecting the Work at the place of the Work.
- .4 The Contract Price and each Sub-Contractor's price shall include the profit, overhead cost, administrative and supervisory services necessitated by the scope of the Work.
- .5 The Work of the Contractor includes the services required of the Contractor or those services that are otherwise found to be necessary, that enable the Contractor to appropriately evaluate the capability and capacity of Sub-Contractors and that enable the Contractor to ensure that all Sub-Contractors are qualified and competent.
- .6 The Work includes the work and services necessary that must be performed by the Contractor in order to ensure that all persons providing labour, materials and services to the Project, conduct a thorough investigation of the existing conditions at the Place of the Work to an extent judged to be necessary by the Contractor, the Owner, the Consultant or an Authority Having Jurisdiction and that, with due consideration of the state of the Place of the Work, all requirements of the Work, complete with additional labour, materials and services deemed to be necessary due to the state of the Place of the Work, are incorporated into the Work.
- .7 The Contract Price shall be calculated following the development of a complete scope of the Work. The scope of the work necessary to effect the Work shall be determined through the diligent review of all Bid and Contract Documents and through a comprehensive investigation by the Contractor of the existing Place of the Work, including the environs associated with work required within Municipal rights-of-ways or within the bounds of neighbouring properties, as applicable. The Work and the cost of the Work incorporated within the Bid and the Contract Price shall include the labour and services and the cost of all labour and services necessary to facilitate the development of the scope of the Work.

- .8 The Contractor's investigation of the Place of the Work shall be undertaken to discern the extent of the Work and to discern the nature of the equipment, materials and labour required to prosecute the Work, including the intended modifications to existing materials and conditions that can be readily seen during a thorough investigation of the conditions at the site or conditions that can be interpreted to exist following diligent review of the content of the Contract Documents.
- .9 The Contractor shall confirm through contact with local and Provincial Authorities the limit to the weight of trucks imposed seasonally on the roads linking the Place of the Work with all relevant suppliers, manufacturers and Sub-Contractors and calculate the influence these restrictions on the Contract Price. Load restrictions apply to local, County and Provincial roadways and highways on a seasonal basis: load restrictions applicable to truck transport are imposed during winter and early spring periods.
- .10 The Contract Price includes the cost and administration of applications and documents associated with disposal at any Municipal landfill site or any site selected by the Contractor, where ever they are located.

1.11 CONTRACTOR'S RESPONSIBILITY TO ENSURE RECEIPT OF COMPLETE DOCUMENTS AND INCLUSION OF ALL PARTS OF THE WORK:

- .1 The Owner will not pay a cost that is additional to the Contract Price found mutually agreeable due to a claim made by the Contractor for an additional cost when the claim asserts any of the following instances:
 - .1 The claim for additional cost arises from the Contractor's discovery that *Bid Documents* or any information distributed during the *Bid Period* or that any part of the Contract Documents are not in the Contractor's possession and that the increase in cost proposed is alleged to arise due to Work that had not been included in the calculated Contract Price found mutually agreeable.
 - .2 That the claim for additional cost arises due to the cost of Work described on documents issued during the Bid Period or attached to the Contract that are not in the Contractor's or any particular Sub-Contractor's possession.
 - .3 The claim made by the Contractor or any of the Contractor's Sub-Contractors that a part of the Work had been omitted from the calculation of the Contract Price when such Work is clearly identified within the Contract Documents.
 - .4 It is apparent that the claim for additional cost arises from the Work described on Contract Documents when the Work is clearly identified within the Contract Documents and the implications of the Work so described result in other Work, which, although not explicitly described on the Contract Documents, is reasonably expected to occur in the normal course of construction in similar circumstances and during construction of similar assemblies or site works.
- .2 In the instance of the occurrence of any of the circumstances listed above, the Owner may elect to negotiate a mutually agreeable resolution to the issue with the Contractor or to reject the claim for the additional cost.

1.12 GENERAL REQUIREMENTS ASSOCIATED WITH CONTRACT TIME:

- .1 The Owner requires that the Work is completed as quickly as possible and time is of the essence of the Contract.
- .2 Adjustments to Contract Time identified within the Contract may be made through written Change Order, only.
- .3 The Contractor shall declare all required adjustments to Contract Time that are attributable to Changes in the Work when the monetary value of any Change is presented to the Owner. The monetary value of the Change shall include the cost, if any, that is attributable to the adjustment of the Contract Time.
- .4 Absence of a declaration of a required adjustment to Contract Time attributable to Changes in the Work shall permit the Owner to consider that no change in Contract Time has occurred.

- .5 The Contractor shall document within detailed schedules prepared by the Contractor, the estimated total Change in Contract Time that may be attributable to Work that will take place according to the terms of a Change Directive prior to commencing the Work associated with the Change Directive. Such schedules shall be amended as the work progresses under the same terms as are set out within Section 01 32 20 Project Planning and Time Management.
- .6 Commencement of Construction:
 - .1 Refer to definitions in this Section.
- .7 Allowance for the Owner's activities that will require the cessation of Work:
 - .1 Refer to Section 01 32 20 Project Planning and Time Management for requirements.
- .8 Following Substantial Performance of the Contract, the Owner may elect to occupy all or a portion of the Project whether the entirety of the Work is completed or not.
- .9 Provided that there is mutual agreement between Owner and Contractor, the Owner may occupy a portion of the building or the Place of the Work prior to substantial performance of the Contract.
- .10 Occupancy by the Owner or the Owner's equipment, fittings, or furnishings of a part of the building, the Owner is not obliged to issue a Certificate for Substantial Performance of the Contract for less than the entirety of the Work.
- .11 Co-ordination of the Work undertaken for the Project, the establishment of a sequence of operations and mobilization of all Sub-Contractors is the Contractor's sole responsibility. Written and graphic documents describing the Construction Schedule shall be drafted by the Contractor and subsequently amended throughout the course of the Work and the schedule shall be designed to clearly illustrate the scope and extent of the Work and its entire duration.
- .12 Warranty:
 - .1 The warranty period for the Contractor extends for 12-months next following the date established for Substantial Performance of the Contract.
 - .2 Defects found during the warranty period shall be corrected by the Contractor at no additional cost to the Owner or Consultant.

1.13 GENERAL CONDITIONS ASSOCIATED WITH OCCUPANCY:

- .1 Refer to definitions of "Care and Control of the Place of the Work" and "Occupied, Occupancy and Occupy".
- .2 The presence of the Contractor at the Place of the Work is intended to be temporary and the duration of the Contractor's presence is limited to the duration of the Contract Time as it is defined in the Contract or otherwise amended through mutual agreement during the course of the prosecution of the Work. When the Work is deemed complete, the Contractor shall vacate the Place of the Work.
- .3 Through execution of the Contract, the Contractor assumes a duty to care for and control the Place of the Work while the Work is in progress and for any aspect of the Project and for any discrete area identified as part of the Work.
- .4 The Contractor shall as part of its duty to care, protect all occupied areas from deleterious effects of construction including physical damage and contamination of occupied areas by dust or moisture arising from the process of the work including damage that is caused by exposure to wind and precipitation, excessive humidity, earth or ground water due to any activity undertaken as part of the Work.
- .5 The Contractor shall establish temporary protection from weather and other deleterious conditions using reasonable barriers and enclosures, access controls and dust-tight enclosures and other measures required by the Contract Documents to separate the area under construction from all occupied areas.
- .6 The Owner and the Consultant shall judge the propriety of the access, and dust control measures proposed or instated by the Contractor for Work of short duration within occupied areas of the Place of

the Work. However, no request of the Owner is intended to result in a breach of safety regulations applicable at the Place of the Work. The Contractor is responsible to enact all measures appropriate to the work in progress regardless of the duration of the work or its location.

- .7 The Contractor is entirely and solely responsible for the safety of persons within portions of the Place of the Work and for the security of the Place of the Work until the established date for Substantial Performance of the Contract or until the Contractor surrenders occupancy to the Owner, whichever first occurs.
- .8 The Contractor shall complete all work outstanding or deficient following the date of the Substantial Performance of the Contract and cooperate with the Owner regarding occupancy continuously until all Work is completed.
- .9 The establishment of Substantial Performance of the Contract does not signify that the building and the site are ready for Occupancy as it is defined within the Contract.

1.14 OCCUPANCY BY THE OWNER'S FITTINGS, EQUIPMENT, AND FURNISHINGS:

- .1 The Owner reserves the right to use portions of the Work whether partially or entirely finished, whether completed on schedule or not and in particular, in order to accommodate the following occurrences:
 - .1 Persons engaged by the Owner under separate contracts who attend the Place of the Work to perform work associated with the connection, installation and testing of data and communication conductors and equipment, including, but not limited to, the data and communications network, the security system and
 - .2 Persons, vehicles and equipment necessary to facilitate delivery of the Owner's furnishings and equipment.
- .2 Partial occupancy by the Owner, the Owner's personnel and equipment or property shall not imply acceptance of the Work in whole or in part nor shall it imply acknowledgment that terms of the Contract are met in full or that the Contract is substantially performed.
- .3 The Contractor shall not be entitled to indemnity for interference with performance of Work due to Owner's occupancy of areas of the Project.
- .4 The Owner may require occupancy of the building when interior work is completed to a state where the Building Official may grant occupancy while the balance of the work remains under construction.
- .5 This contract shall include all provisions for access control and protection of materials and equipment and persons using the building during construction when the Owner assumes occupancy of part of the Work.
- .6 The provisions above apply to all aspects of the work and particularly to rooms and spaces which require access for Work above, below or adjacent to the main portion of the Work associated with Nursing Stations 4/5 and 4/6.

1.15 ADMINISTRATIVE ITEMS FOR CONTRACT DOCUMENTS:

- .1 Omission of the words "a" and "the" throughout the Contract Documents is intentional and is done for the sake of brevity. Use of these words is implied and Contract Documents shall be read as though they were written including these words.
- .2 Statements, clauses and sub-clauses containing directions, instructions and orders written on drawings and included within specifications are directions, instructions and orders given to the Contractor and all are incorporated into the requirements of the Contract Documents.
- .3 The Contractor may transfer responsibility to execute directions, instruction or orders provided within the Contract Documents to others under his control or in his employ. Such a transfer does not diminish the Contractor's responsibility for the execution of the Work in any way.

1.16 ORDER OF PRECEDENCE FOR CONTRACT DOCUMENTS

- .1 Order of Precedence: in each instance, the order of precedence applicable for items illustrated or described in contrary ways within the documents shall be determined according to the order of precedence described within the Contract Documents.
- .2 The order of precedence of the documents is listed within the executed CCDC2 modified by Supplementary Conditions.

1.17 REQUIREMENT TO REVIEW THE CONTRACT DOCUMENTS AND LIMITATIONS ON THEIR USE

- .1 The Contractor is solely responsible for the development of a full and comprehensive understanding of the Work illustrated, specified and implied by the entirety of the Contract Documents and the Contractor shall seek clarification of the content of the Contract Documents when the intent of the documents is not clear.
- .2 The Contractor is solely responsible to report discrepancies found within or among the Contract Documents to the Consultant.
- .3 The entity which produced the Bid or Contract Document retains copyright over the content of the document. The content of all documents associated with the Project and all information contained therein shall be considered to be the intellectual property of the Consultant and the Contractor shall treat all documents as confidential, produced solely to assist the Contractor the Sub-Contractors in the prosecution of the Work and for no other purpose.
- .4 Contract Documents are made available for the purpose of constructing the Project, only. Their use does not confer license or grant for any other purpose.
- .5 All Bid and Contract Documents remain the property of the entity that had prepared the documents and these must be returned immediately upon request or, if in electronic or digital form, deleted completely from all of the Contractor's, suppliers', fabricators' and Sub-Contractors' electronic file systems and portable data storage devices together with all remote data storage or portable information storage device or system when requested to do so. Remote storage systems include internet-based storage services also known as "cloud" storage systems, USB port storage devices, flash drives, portable hard disk drives, laptop and desk top computers operated by the Contractor or the Contractor's employees, compact disks and any other digital storage media. The foregoing provisions apply to all Sub-Contractors as though they are in the same position and relationship contractually to the Owner as is the Contractor or Contractor.
- .6 The Contractor is solely responsible to ensure that all Sub-Contractors had received complete sets of all Bid and Contract Documents; that they had understood the terms of the Contract and the terms or requirements of the Bidder or the Contractor; that all Sub-Contractors or the Contractor have included all aspects of their respective parts of the Work within their collected offers within the Contract Price.

1.18 PROJECT MANUAL AND SPECIFICATIONS – DEFINITION AND APPLICATION:

- .1 The term "specifications" shall mean the entire contents of the Project Manual which is developed using a system similar, but not identical to, a National Master Format Specification numbering system.
- .2 The Project Manual shall consist of:
 - .1 Sections of Division 01 also known as General Requirements which are applicable to all Sections.
 - .2 Technical Specification Sections applicable for the Work are listed in the Contract Documents and these are selected from Divisions 02 through 35 of the National Master Format specification numbering system (NMS) when they are applicable to the Project. Some Sections may be numbered differently from the NMS, but this shall not diminish their force and effect. Any of the Sections of the Specifications may incorporate Work that could be attributed to the Work of alternative Sections within other specification numbering systems utilized for other projects. This does not

- diminish the Contractor's responsibility to read and develop a comprehensive understanding of the Work specified within each Section provided in the Contract Documents.
- .3 In addition, the Work does not incorporate Work relevant to all possible Sections within each possible Division of the NMS system.
 - .4 Specifications and the names of materials are also written on the drawings. Specified materials and processes named on drawings supplement those written within Sections of the Specifications.
 - .3 Specifications applicable to the project and included within the Contract are listed within the Table of Contents for the Project Manual.
 - .4 Specifications are not intended as a detailed description of installation or construction methods but they shall serve to indicate the particular requirements of the completed Work and its performance in service.

1.19 GENERAL REQUIREMENTS ASSOCIATED WITH DRAWINGS:

- .1 Refer to CCDC Contract and Supplementary Conditions.
- .2 Detail drawings govern over general drawings. Detail drawings are made at scales of 1:50, 1:25, 1:20, 1:10 and 1:5. General drawings are made at scales of 1:500, 1:300, 1:250, 1:200, 1:100.
- .3 Drawings indicate the scope of Work in general and illustrate the approximate location of assemblies and devices, the arrangement and size of fixtures, equipment, ducts, piping, conduits, outlets, finishes and surfaces, etc. on general drawings. Detailed drawings illustrate the precise intended arrangement of assemblies and elements unless conditions at the Place of the Work require modification to locations and arrangements illustrated. As such, the following shall apply for the full course of the Project:
 - .1 Where specific dimensions and arrangements are clearly delineated on the architectural drawings, these dimensions and arrangements shall govern over the placements and arrangements shown on other drawings.
 - .2 The Architect shall review placement of all elements in the field as the Work progresses and is entitled to request adjustments to installed elements within a radius of 3000 mm (10') of the element positioned and the Contractor shall effect the adjustment without additional cost to the Owner or the Consultants.
 - .3 The Contractor shall cause items to be moved or relocated from their installed locations within a radius of 3000 mm (10') from the illustrated position should the position selected by the installer be found to conflict with other elements and services shown on other drawings regardless of the state of the Work at the time that the conflict is discovered. This relocation or adjustment shall be accomplished without additional cost to the Owner.
 - .4 The placement of wall-mounted and ceiling-mounted devices and equipment exposed to view is of critical importance to the Project. As such, the Contractor shall assume full responsibility for coordination of arrangement and positioning of exposed devices, services and equipment in all cases. The Contractor is responsible to communicate concerns raised or understood to exist with respect to the final location of all such elements to the architect and for the transmission of the architect's decisions to the trade Section, sub-contractor or persons charged with installation of the affected items.
 - .5 The Contractor's review of all shop drawings shall include due consideration for the position of elements and services relative to specified limitations such as finishes on wall and the position of ceilings. Special attention must be paid to the routes of cable management trays, hooks and conduits, sprinkler system piping and heads, grilles, diffusers and lights.
 - .6 The Architect shall be advised of conflicts among documents with respect arrangement and positioning of all elements and devices. The Contractor shall not proceed with installation of such

elements and devices without expressed written consent of the Architect regarding the final position of the elements.

- .7 Unless devices and services (conduit, cable, ducts, equipment and devices) are installed within areas that do not have finished surfaces such as suspended ceilings, these items shall be positioned to permit their concealment by finishes.
- .8 The Contractor shall not cause ceiling heights specified to be made lower without the expressed written consent of the Architect.
- .9 The Contractor shall anticipate conflicts associated with services, crossing points for services and the relationship between these and the implication of the relationships on the final position of the ceiling plane. The ceiling plane(s) shall not be made lower without expressed written consent of the architect.
- .10 Prior to commencement of the Work, the Contractor shall determine accurate locations and arrangements and sizes by study and co-ordination of architectural drawings, structural, civil engineering, mechanical and electrical engineering drawings, all shop drawings or installation diagrams and existing site conditions.
- .11 Before proceeding with the Work, ensure that spaces and arrangements that affect installations are adequate and coordinated.
- .12 Where construction conditions require reasonable revisions to location of items illustrated and their spacing and arrangement relative to other elements illustrated or found on the site, make such revisions at no additional cost to the Owner. No additional cost shall be awarded to the Contractor as a result of the requirement to relocate previously installed items to positions referenced on the architectural drawings.
- .13 Do not scale drawings. Verify all dimensions in the field or contact Architect to coordinate final placements among all parties affected prior to proceeding with any part of the Work including prior to development of shop drawings, fabrication of parts of the work and placing orders for equipment or materials. Report all discrepancies among construction and contract documents to the Architect and seek Architect's interpretation of the requirements of the Work.

1.20 REQUIREMENT TO REVIEW THE CONTRACT DOCUMENTS AND LIMITATIONS ON THEIR USE

- .1 The Contractor is responsible for the development of a full and comprehensive understanding of the Work illustrated, specified and implied by the entirety of the Contract Documents and the Contractor shall seek clarification of the content of the Contract Documents when the intent of the Contract Documents is not clear.
- .2 The Contractor is responsible to report discrepancies found within the Contract Documents to the Consultant.
- .3 No AutoCAD or similar design and drafting, editable, digital files or information will be provided to the Contractor. No Word or similar editable text files will be provided to the Contractor.
- .4 The Consultant holds copyright over all Contract Documents prepared by the Consultant. The content of all Contract Documents associated with the Project and all information contained therein shall be considered to be the intellectual property of the Consultant and the Contractor shall treat all Contract Documents as confidential, produced solely to facilitate the construction of the Work by the Contractor and its Sub-Contractors and for no other purpose.
- .5 The Contractor's use and the Sub-Contractor's use of the Contract Documents does not confer license or grant for any other purpose.
- .6 All Contract Documents must be returned to the Consultant immediately upon request or, if in electronic or digital form, deleted completely from all of the Contractor's electronic file systems and portable data storage devices together with all remote data storage or portable information storage

device or system when the Contract has been completed. In this instance, remote storage systems include internet-based storage services also known as "cloud" storage systems, USB port storage devices, flash drives, portable hard disk drives, laptop and desk top computers operated by the Contractor or the Contractor's employees, compact disks, DVD's and any other digital storage media.

1.21 SUB-DIVISION OF THE CONTRACT DOCUMENTS:

- .1 Work required by the Specifications is divided into descriptive Sections for convenience and this sub-division of the Work is not intended to identify absolute contractual limits among the Sub-Contractors nor between the Contractor and his Sub-Contractors.
- .2 All sections of Division 01 of the Specifications describe Work, management and co-ordination that is the direct responsibility of the Contractor. However, these Sections shall also apply to the Work of all Divisions following Division 01.
- .3 In the context of the Specifications, the phrase "this Section" shall mean the entity or persons responsible for executing the Work referenced and the ultimate responsibility for performance of all parts of the Work of the Section rests with the General Contractor. The term "Section" also means "Sub-Contractor" or "Contractor" depending on the agency prosecuting the Work of the particular Section.
- .4 Sub-division of the Specifications into Divisions and Sections does not imply that the Owner or the Consultant has responsibility to resolve disputes, co-ordinate or otherwise intervene in the relationship established between the Contractor and its Sub-Contractors.
- .5 The Contractor shall ensure:
 - .1 That all prospective and engaged Sub-Contractors and Suppliers receive all Sections of the Specifications all drawings for reference during the prosecution of the Work.
 - .2 That all prospective and engaged Sub-Contractors have developed a comprehensive understanding of the Work specified and that each had received and understood all Sections applicable to their scope of Work.
 - .3 That the sub-division of the Work among Sub-Contractors and Suppliers incorporates all aspects of the Work described, illustrated and implied by the Contract Documents.
 - .4 That the Work undertaken by the Contractor includes all aspects of the total Work of the Project that may not be within the collected scope of Work for all Sub-Contractors.

1.22 OBLIGATION TO ADHERE TO CONTRACT DOCUMENTS THAT DESCRIBE WORK EXCEEDING MINIMUM STANDARDS:

- .1 In most instances, Specifications stipulate requirements, construction methods and specify materials that would result in finished Work that exceeds the requirements of referenced standards for the work including Ontario Building Code. In this instance, the excessive aspect of the Work is included within the Contract Price and it is the expected standard for the Work.
- .2 Otherwise, the referenced standards within the Specifications shall govern the quality and nature of the materials and methods used for execution of the Work for every Section. The reference standards listed within specifications establish the minimum standard for the Work; however, specifications may exceed the referenced standard.
- .3 Where specifications do not exceed the referenced standard, executed Work with quality or performance characteristics, that exceeds the minimum, shall be considered to conform.
- .4 Generally, specifications are intended to supplement standards referenced and may describe additional requirements for the work that exceed the referenced standard and such requirements of the Contract Documents shall take precedence over requirements of any referenced standard
- .5 Applicable Reference Standards:

- .1 Where any reference standard is indicated in the Contract Documents, it shall mean reference to the latest edition of the standard referenced or the latest edition of the manufacturers' requirements or to the latest, published applicable legislative requirements, all as approved by the issuing organization, current for the date of the Contract.

1.23 MINIMUM STANDARD FOR THE WORK:

- .1 All Work shall be executed in such a way as to achieve or exceed, as applicable and described within Contract Documents, the requirements of the Ontario Building Code, Ontario Regulation 332/12 and all subsequent amendments made prior to the date on the Bid Documents, herein after referred to as the OBC.
- .2 No aspect of the Work or requirement of the Contract Documents is intended to result in Work that would not achieve the minimum standard for construction stipulated with the Ontario Building Code.
- .3 The Contractor shall report any condition in the Work that would result in a violation of any legislation governing construction of buildings in the Province of Ontario.
- .4 Codes and Standards listed below are applicable throughout the entire course of the Work. Reference standards within the Specifications may exceed these standards.

1.24 FUNDAMENTAL CODES AND STANDARDS:

- .1 Jurisdictional Authorities:
 - .1 Where reference is made to jurisdictional authorities or Authorities Having Jurisdiction, it shall mean all authorities who have within their constituted powers, the right to enforce the laws of the Place of the Work.
 - .2 Requirements of jurisdictional authorities shall take precedence over the requirements of the Contract Documents except that the more stringent requirements of the Contract Documents shall take precedence over requirements of the jurisdictional authorities.
 - .3 Comply with all Municipal Bylaws, Provincial and Federal legislation or regulation and regulations of any Authority Having Jurisdiction at the Place of the Work.
 - .4 Jurisdictional authorities governing the work shall include, but shall not be restricted to, the following:
 - .1 The Ontario Building Code, regulation 332/12 and all applicable amendments in force at the time that the Building Permit is issued
 - .2 The Ontario Electrical Code
 - .3 The Electrical Safety Authority
 - .4 The Municipal Building Department
 - .5 The Municipal Fire Department
 - .6 The Municipal Police Department
 - .7 The Municipal By Law Enforcement Department
 - .8 The Grey Bruce Health Unit
 - .9 The Grey-Sauble Conservation Authority
 - .10 The Municipal Department of Public Works
 - .11 The Municipal Engineering Services Department
 - .12 Regulations made under the Occupational Health and Safety Act
 - .13 Regulations made by the Workplace Safety and Insurance Board
 - .14 Regulations enforced by the Ministry of Labour
 - .15 Regulations and requirements of TSSA – Technical Standards and Safety Authority

- .2 The Contractor shall co-ordinate all required inspections by all Authorities Having Jurisdiction at the Place of the Work and these inspections shall be arranged in a timely manner which will not disrupt the progress of the Work schedule.

.3 Abbreviations Used to Refer to Applicable Standards:

AA	- the Aluminum Association
AAMA	- American Aluminum Manufacturers Association
AISI	- American Iron and Steel Institute
ANSI	- American National Standards Institute
ASTM	- American Society for Testing Materials
AWI	- Architectural Woodwork Institute
AWMAC	- Architectural Woodwork Manufacturers Association of Canada
NAAWS	- North American Architectural Woodwork Standard
CCDC	- Canadian Construction Documents Committee
CGSB	- Canadian General Standards Board
CISC	- Canadian Institute of Steel Construction
CPMA	- Canadian Paint Manufacturers' Association
CSA	- Canadian Standards Association
CSSBI	- Canadian Sheet Steel Building Institute
MTO	- Ministry of Transportation, Province of Ontario
NFPA	- National Fire Protection Association
OAA	- Ontario Association of Architects
OBC	- Ontario Building Code
OGCA	- Ontario General Contractors' Association
OLS	- Registered Ontario Land Surveyor
SAE	- Society of Automotive Engineers
TSSA	- Technical Standards and Safety Authority
ULC	- Underwriters' Laboratories of Canada
UL	- Underwriters' Laboratories Incorporated

1.25 CONSTRUCTION PERMITS, APPLICATION FEES, DISPOSAL FEES, NOTICE OF PROJECT AND APPLICATIONS TO ELECTRICAL SAFETY AUTHORITY:

- .1 The applicable Sub-Contractor, under the direction of the Contractor shall incorporate within the Contract Price the cost of the fees and the cost of administrative work, including preparation of application forms, communications and correspondence and preparation of drawings and servicing details associated with the following activities:
- .1 The application for plumbing permit from the Municipal Building Department.
 - .2 Applications and fee payments or deposits associated with mud-tracking through the Municipality.
 - .3 Permits associated with Electrical Safety Authority and ensure requirements of that application are met to permit appropriate prosecution of the Work. The Contractor shall facilitate, together with the Consultant, the Utility application for service and their requirements including Electrical Safety Authority application. The applicable plan review fees will be paid by the Owner or through a Cash Allowance.
 - .4 The cost and administration of applications and documents associated with disposal at the Municipal landfill site or any site selected by the Contractor, where ever they are located.
 - .5 The applicable Sub-Contractor shall make application for and pay all fees associated with all other permits or applications required to prosecute the complete Scope of the Work indicated in the Contract Documents including, but not limited to, water use applications and fees, permits,

applications and fees related to use of Municipal services of any kind including Municipal Transfer Station.

- .2 The **Owner** shall make application for the Building Permit and pay the cost associated with this application.
- .3 The **Contractor** shall pay all cost associated with the transportation and disposal of waste for the work of this Contract or assign this cost to the Sub-Contractors.
- .4 The **Contractor** shall issue a Notice of Project to the Ministry of Labour.

1.26 CONTRACTOR'S ACCESS TO THE WORK:

- .1 The Contractor shall maintain all operations within the limits established on site by the Owner and as illustrated on drawings.
- .2 Access to
- .3 Following Substantial Performance of the Work, the Contractor shall seek the consent of the Owner prior to entering Occupied portions of the building not within the current Place of the Work.
- .4 The Place of the Work is designated as the area for temporary storage of the Contractor's materials and equipment at the Place of the Work. Co-ordinate all areas required for temporary storage with the Owner following Substantial Performance of the Work.
- .5 The Contractor shall store and stage materials from the property upon which the Project is to occur when materials and assemblies are delivered to the site. The Contractor shall provide adequate and appropriate protection and security including containers and enclosures for such materials and assemblies.

1.27 MANAGEMENT OF VOLATILE SUBSTANCES:

- .1 Solvents and other off-gassing or volatile substances including adhesives and paints shall not be stored within buildings over night, but shall be removed to the exterior at the completion of each day's work, stored securely or disposed off site or otherwise treated to prohibit access to these materials by potential vandals and fire or spontaneous combustion.
- .2 Store applicators, rags, brushes or sponges, which have been used in association with solvents, within sealed containers, filled with water.

1.28 CONCEALMENT OF BUILDING SERVICES, SUPPORTS AND FASTENERS:

- .1 Unless indicated on the drawings or otherwise approved by the Consultant, conceal from view all supports, braces, pipes, conduits, ducts, wiring and other services within finished areas.
- .2 Clarify the intent of all such concealment with the Consultant whenever it is in doubt. Ensure that all concealed components are tested, inspected or otherwise approved so as to not disrupt construction schedules.
- .3 Advise Consultant immediately of any item intended to be concealed which cannot be accommodated within the limits of the finishes indicated.

1.29 PRE-CONSTRUCTION MEETING:

- .1 Purpose: Review personnel assignments, responsibilities, and administrative and procedural requirements, including site safety plans.
- .2 Location: The Place of the Work, or if required for social distancing purposes, virtually.
- .3 Minutes: Contractor shall record minutes and distribute to parties in attendance within three (3) Working Days of the meeting.
- .4 Attendees:
 - .1 Contractor's representatives: senior management, Project Manager and Site Superintendent.

- .2 Sub-Contractor representatives: Selected by the Contractor due to the significance of the Sub-Contractor in the Project.
- .3 Consultant's representatives: as determined by the Consultant.
- .4 Owner's representatives: as determined by the *Owner*.
- .5 Agenda will include the following:
 - .1 Introduction of Owner's, Consultant's, major Subcontractors' and Contractor's representatives.
 - .2 Appointment of primary and secondary contacts for Project team.
 - .3 Review status of Contracts, building permit and other permits.
 - .4 Review status of submissions: Project schedule, safety plans, Owner's forms and access control information and requirements.
 - .5 Review appointment of Testing and Inspection Agency as necessary.
 - .6 Address questions raised about Contract administration requirements and review communication protocol.
 - .7 The Contractor shall provide an overview of procedures, safety and site access, and address requirements for as-built/record documents and drawings and requirements for maintenance materials and spare parts.
 - .8 New Business.

1.30 SITE MEETINGS - ALSO KNOWN AS CONSTRUCTION PROGRESS MEETINGS:

- .1 The Contractor shall schedule site meetings at regular intervals, to suit the progress of the Work.
- .2 The Contractor shall preside over all site meetings.
- .3 The Contractor shall prepare agenda for all site meetings.
- .4 The Contractor shall distribute written notice of each site meeting 4 days in advance of meeting date to consultant and Owner.
- .5 The Contractor shall provide space at the place of the work and make arrangements for meetings with the Owner at an alternate location on site after the building is occupied.
- .6 The Contractor shall record the minutes including significant proceedings and decisions. Identify actions required by parties involved in the work, including all consultants.
- .7 Contractor shall reproduce and distribute copies of the meeting minutes within 5 business days after the meeting and submit copies to all meeting attendees, affected parties not present, the Consultant, sub-consultants and the Owner.
- .8 Representatives of the Contractor, Sub-Contractors and suppliers attending meetings must be qualified and authorized to act on behalf of the company each represents.
- .9 Meetings shall be scheduled at the call of the Contractor or the Owner and as required by the progress of the work. Meeting dates shall be specified at the first site meeting as determined convenient by the Consultant, Owner and Contractor.
- .10 Meeting agenda shall include but not be limited to the following:
 - .1 Review and approval of minutes of previous meetings
 - .2 Review of work progress since previous meeting
 - .3 A discussion of field observations, construction method and conflicts in material, schedule or construction methods
 - .4 A review of all items affecting construction schedule
 - .5 Review of delivery schedules of off-site material fabrications, shop drawings and equipment

- .6 A review of corrective measures to be undertaken to meet the milestone dates on the construction schedule
- .7 A discussion of any required revisions to the construction schedule
- .8 A review of submittal schedule
- .9 A review of quality standards and workmanship
- .10 A review of proposed and approved changes for their affect on the construction schedule and completion date
- .11 A review of any part of the work affecting the Owner's access to the site and services to the Owner's occupied facilities
- .12 New business

1.31 GENERAL SAFETY MEASURES AND ACCESS CONTROLS:

- .1 Refer to Technical Specifications for particular requirements.
- .2 Contractor shall provide all access controls, warning signs or devices.
- .3 Contractor shall verify capacity of building structure or building structure that is being constructed to support all loads imposed or intended to be imposed on the structure throughout the complete duration of the Contract Time including, but not limited to the loads imposed by the following activities:
 - .1 The placement of new (wet) concrete on any surface or in any circumstance.
 - .2 Cutting of existing structural members that may result in transference of load to adjacent or other structural members not intended to support the additional load.
 - .3 The cutting of existing load-bearing materials without appropriate temporary support.
 - .4 Use of lifts, scaffold and equipment used to transport materials and personnel.
 - .5 The placement on any surface of materials and pallets of material stored temporarily and awaiting installation.
- .4 Contractor shall neither operate cranes and motorized platforms and hydraulic lifts nor shall the Contractor use other equipment that provides aid for access to the Work, including, but not limited to, ladders and scaffolding without operators who have received current training appropriate to the equipment and who can produce proof of the training upon request. The Contractor shall ensure that the equipment has been subject to appropriate and current safety inspections and that certificates attesting to the inspection are associated with the equipment and available for review by the Owner and Consultant and any Authority Having Jurisdiction.
- .5 The Contractor shall not permit use of devices powered by electricity or equipment that conducts or generates electricity unless the equipment bears appropriate certificates and clearances associated with the item and the Contractor shall ensure that all such devices are routinely inspected.
- .6 Access controls, warnings and equipment include, but are not limited to, the following items:
 - .1 Temporary construction, access control and access barriers required.
 - .2 Construction ventilation equipment equipped with filters appropriate to the task.
 - .3 Temporary electrical services and adequate lighting.
 - .4 Appropriate temporary water supply hoses.
 - .5 Traffic cones, traffic barriers, interior and exterior caution tapes and warning signs.
 - .6 Tapes and adhesives for application of warning devices or to establish air-tightness.
 - .7 Masking of finished Work or existing items that will remain in situ during the work.
 - .8 Protective surfaces and coverings for the Owner's finishes and equipment that are not part of the Work.

- .9 Protective surfaces and coverings for executed Work that may be damaged by the completion of other Work.
- .10 Safety barriers and railings – site-built or purpose-made.
- .11 Safety gear and equipment required by applicable legislation or the Work described within the Specifications.

1.32 SITE SUPERINTENDENT

- .1 Contractor shall employ a capable, experienced and qualified superintendent. This is a critical and essential requirement of this Contract.
- .2 Qualifications of superintendent:
 - .1 Site superintendents selected for supervision of this Work shall be trained in all aspects of Workplace safety, coordination of the Work, preparation and manipulation of project schedules and management of construction projects.
 - .2 Evidence of training shall consist of degrees granted through institutions providing training specific to construction management or through the superintendent's possession of certificates attesting to successful completion of training programs specific to construction site management such as the Gold Seal program.
- .3 The Owner reserves the right to reject the proposed Site Superintendent if evidence of appropriate qualifications cannot be produced.
- .4 The Owner may request that the Contractor appoint an alternate superintendent at any time during the prosecution of the Work.
- .5 The Contractor shall provide a resume, an experience record and evidence of training upon request.
- .6 Superintendent must continue to demonstrate an appropriate level of skill required for the Work of this project and in the management of construction projects in general throughout the course of the Work.
- .7 Performance shall be measured through personal interaction during site meetings, observation of construction site management made by the Consultant, the condition of the place of the Work, the management of safety provisions and maintenance of project schedules.
- .8 Evidence of incompetence raised by sub-contractors may be considered by the Consultant as a part of any evaluation of the performance of the superintendent.
- .9 Violation of construction safety provisions resulting in penalties applied under the Ministry of Labour or by any similar Authority may be considered evidence of failure to appropriately manage the construction site and could result in the Owner's request to replace the superintendent.
- .10 Behaviour that results in unsafe conditions on the job site or that seriously impairs the prosecution of the Work shall be considered sufficient justification to warrant dismissal of the superintendent.
- .11 The Owner's request to replace the superintendent shall be honoured or evidence sufficient to result in the withdrawal of the request must be presented to the Owner for consideration. The Owner's rejection of the evidence presented shall oblige the Contractor to provide a substitute superintendent.

1.33 SITE ASSESSMENT AND ACCESS TO DOCUMENTS BY SUB-CONTRACTORS

- .1 Site assessment shall continue, uninterrupted, through the entire course of the Contract Time.
- .2 The Contract Price includes the cost of competent and qualified personnel who will conduct continuous careful and extensive review of conditions at the site as the Project is developed followed by recording and documentation of as-built conditions.
- .3 Review site for conditions which may affect the execution of the Work and incorporate all such conditions in the calculation of the Contract Price.

- .4 The Contractor is solely responsible to ensure that all Sub-Contractors have conducted extensive, significant and appropriate investigations of the site and the Work in progress together with a complete review all available Bid and Contract Documents.
- .5 The Contractor shall ensure that all Sub-Contractors possess all pertinent information, including all Contract Documents and other information generated, discovered, inferred or otherwise deemed prudent or important to the Work of the Sub-Contractor by the Contractor.
- .6 The Contractor shall be solely responsible for the coordination of the parts of the Work and the assignment of the scope of Work associated with all Sub-Contractors. The Contractor shall ensure that the content, findings and considerations arising from site assessment activity together with a comprehensive review of the Bid and Contract Documents are incorporated appropriately within the respective parts of the Work for each Sub-Contractor.

1.34 ACKNOWLEDGEMENT OF SITE CONDITIONS

- .1 Through submission of a Bid and execution of the Contract, the Contractor has acknowledged that circumstances within the existing building and surrounding site are understood within the context of all materials provided for review including the Bid and Contract Documents and through the Contractor's attendance at the place of the Work and the implication of these circumstances is included within the Contract Price.

Part 2 Products - NOT USED and Part 3, Execution - NOT USED

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Executed Contract.
- .2 All sections of Division 01
- .3 All Sections of the Technical Specifications

1.2 LIMITATIONS OF THE REQUIREMENTS OF THIS SECTION:

- .1 This Section provides a general summary of the Contractor's duties, therefore, this Section conveys information that, when read together with the drawings and technical specifications, describes the general relationship between the conditions at the site as they are understood by the Consultant and the Owner prior to construction of the Work described and illustrated within Contract Documents.

1.3 SPECIFICATION CONTENT:

- .1 The *Specifications* use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - .1 Related Requirements: Related requirements listed in the *Specifications* indicate *Specifications* Sections that are related to work of the Section but do not create a trade scope of work:
 - .1 Related requirements are provided to indicate closely coordinated requirements during preparation of the *Construction Documents* and that may aid the *Contractor* and the *Sub-Contractor* in the complete integration of their components with the Project.
 - .2 *Sub-Contractors* are expected to coordinate with all Sections affecting their work and ensure that the subject scope of work is fully accounted for, including requirements of Division 01 and other Sections that may not be listed in the listings associated with related requirements.
 - .2 Laws, Statutes, Codes and Reference Standards: Dated reference standards listed in the *Specifications* generally reflect the version used to establish the performance requirements for the work described:
 - .1 Reference to any provincial or Federal statutes and codes includes the full content of the code or statute including any amendment, revision or consolidation published by the Authority Having Jurisdiction.
 - .2 Dated reference standards listed in Provincial or Federal codes or statutes apply to the *Work* of the *Contract*.
 - .3 Dated reference standards listed in Provincial codes or statutes govern where an older or newer version of a reference standard is listed in the *Specifications*.
 - .3 Abbreviated Language: Language used in the *Specifications* and other *Construction Documents* is abbreviated to aid interpretation of the documents:
 - .1 Words and meanings shall be interpreted as appropriate and are intended to be read as a whole, not extracted and read individually.
 - .2 Words implied but not stated, shall be inferred as the sense requires.
 - .3 Imperative Mood and Streamlined Language: Generally used in the *Specifications* to assign responsibility to the *Contractor* who shall delegate responsibility to a *Sub-Contractor*.
 - .4 Occasionally, the indicative or subjunctive mood may be used in the Section text for clarity to describe responsibilities that must be fulfilled indirectly by *Sub-Contractors* or by others when so noted.
 - .5 Use of May, Shall, Must and Will: Use of the words may, shall, must and will is minimized throughout the *Specifications*, but are used to indicate preferred directives to the *Contractor* and *Subcontractor* where greater clarity to the documentation is achieved using those words:

- .1 The word “may” is indicative of a directive subject to discretion on the part of the party from whom the action is forthcoming, and the other party has an obligation to act upon when the purpose or result of the directive is identified.
- .2 The word “shall” is indicative of a directive when one party “has a duty” to another, and where a failure to do something has potential to breach an obligation under the contract; typically requiring that the *Subcontractor* undertake a specific task or assignment.
- .3 The word “must” is indicative of a directive when one party “is required to” perform an action or directive, with no other interpretation.
- .4 The word “will” is indicative of a directive that one party “has an express obligation” to the other party; typically, an action or task required by the *Owner, Contractor* and *Consultant*.
- .6 Use of Singular and Plural Words: The language of the *Specifications* is essentially plural, and usage of singular and plural words is governed as follows:
 - .1 Every attempt has been made to apply singular and plural word usage based on numbers of components required by the *Project*; however, it is expected that use of singular and plural words will be interpreted in context to what the *Construction Documents* indicate.
 - .2 The use of plural words when ascribed to a singular requirement shall be reasonably interpreted as relating to a singular requirement when a count of components described by the plural word indicates a single occurrence.
 - .3 The use of a singular word version when ascribed to multiple requirements shall be reasonably interpreted as relating to multiple requirements when a count of components described by the singular word indicates multiple occurrences.
- .7 Use of Gender Specific Words: The language of the *Specifications* is generally written using nouns derived from the *Contract* and the text generally avoids the use of gender specific pronouns wherever possible, including where reference is made to partnerships, firms or corporations involved and:
 - .1 Words describing gender and that relate to the partnerships, firms and corporations can be interpreted as relating to the *Contractor* and *Sub-Contractor* as defined by the *Contract* within the context of what the *Construction Documents* require for those parties.

1.4 COMMUNICATION AND FACILITATION OF COMMUNICATION AS A FUNDAMENTAL TASK OF THE CONTRACTOR:

- .1 The scope of the work for the Contractor includes communication of all pertinent information and delivery of queries for all parts of the Work that influence the Contract Price, the Contract Time or the relationship formed by the Owner's agreements between the Owner and the Authorities Having Jurisdiction when any adjustment is made to the Work illustrated or described within the Contract Documents.

1.5 GENERAL DESCRIPTION OF WORK WITHIN THE CONTRACT:

- .1 The scope of Work within the Contract includes all Work and services required to complete all aspects of the work illustrated, described and implied in the Contract Documents.
- .2 The Contract Documents describe the Project in its completed state. The Contractor is obliged to develop the means and techniques used to prosecute the Work to achieve the completed Project.
- .3 The following requirements are not intended to limit or amend the requirements of the Contract Documents.
- .4 General Requirements for Project Planning and Preparation of Schedules:
 - .1 The fundamental duties of the Contractor, within the terms of the Contract, are as follows:
 - .1 To develop and maintain a plan for prosecution of the Work;
 - .2 To ensure the orderly and safe prosecution of the Work; and

- .3 Provide to the Owner an accounting of the financial expenditures as they occur and as compared to the Contract Price; and
 - .4 Provide to the Owner an accounting of the expenditure of the Contract Time as compared to the Contract Time established when the Contract was formed between the Owner and the Contractor; and
 - .5 To provide upon its completion, for use by the Owner, the Project realized according to the requirements of the Contract Documents.
- .2 Development of a Scope of Work: The Contractor shall determine the number, nature and sequence of all activities necessary to prosecute the Work and arrange these within a system that enables the Contractor to establish the priority of each task.
- .3 The Contractor's establishment of the priority for tasks must be directed toward the discovery of the most efficient means to achieve completion of the Project.
- .4 Tasks developed must include supplemental activities and services, processes, consultations, and inspections.
- .5 The Contractor is obliged within the terms of the Contract, to develop a comprehensive understanding of the Work and the completed Project prior to establishing the project schedule (illustrating the way the Contract Time is distributed among the related tasks) and the sequence of tasks required together with the relationship between the Work itself and the work of the engaged Sub-Contractors.
- .6 The Contractor shall modify and adapt the sequence of activities as the Work progresses and as the Contractor finds necessary to adapt the planning of the Work to the changing conditions at the site in such a way as to maintain the efficiency of the work in progress and to achieve the goals established in the construction schedule submitted to the Owner.
- .5 General Scope of the Construction:
- .1 The existing site contains hazardous materials. Refer to attached Designated Substance Survey and Phase 2 Environmental Assessment attached with this Specification.
 - .2 Work of this Contract incorporates, but is not limited to, provision of labour, materials and administrative tasks associated with the following activities:
 - .1 Discover the location of all existing utilities and services applicable to the Work and other services that must be connected to the Work. Preserve and protect existing services in the vicinity of the Work and mark these clearly for all persons performing Work on the Project.
 - .2 Preserve and protect existing services that must remain in operation outside of the Place of the Work, including, but not limited to, the following:
 - .1 The domestic water and fire suppression water supplies serving fire hydrants; a water supply that may be used by the Contractor as a temporary supply during construction.
 - .2 The retention of existing sanitary drainage as necessary and to suit the Contractor's Construction Schedule and temporary use during construction.
 - .3 The maintenance of existing plumbing system drains and vents and rain water leaders to ensure that rain water and sanitary sewer drainage is permitted to leave the Place of the Work during construction; and
 - .4 Maintenance of existing electrical services as a temporary measure to facilitate construction under the terms of ESA approval.
 - .3 Erect access control and safety barriers required according to applicable legislation and to conform to the requirements of the Contract Documents and the Contractor's safety policy. Provide appropriate signage and direction to all persons within the Place of the Work regarding safety procedures.

- .4 Workers shall wear appropriate person protective equipment and clothing while prosecuting selective demolition.
- .3 Undertake Selective Demolition:
 - .1 The existing building contains severe contamination by mould that will be hazardous to persons working at the Place of the Work. Take measures to protect all workers prior to initiating selective demolition operations. This Contract includes all cost and the materials and methods necessary to safely remove materials that exhibit mould growth. Provide appropriate person protective equipment and respirators as necessary to the hazard encountered.
 - .2 The Owner anticipates that the Contractor will use to its best advantage the existing building enclosure to prevent spread of dust, mould spores and debris to surrounding sites.
 - .3 Provide on the job site a safe and clean area for sanitation facilities and for workers' breaks and meal times.
 - .4 Provide a safe and clean environment for the supervisory staff and for the Owner and Consultants who visit the site. This environment shall have heating and lighting adequate for office work.
 - .5 Erect dust control barriers to maintain on site dust generated by removal of existing concrete and masonry. Do not permit materials removed from the interior to contaminate by the spread of dust and mould spores the exterior of the site and surrounding properties. Secure all removed materials in bins or other spaces protected from the wind and weather. Stage demolition work to the best advantage of the Contractor.
 - .6 Supply and install scaffolds, utilize lifts and other measures intended to permit safe removal of building materials. Permit Owner's inspection prior to commencing work. Correct any deficiencies in barriers and other items noted by Owner. Do not commence work unless Owner provides consent to start in writing.
 - .7 Make safe electrical systems throughout all parts of the site that are subject to selective demolition operations. Make safe all natural gas supply piping throughout the building.
 - .8 Empty and otherwise effect appropriate disposal of water storage tanks and tanks filled with other substances. Capture refrigerant and other mechanical system liquids according to applicable legislation. Remove from the site all hazardous liquids.
 - .9 Remove existing fluorescent lighting, their lamps and their ballasts. Ballasts contain PCB materials and must be disposed according to applicable legislation.
 - .10 Remove all existing acoustic tile panels and all existing gypsum board ceilings followed by the removal of all suspended ceiling framing whether supported by steel grid structure or suspended by wood or light-gauge metal framing. Dispose of removed metal products in separated bins appropriate for recycling. Remove ceiling tiles and suspension system within enclosed construction area.
 - .11 Remove using all necessary protective measures and personal protective equipment, all existing gypsum board material and finishes attached thereto using means to control dust and spread of mould spores. Ensure that demolition personnel wear appropriate protective gear and respirators.
 - .12 Disconnect and remove all existing HVAC system ducts. Remove existing mechanical units and fans. Dispose of metal waste at appropriate recycling facilities. Note that all existing ducts may contain dust and mould spores that are hazardous to human health. Workers shall wear appropriate person protective equipment and clothing.
 - .13 Remove using measures intended to control the spread of mould, dust and fiberglass fibers and other hazardous materials, all existing building insulation. This includes fiberglass and mineral fiber products that are hazardous to human health. Dust and mould on fibrous insulation will be hazardous to human health.

- .14 Remove existing floor finishes and all existing wood framed construction: Framed walls, framed floor systems and the supports for these floors.
- .15 Saw-cut existing concrete floor slabs under cover of existing building enclosure. Provide adequate ventilation.
- .16 Disconnect and remove all existing electrical power systems that may impair the contractor's ability to effect demolition of existing walls and roof and interior spaces. Establish to Contractor's best advantage, part of the existing electrical system for use during construction. Maintain this as a temporary service in accordance with ESA requirements and permits. Pay the cost of this temporary electricity service: both the cost of set-up, distribution and demounting of the system following completion of the permanent electrical power system.
- .17 Disconnect and remove all existing above ground plumbing piping back to source and determine whether a temporary water service will be retained using the existing plumbing system. If any part is retained, ensure adequate temporary heating and protection from weather and freezing temperatures.
- .18 Cut and carefully remove existing structural steel elements following erection of temporary supports that permit structure that will remain in the final project to remain supported.
- .19 Remove by disassembly components of the existing steel building structure including purlins, girts and braces when these must be removed to permit new work.
- .20 Remove existing cast in place concrete floor structure and related supports as illustrated on drawings. Install appropriate shoring to provide temporary support of the structure. Shoring shall be designed by a structural engineer in accordance with shop drawings created for this purpose.
- .21 Remove existing load-bearing masonry using saw-cutting and ensure that remaining walls and surfaces are cut square, plumb and level to suit new installations. Do not demolish the perimeter of removed walls by smashing existing masonry units.
- .4 Site Work:
 - .1 Examine Phase 2 environmental report and incorporate recommendations.
 - .2 Remove existing cast-concrete curbs and walks, complete. Refer to architectural drawings and civil engineering drawings. Crush concrete and asphalt and use on site to best advantage or remove from the site and dispose in accordance with all applicable legislation.
- .5 Perform All Construction Work:
 - .1 Provide administrative work including development of the construction schedule and the sequence of construction events, facilitation of submittals and supervision of the work.
 - .2 Maintain temporary sanitary facilities and office work facilities as necessary and in accordance with applicable legislation.
 - .3 Conduct training and examine the site for safety hazards on a routine basis and communicate safety requirements and hazards to all workers.
 - .4 Maintain a safe access to the site for fire fighters and medical emergency personnel.
 - .5 Provide all support services necessary to facilitate the work of Sub-Contractors and to supplement the work of Sub-Contractors including provision of temporary services, construction aids and lifts, construction facilities and facilitation of required testing and inspection services.
 - .6 During each phase, perform the following tasks:
 - .1 Erect stud work and bulkhead and ceiling framing and obtain Consultant's approval of layout.
 - .2 Mark all electrical and communication device box locations on partition studs for approval by Consultant and Owner. Incorporate door and building security devices into assemblies as the work progresses.

- .3 Contact Municipal Building Department for routine inspections required under the terms of the Building Permit prior to concealing work subject to such inspections.
- .4 Carefully and frequently examine Contract Documents, shop drawings product literature for all mechanical and electrical work, and in particular those parts within ceiling spaces, and ensure that it is appropriately completed and reviewed by the Consultants prior to completion of mechanical or electrical rough-in work within ceiling spaces. Request an above-ceiling inspection prior to concealing from view any mechanical and electrical services.
- .5 Obtain review by Consultant of all installed services following rough-in and prior to applying gypsum board panels, ceiling tile panels or other material which will conceal from view elements of the Work within stud spaces or ceiling spaces.
- .6 Protect finished work as necessary and as work progresses to avoid damages to new materials.
- .7 Complete the work of the Contract.
- .8 Conduct testing and certification processes including, but not limited to, sprinkler system review by designer of the system and sign-off on the installation, undertake Testing Adjusting and Balancing of all air handling systems, conduct Fire Alarm System Verification, complete Integrated Life Safety Study. Obtain certificates and final inspection from authorities having jurisdiction, ESA and similar organizations. Complete other commissioning and closeout procedures at completion of construction.
- .9 Complete Closeout Submittals and provide to Consultant. Complete corrections or add supplemental and missing information and re-submit closeout materials as necessary.

1.6 GENERAL ADMINISTRATIVE WORK:

- .1 Work of this Contract includes administrative tasks that shall be performed by the Contractor and to suit the Contractor's established schedule and sequence, together with supplemental tasks not recorded here, that are deemed by the Contractor to be necessary:
 - .1 Prepare administrative documents and submittals and establish the protocol associated with communication among all parties involved in the Work, and
 - .2 Convene meetings with Owner according to an agreeable, established protocol associated with the prosecution of construction Work.
 - .3 Establish and implement the means to control the limits of activity on the site and
 - .4 Establish procedures associated with the interaction of the Consultant, the Owner, Field Engineers, Authorities Having Jurisdiction and their designees with the Sub-Contractors.
 - .5 Establish communication protocols and implement these to the benefit of all parties.
 - .6 Establish techniques and implement the means to facilitate the completion of the Work in accordance with the mutually agreeable Construction Cost and according to the limits of a mutually agreeable duration of Construction Time.

1.7 WORK SEQUENCE AND GENERAL REQUIREMENTS OF THE CONSTRUCTION SCHEDULE:

- .1 Provide project schedule or detailed schedule associated with a discrete scope of work in accordance with Contract following execution of Contract.
- .2 Convene start-up meeting to establish the following, as a minimum:
 - .1 Clarify the Contractor's use and access of the site, including any restrictions imposed by the Owner,
 - .2 ratify among all parties the schedule determined by the Contractor and, in particular, the Work that is associated with use of the site or that may adversely impact neighbouring properties,
 - .3 to permit the Contractor to clarify and seek permissions for use of the site or environs, if this use is not clear.

- .4 To discuss or determine extent of any restrictions to access or use of the site for Municipal events and purposes.
- .5 To establish agreeable locations for construction vehicles, determine position of construction fencing, determine position of temporary storage, the extent of property available to the Contractor, location of Municipal landfill and materials accepted there.
- .6 To verify the Contractor's use and the location of material storage on site including clean fill or temporary stockpiling for disposal of removed materials and
- .7 to discuss conditions associated with the Contract and the site.
- .3 Construction of the Project may occur as soon as practical and continue for duration. There is no intention to make any part of the project contingent on completion of work executed by the Owner's forces.
- .4 Construct the using a sequence determined by the Contractor in order to achieve the goals implicit in the Contractor's schedule.

1.8 GENERAL FIRE PREVENTION AND SUPPRESSION:

- .1 Maintain and continuously improve as the Work progresses, access to the site by fire-fighters and their equipment. Maintain fire control measures at all times.
- .2 Maintain fire control measures at all times including appropriate management of flammable substances, cloths used with chemical cleaning processes and other elements susceptible to spontaneous combustion. Establish and maintain for 4-hours next following hot work, fire watches. This provision applies to welding in the field and use of tools or torches that utilize an open flame.
- .3 Provide fire extinguishers (10-lb, ABC) within the area under construction. Provide a minimum of 5 extinguishers distributed in the Place of the Work. Maintain such extinguishers near the work in progress and near exits from the work area.

1.9 GENERAL WASTE DISPOSAL REQUIREMENTS:

- .1 Undertake delivery of waste materials to appropriate recycling and salvage operations or transfer stations facilitating recycling and re-use of material as a priority over disposal to landfill sites or transfer sites from which materials will be subsequently disposed at landfill sites.
- .2 Temporarily store waste in a location designated by the Owner using bins approved by the Owner.
- .3 Transport waste from the Place of the Work to the temporary waste storage location using carts covered with dust-tight fabric approved by the Owner. Undertake infection control measures and necessary cleaning for each bin and for each trip between the Place of the Work and the temporary waste storage location.
- .4 Dispose all waste that is not suited to recycling or re-use using means that comply with all applicable legislation to locations that are registered and licensed to receive such waste. No disposal to locations that are not registered and governed under applicable legislation is permitted.
- .5 Remove filled waste bins routinely and replace with empty.
- .6 Do not allow waste materials to accumulate within the work area such that an unsafe environment will result.
- .7 Do not allow waste materials to accumulate outside of refuse bins.

1.10 CONTRACTOR USE OF PREMISES

- .1 Review Section 01 00 00 General Requirements and executed Contract.
- .2 Establish constructor's parking and exterior storage facilities on the site in close cooperation with the Owner and to permit execution of the Work unencumbered.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 Do not place exterior storage containers without mutual agreement of the Owner.

1.11 RELATED WORK BY OWNER'S CONTRACTORS

- .1 Other contractors may be employed under separate contracts with Owner to perform the following work which is integral with the Work of this Contract including, but not limited to, work related to:
 - .1 IT System (telephone, internet, and some aspects of security).
 - .2 Other fixtures, fittings and equipment items selected by the Owner and notice of which shall be provided to the Contractor at a later date.
- .2 The Owner may elect to assign coordination of the work associated with these items to the Contractor under the terms provided within the Contract.
- .3 The Contractor and Sub-Contractors must afford the Owner's designees and separate contractors every opportunity for introduction and storage of their Work and Products required to facilitate the execution of the work undertaken by the Owner under separate contracts or by the Owner's designees.
- .4 The Contractor and the Sub-Contractors must coordinate and connect the Work of this Contract with the work of Owner's contractors as required.
- .5 The Contractor and the Sub-Contractors must cut, fit and patch the Work as required to accommodate the work of the Owner's separate contractors or the Owner's designees in accordance with Section 01 73 00 Execution.

1.12 OWNER OCCUPANCY

- .1 Refer to Section 01 00 00 General Requirements for Definitions associated with Occupancy.
- .2 Refer to executed Contract.
- .3 Owner may occupy premises following Substantial Performance of the Work during the construction period to effect connection of building services to the Owner's equipment. Owner may elect to move fixtures, furnishings and equipment into areas of the work found to be ready for Occupancy.
- .4 Co-operate with Owner in scheduling Contractor's construction operations within Occupied areas to minimize conflict and to facilitate Owner usage.

1.13 EXISTING SERVICES

- .1 Contractor shall communicate with Utility Providers affected by the Work in every instance and arrange to prepare applications, pay fees and request inspections as necessary to prosecute the Work. Utilities include water supply, sanitary sewer outlet, electrical power supply, natural gas service and communications services.
- .2 Sanitary Sewer:
 - .1 Maintain, to best advantage of the Contractor, temporary connection to existing sanitary drains and vent piping. Isolate this temporary service from new services and remove such temporary work when required in the Contractor's Construction Schedule.
 - .2 Cap installed, permanent drains during the full course of the work to prevent debris from entering the system until fixtures are connected to the drains.
 - .3 Install new vent piping as necessary and seal at the roof penetration as soon as is feasible to prevent leaking. Cap vent lines not in use during construction until connected to fixtures.
- .3 Water Service:
 - .1 Remove all existing water supply piping entirely and dispose metal piping for recycling. If water service is used in part for temporary services, isolate this piping from all new water piping. Remove all temporary piping at completion of the permanent water system or to suit construction schedule.
 - .2 Provide backflow prevention measures for the water system including both fire suppression water supply and potable water supply.
- .4 Electrical and Communication Service:
 - .1 Connect Owner's communication services to building services according to Owner's direction and as required in the Contract Documents.

- .2 Maintain as temporary part of existing electrical service if permitted by Electrical Safety Authority and provide new temporary meter for temporary power connection. Supply and install new service to suit construction schedule.
- .5 Natural Gas:
 - .1 Supply and install and connect new natural gas service and meter according to arrangement illustrated and described within Contract Documents and in accordance with applicable law.
- .6 As-Built Information:
 - .1 Record locations of all new, maintained, re-routed and abandoned services when abandoned services remain at the Place of the Work or when they are buried.
 - .2 Provide as-built drawings as part of Closeout Submittals.

1.14 DOCUMENTS REQUIRED AT THE PLACE OF THE WORK

- .1 In addition to the requirements of the executed Contract, maintain at job site, paper copies or electronic copies of the following documents:
 - .1 A copy of the executed Contract.
 - .2 Post Tender Addenda and Addenda issued during Bid Period.
 - .3 Project Manual.
 - .4 All Drawings.
 - .5 All Reviewed Shop Drawings.
 - .6 All Shop Drawing Tracking Logs.
 - .7 All RFI's and Supplemental Instructions.
 - .8 Contemplated Change Orders.
 - .9 Change Orders.
 - .10 Other Modifications to Contract.
 - .11 Field Test Reports.
 - .12 Construction Schedule.
 - .13 Health and Safety Plan and Other Safety Related Documents.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Connecting to existing services.
- .2 Special scheduling requirements.
- .3 Security at the Place of the Work.

1.2 RELATED SECTIONS

- .1 All Sections of Division 01.
- .2 Section 00 21 13 Instructions to Bidders
- .3 All technical Sections.

1.3 OCCUPANCY AND CARE AND CONTROL OF THE SITE:

.1 Definitions:

.1 Occupied:

- .1 Throughout the Contract Documents, the word “occupied” refers to rooms, spaces and areas interior or exterior to the building that are not under construction. These areas are being used and accessible to the Owner during the course of undertaking their business or by the general public who use the Owner’s facility or both.
- .2 Areas used to temporarily store Owner’s materials and equipment or furnishings are considered to be occupied if use of the space for storage arises from the necessity for the Owner to vacate spaces under construction or to facilitate phasing of the construction. In this sense, areas used to store Owner’s materials and equipment shall be separated from the Work using access and Infection Control barriers.

.2 Occupancy:

- .1 Throughout the Contract Documents, the word “occupancy” refers to the use of the rooms, areas or spaces interior or exterior to the building for a particular purpose by the Owner and as such, it is intended to imply that the space is “occupied” by the Owner or it refers to the condition of the space, usually as complete, when it would be “occupied”.
- .2 The expression “ready for occupancy” means that the work is substantially completed and that the balance of Work incomplete will not require Infection Control barriers to effect completion.

.3 Care and Control of the Place of the Work:

- .1 The Contractor shall assume care and control of the entire extent of the work site identified on the drawings together with areas under construction.
- .2 The area under the care and control of the Contractor includes any area (interior or exterior) to which access by the Contractor is required to complete the Work.
- .3 The Contractor has care and control of any area in which the Contractor stores equipment or materials during the prosecution of the Work.
- .4 The Contractor no longer has Care and Control of those areas of the Work that are deemed to be “ready for occupancy” or “Occupied” while other work is in progress.

1.4 ACCESS CONTROLS AND THE PLACE OF THE WORK:

- .1 Before commencing Work, request a meeting with Owner and consultants in order to reach agreement regarding construction safety, the demolition and construction sequence phasing, scheduled closure of facilities or parts of facilities and property, site access and the length of

time the contractor may interfere, possess, obstruct or remove from use any area or service.
The Owner must approve all such measures, construction sequence and construction schedule.

- .2 Take measures to minimise and control noise, dirt and dust during Work.
- .3 The Contractor shall ensure that all parts of the site are controlled in accordance with all applicable legislation and to ensure fire and ambulance service to the site at all times.
- .4 The Contractor shall provide safe and secure access for personnel, pedestrians and vehicular traffic around work areas on site and within building and to permit access by emergency vehicles at all times.
- .5 Use caution tape, scaffolding, traffic cones, temporary fencing with gates and other barriers to control access to all work areas and to areas used for receiving construction materials.
- .6 Do not allow debris to accumulate at any location within the bounds of the Owner's premises and site.
- .7 Construct Infection Control Barriers within the building in accordance with Section 01 15 00 Infection Control Measures at the place of the work and maintain these throughout the course of construction as follows:
 - .1 Such barriers are required to isolate the Work from public or Occupied areas and to protect existing rooms and spaces not within the scope of the work in the Contract or
 - .2 that may be used to store Owner's materials and equipment whether temporary or permanently.
 - .3 Install Infection Control barriers to separate areas Ready for Occupancy from areas under construction.
 - .4 Install Infection Control barriers to separate Occupied areas from work under construction throughout the duration of the Work regardless of status of work.
- .8 Exterior Access Points:
 - .1 The Contractor shall provide personnel, pedestrian and vehicular traffic at all times around designated access to shipping and receiving areas used by the Contractor. Contractor's use of all exterior areas shall conform to Owner's access requirements including controlled access parking.
 - .2 No aspect of the contractor's use of exterior areas shall impair access to the building by emergency vehicles at any time.
 - .3 Erect barriers to maintain controlled access to vicinity of shipping and receiving operations at all times.
 - .1 For exterior barriers and access control, use scaffolding to form protected public access corridors when building entrances require protection due to overhead lifting or any other hazard to pedestrians for any entrance in the vicinity of hazard for a continuous period exceeding a period of 6 hours.
 - .2 Erect temporary fencing with gates and other barriers to control access to all work areas and to areas used for receiving construction materials when exterior storage or operations would be continuous for a period exceeding 6 hours or when stored materials are not within secured containers.
 - .3 Use caution tape, scaffolding, traffic cones and employ flag persons as required for all shipping and receiving operations with a duration of fewer than 6 hours occurring continuously.

1.5 SERVICES

- .1 When any Work involves breaking into or connecting to services connected to occupied facilities within the building, for any reason, provide Owner and Consultant 48-hours of notice for

necessary interruption of mechanical (gas service, drainage, sanitary sewage system or domestic water supply or medical gas), communication or electrical service throughout course of work. Carry out interruptions to services for occupied buildings, during the period occurring between 7:00 AM (0700 hours) each morning through to 6:00 PM (1800 hours) In the case of a critical service, plan work to occur outside of the critical service's working hours for the operation identified.

- .2 Apply temporary caps to supply water system when piping affected is connected to occupied spaces while performing work affecting previously connected systems or systems in occupied areas in order to avoid contamination of the system and to facilitate connections to new systems. Disinfect and provide bacteria test to water service for each such instance.
- .3 Cap all drain and waste and vent piping in the place of the work as work progresses to avoid contamination of the previously installed parts of the system and to permit the connection of new work to the system.

1.6 OCCUPANCY:

- .1 The Contractor shall have Care and Control of the spaces and rooms identified on the drawings during the prosecution of the Work according to the Phasing Plan.
- .2 The Contractor shall have no access to areas designated as Ready for Occupancy or Occupied.
- .3 The Contractor shall have temporary, episodic access for a mutually agreeable duration to rooms and spaces outside of the Work area during each Phase under the following conditions:
 - .1 The work outside of the Infection Control Barrier is for a short duration and
 - .2 The access is agreeable to the Owner's ICP and
 - .3 The Work does not require Infection Control Measures and
 - .4 such access is disclosed on the Construction Schedule and agreeable to the Owner.
- .4 Install Infection Control Barriers to separate areas Ready for Occupancy or Occupied from areas under construction throughout the entirety of the Contract Time regardless of status of work, until all work is completed.
- .5 Include the following measures, as a minimum, subject to final approval by the Owner:
 - .1 Establish protective measures to maintain safe access from exterior to any Occupied areas by members of the public or the Owner's staff without passing through any area of the Work under construction.
 - .2 Where public and Owner's staff access route conflicts with the Contractor's overhead work and when permitted by Ministry of Labour and Authorities Having Jurisdiction, erect scaffold to protect the users of the access route from falling debris and other hazards.
 - .3 Maintenance of access and egress to the facility includes the provision of a safe path between the Place of the Work and all exit doors.
 - .4 Post appropriate caution signage and use appropriate barricades, caution tape and traffic cones required to alert building users of hazards when such hazards exist outside of the building.
 - .5 Prevent access to exterior storage and lay-down areas by unauthorised persons.
 - .6 Position in a neat and orderly manner, staging areas for the temporary storage of materials and debris.
 - .7 Disposal bins shall be located to facilitate regular removal and such that recyclable waste materials are segregated from waste materials on site prior to shipping to the local recycling centre.
 - .8 Adhere to all by-laws, regulations or prohibitions related to waste disposal at any landfill or similar waste disposal area for all waste materials generated by the work of this Contract.

- .9 Co-ordinate access to the site for all vehicles including use of any part of the site for staging areas. No bins, equipment, materials or vehicles shall be permitted to block emergency vehicle access to the site and buildings under construction during the course of the work.
- .10 The Contractor shall remove all waste from the site or receive large shipments of materials during normal working hours. All shipping and receiving shall occur such that no vehicle or material will block any required access/egress points to any occupied areas of the building(s).

1.7 SHORT DURATION WORK OUTSIDE OF CONTRACTOR'S ASSIGNED AREA:

- .1 When any part of the Work the work cannot be executed within enclosed areas turned over to the Contractor, undertake such work after full disclosure of conditions for work outside of enclosures are discussed with the Owner and conditions of prosecuting the work are found mutually agreeable.
- .2 For all areas located outside of the confines of space under the Care and Control of the Contractor, the Contractor shall relocate fixtures, fittings and equipment temporarily to adjacent spaces and protect all remaining fixtures, fittings and equipment throughout the duration of the work within any given space at the Contractor's expense.
- .3 While working outside of areas identified as under construction or otherwise turned over to the Contractor, maintain access to exit and corridors clear of obstructions to permit passage of Owner and other occupants to exits.
- .4 Co-operate with Owner's staff regarding temporary cessation of work in order to permit passage of building occupants at all times. Be prepared to clear corridor in event of emergency or signal of fire alarm.
- .5 Instate Infection Control Measures to all spaces temporarily accessed by the Contractor. Measures used shall be reviewed and approved by Owner.

1.8 ACCESS RESTRICTION ASSOCIATED WITH HEALTH CARE

- .1 Owner's Fundamental Concern:
 - .1 The safety and security of building occupants and confidentiality of all information associated with building occupants is the primary consideration for the Owner and these two concerns are fundamental to the Owner's operations at all times.
 - .2 The prosecution of the Work of the Contractor is a secondary concern and incidental to the Owner's operations.
 - .3 The Owner's designee will act as prime contact for the project for all matters concerning occupancy and the Contractor's possession or use of the site and environs.
- .2 Scope of Health Care Activity:
 - .1 Health Care Activity includes all services and processes undertaken on the site by the Owner or the Owner's designees. These include operations involving machine and human interaction such as imaging or monitoring and human to human interaction within the building.
 - .2 Food services, housekeeping services, waste management services and laundry services on the Owner's property and premises is also Health Care Activity.
 - .3 Health care activity includes informal conversation among building occupants or between members of the public and any building occupant whether within the building or on the property owned by the Owner.
 - .4 The privacy of the persons and information of any persons within the building or attending at the Owner's property is of primary importance and the Contractor is obliged by the Contract to preserve the privacy and confidentiality of activities for all persons at the Place

- of the Work or within the boundary of the Owner's property regardless of the means by which any information or knowledge had been received by the Contractor or any Sub-Contractor.
- .5 Persons attending the site for which Privacy and Confidentiality applies will include, but will not be limited to, any of the following persons:
 - .1 Patients who attend the site or are within the building or who may be outside of the building on the Owner's property.
 - .2 Physicians within the facility or on the Owner's property.
 - .3 The Owner's employed Staff members including, but not limited to, nursing staff, clerical staff, technicians, food service workers, housekeeping workers, grounds keepers and maintenance personnel.
 - .4 Social Workers and Therapists of all types.
 - .5 First Responders including, but not limited to, Emergency Medical Services personnel and fire fighters,
 - .6 Police.
 - .7 Members of the Public seeking medical services or visiting those within the facility.
- .3 Contractor's Obligation to Privacy and Safety of Building Users – Public, Physicians and Owner's Staff:
 - .1 Work requiring access within occupied spaces will require security clearances, execution of non-disclosure agreements and extreme care with respect to protection of the Owner's and the Building User's property and information.
 - .2 The Contractor's access to the site is subject to restrictions, the nature of which is dependent upon the use of various parts of the building including considerations for the presence of persons within private rooms, spaces or suites and in particular, within areas used for patient assessment, registration, admitting or examination.
 - .3 All of the Contractor's visits or attendance at the Place of the Work to perform any work at the Place of the Work must be undertaken with utmost care and respect for the privacy, health and safety of the persons using occupied areas of the building.
 - .4 The Contractor and sub contractors' representatives and all their personnel shall not enter areas of the building occupied by the Owner if ill with symptoms affecting respiratory system, fever, flu, infectious condition due to bacteria or other pathogens, pneumonia, severe headache or cough or otherwise ill in accordance with the Owner's access policy.
- .4 Disease and Outbreak of Infection:
 - .1 Access to the parts of the building that contain Health Care Activities may be restricted as a result of an outbreak of infectious disease within the site or within the general population.
 - .2 Should a prohibition on access affecting the Contractor's ability to attend at the Place of the Work persist for a duration that may impair the Construction Schedule, the Owner will agree to an extension to the Contract Time.
 - .3 The Contractor shall adhere to the Owner's protocol established to screen those entering the hospital for COVID. The requirements include, but are not limited to the following:
 - .1 The Owner will supply forms, declarations and questionnaires for execution by the Contractor. The Contractor shall ensure that all persons attending the site to perform the Work or deliver products have completed the documents provided. This requirement applies to all persons engaged by Sub-Contractors as well.
 - .2 The Contractor shall ensure that all persons attending the site to perform the Work or deliver products within the building shall have proof in a form acceptable to the Owner that the person had received at least two doses of COVID 19 vaccine.
 - .3 The Contractor shall ensure that persons who fail to pass the screening protocol or who refuse to present proof of vaccination or who refuse to submit to a rapid test for the

COVID 19 virus, as applicable or who refuse to execute attestations and declarations will not be admitted to the site.

1.9 SPECIAL REQUIREMENTS – NOISE AND DISRUPTION OF OWNER'S HEALTH CARE ACTIVITIES

- .1 Application of prohibitions noted below is subjective and subject to experience of the activity on the site.
 - .1 The intent of this section is to permit the Owner to halt any of the named operations at any time if work is found disruptive to users of the building.
 - .2 However, through experience of the work on the site, it may be discovered that some operations listed below are tolerable.
 - .3 It is the Owner's intent to permit tolerable activity and to prohibit intolerable activity.
 - .4 The Contractor must assume that each operation listed as disruptive, unacceptable or intolerable must occur during times approved by the Owner.
- .2 For this Section, application of Special Provisions shall refer to a situation involving one or more people providing Construction services that is prohibited or may be discovered to be unacceptable or intolerable to the building users.
- .3 Unacceptable, Prohibited Work:
 - .1 All use of jack hammers of any kind within the building. Jack hammers may operate outside of the building during normal working hours.
- .4 Noise generating activities that **may** be considered intolerable, disruptive and unacceptable to the Occupants and therefore, may be subject to prohibition during certain hours of the day or night include the following activities:
 - .1 Saw cutting, coring and boring (drilling) of steel, or concrete floor and roof structures or masonry within the building.
 - .2 Cutting or grinding of metal components using motorized tools.
 - .3 Repetitive use of impact tools (hand powered or otherwise) used to strike work associated with floors, roofs or exterior walls or to elements connected to the building structure for any part of the building beyond a single isolated instance occurring no more frequently than three times per hour. The use of such tools by more than a single person concurrently shall also be considered an instance of more use than 3 occasions per hour.
- .5 Construction Schedule:
 - .1 Submit schedule in accordance with Section 01 33 00 Submittals and Section 01 32 16 Project Planning, Phasing and Time Management using the Bar (GANTT) Chart Method.
- .6 No requirement of this specification shall remove the Contractor's responsibility to discover and adhere to all laws governing the place of the work including, but not limited to, Municipal noise by-laws and in particular, any Municipal requirement to control noise or prevent excessive noise during any holiday or other special requirements related to weekends, statutory holidays and associated special events, etc.
- .7 Requirements anticipated during each Phase of the Construction would include, but are not limited to, the following restrictions:
 - .1 Contractor may occupy existing parking areas to the extent agreeable to the Owner; however, the Contractor shall not occupy existing parking areas to the extent that snow clearing operations, vehicle access by members of the public or emergency vehicle access is impeded.
 - .2 Stockpile or store materials whether new or salvaged, on stable surfaces and such that materials are suitably protected during the course of the work.
 - .1 Cover new and salvaged materials when stored outdoors.

- .2 Do not store materials beyond extent of work area designated without expressed written permission of the Owner.
- .3 Erect Infection Control Barriers and protect a path of travel from building entrance to areas accessible to the Owner and the Public and keep all means of egress clear of obstruction.
 - .1 Coordinated fire and life safety plan with Authorities Having Jurisdiction, the Consultant and the Owner
- .4 Overhead Work:
 - .1 Provide secure access to all entrances when work occurs above entrances using temporary covered walkways created with scaffold, hoardings, plywood, planking or similar sound and solid surface intended to deflect or prevent falling materials from harming users of the entrances when such protection is permitted by Authorities Having Jurisdiction.
 - .2 Maintain safety for the public and the Owner's staff throughout the execution of all parts of the work with particular attention to exterior work, significant interior demolition, hoisting and lifting operations.
 - .3 Reposition access security and safety measures to suit work sequence for all exterior construction or lifting operations adjacent to occupied spaces.
- .5 Fire, Security and Panic Alarm Systems:
 - .1 The security, fire and panic alarm systems operating within the Place of the Work must remain in operation throughout the duration of the Work.
- .6 Scan of Floors Prior to Cutting of Floors:
 - .1 The Contractor shall conduct a scan using technology acceptable to the Owner (X-ray, etc.) of the concrete floor assembly prior cutting or coring or boring the slab to effect services installation.
- .7 Work necessary to amend, modify or temporarily amend or modify the fire suppression system shall be undertaken by the Owner's Fire Protection Services. Clarify with Owner, identity of appropriate party.

1.10 SITE SECURITY:

- .1 Execute Work in accordance with following security requirements and regulations.
 - .1 Ensure only necessary tools and equipment are brought to each work area where access by public is possible. Keep constant check on these items and at end of each work shift, store all tools and equipment in an area that is secure and not accessible by the public.
 - .2 The Contractor is solely responsible for security of the Place of the Work under construction and for those other areas under the Contractor's Care and Control.
 - .3 The Contractor shall provide temporary locks to all doors used to provide access to the Place of the Work. Remove all temporary locks at completion of the work.
- .2 Owner requires that all persons participating in the work complete security clearance forms.

1.11 SECURITY CLEARANCE REQUIREMENTS FOR ALL EMPLOYEES

- .1 The site is designated by the Owner as a secure location. Workers on Site may be subject to security checks and may be required to obtain security clearance before commencing Work.
- .2 All personnel in the direct or indirect employ of the Contractor shall execute confidentiality and security clearance agreements as a prerequisite for access to any occupied tenancy within the place of the Work.
- .3 Contractor will be required to provide to the Owner, names, addresses and consents of all of its workers, and those of any Sub-Contractor's workers performing work on Site.

- .4 Any worker who is unable to obtain security clearance, or who refuses to consent to security checks, upon notice by Owner to Contractor, shall not be permitted to work on Site.
- .5 During course of Work, new workers not included in original submission may likewise be subject to security check. Such new workers shall not be allowed on Site until clearance is given by the Owner.
- .6 Workers employed on Site may be required to sign a "Daily Register" provided by the Owner that will indicate "IN" and "OUT" times and number of hours worked on each shift.
- .7 Workers shall access the site via designated door openings provided for each area of the work.
- .8 All workers may be required to sign a **Confidentially Agreement**. All workers are advised that conversations, written or graphic material or activity of any sort concerning any person, including, but not limited to, their medical condition, personal information, presence in the facility or identity shall be kept in strictest confidence. A violation of this confidence may result in an action taken against the violator to the fullest extent of the law.

PART 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Cash allowances.
- .2 Contingency allowance.

1.2 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2 Stipulated Price Contract.
 - .2 Section 00 08 12 Supplementary Conditions.

1.3 GENERAL REQUIREMENTS:

- .1 The value of each cash allowance specified herein is assigned to pay the cost associated with specific requirements of the Work and the allocation of the allowance amounts to parts of the Work is described herein.

1.4 CONSTRUCTION SCHEDULE FOR WORK UNDERTAKEN THROUGH CASH ALLOWANCE:

- .1 A schedule shall be prepared jointly by the Consultant and the Contractor to demonstrate clearly the time required to select, review, consider and authorize the procurement of goods and services assigned for purchase within cash allowance.
- .2 The dates indicated on the schedule must be determined to facilitate all aspects of administration, procurement, authorization of expense, ordering, delivery and installation in efficacious sequence to avoid a delay in the orderly and planned progress of the Work.
- .3 The schedule must be authorized by Consultant. Authorization will be provided in the form of a Supplemental Instruction.

1.5 CASH ALLOWANCE VALUES ARE INCLUDED IN THE CONTRACT PRICE:

- .1 Include within the Bid Price and the Contract Price, the value of all cash allowances stated herein and account separately for all overhead expenses together with any amount of profit that may be allocated by the Contractor against the Work associated with each cash allowance and the value of each cash allowance.
- .2 The value of each cash allowance specified herein shall be incorporated into the Contract Price at the full value stipulated for each cash allowance without deductions or allowances associated with applicable taxes or any other consideration.
- .3 All references to Contract Price shall bear the same meaning as "Bid Price" during the Bidding Period and prior to the execution of the Contract.

1.6 HARMONIZED SALES TAX (HST) ASSOCIATED WITH THE VALUE OF CASH ALLOWANCES:

- .1 Cash allowance values stipulated herein do not incorporate HST. HST will be accounted separately and in addition to the stated value of each cash allowance.
- .2 HST associated with the value of all cash allowances will be calculated and incorporated into the Contract Price in accordance with the terms of the Contract.

1.7 OTHER WORK AND SERVICES ASSOCIATED WITH CASH ALLOWANCES:

- .1 The cost for the following work and services shall be calculated by the Contractor and incorporated into the Contract and the Contract Price by the Contractor and the cost shall not be considered to be incorporated within the value of cash allowances:
 - .1 Overhead and Profit:
 - .1 Refer to CCDC 2 GC.
 - .2 The Contract Price and not the stipulated value of any cash allowance specified herein shall include:
 - .1 All of the Contractor's overhead expense associated with the stated value of the cash allowances together with the overhead expense that is associated with all work and services

associated with the cash allowances, including, but not limited to, the provision of any supplementary material, labour and administrative services rendered by the Contractor in respect of the cash allowances specified.

- .2 The value of any profit calculated by the Contractor that the Contractor may allocate, or associate or attribute to the specified amount or value of any cash allowance.
 - .3 The value or amount of profit that the Contractor may calculate and allocate or associate or attribute to the Contractors calculated value of the Work that is included within the Contract Price and associated the stipulated cash allowance values or that is otherwise incorporated into the Contract Price as is stipulated within this Section.
 - .4 The cost of the Contractor's and the affected Sub-Contractors' site supervision, insurance, overhead charges, administrative charges and any allowance for profit.
 - .5 The value of bid bonds, performance and labour and materials payment bonds and insurance.
- .2 Cash Allowance Contract Administration:
- .1 The Contract Price includes all expense and all cost incurred by the Contractor that is associated with the procurement, management and administration of all aspects of the Work associated with each cash allowance including field supervision.
 - .2 The Contractor shall provide the services required to arrange the supply of labour, accommodate delivery at the job site and provide the services associated with items procured under cash allowances where such services are specified herein to be included within the Contract Price, including, where applicable, the cost of services devoted to the final installation of the items in the field.
 - .3 Contractor shall prepare or obtain itemized quotations for Work procured under cash allowances from multiple potential sub-contractors for each cash allowance unless a supplier is stipulated in the Contract.
 - .4 Contractor shall perform services utilizing its own forces or execute sub-contracts with selected Sub-Contractors who will perform the Work associated with each cash allowance. Each sub-contract is between the Contractor and the Sub-Contractor. Each such sub-contract shall contain terms and conditions commensurate with the Contract.
 - .5 Contractor shall provide schedules, shop drawings, product literature, lists and tracking documents associated the Work of each cash allowance item.
 - .6 As described herein, when the labour required to install items purchased under a cash allowance is to be included within the Contract Price, the Contractor shall calculate the value of the labour associated with items and services allocated to cash allowance amounts and incorporate same, together with any overhead and profit amount, within the Contract Price.
 - .7 The cost of the Contractor's and the affected Sub-Contractors' site supervision, insurance, overhead charges, administrative charges and any allowance for profit.
 - .8 The value of bid bonds, performance and labour and materials payment bonds and insurance.
- .3 For goods and services purchased using funds within a cash allowance, the Bid and Contract Prices must incorporate the following Work and this Work shall not subsequently become charged against the value of the cash allowance:
- .1 All administrative Work including:
 - .1 the Work required to obtain multiple, competitive prices for all items purchased under a cash allowance when a single, preferred supplier is not otherwise identified, and
 - .2 all necessary bookkeeping and accounting Work associated with maintenance of appropriate financial records of the transactions and payment of invoices for goods and services purchased under cash allowances,
 - .3 and all aspects of payment applications, progress draws and project accounting related to cash allowance amounts.

- .2 All cost associated with submittals including product data sheets, colour charts, shop drawing preparation and the process required to review same, together with all associated handling, correspondence, courier charges, technical coordination with sub-contractors and the Contractor's field personnel, field measurement and similar research, project supervision and communications associated with these tasks.
- .3 All cost associated with maneuvering goods on the job site, removal of packaging, handling, and storage and cleaning and the cost of any disposal or recycling services required.
- .4 All cost associated with construction and installation aids used in the construction process including cranes, lifts, scaffold, ladders and temporary support of pre-existing structures.
- .5 All cost associated with installation for all items purchased using a cash allowance accounting process where the cash allowance is associated with materials that are supplied, only. The services and materials incorporated into the Bid and Contract Prices shall include, but are not limited to, installation of the items accounted as part of a cash allowance, miscellaneous hardware and fasteners, preparation of subtrades and previously installed materials, cutting, coring, boring, patching, wood blocking, final cleaning, waste disposal and similar work and all cost associated with layout in the field, field measurement and coordination with other Work and Sub-Contractors.
- .6 The cost of the Contractor's and the affected Sub-Contractors' site supervision, insurance, overhead charges, administrative charges and any allowance for profit.
- .7 The value of bid bonds, performance and labour and materials payment bonds and insurance.

1.8 LABOUR ASSOCIATED WITH THE SCOPE OF CASH ALLOWANCE WORK:

- .1 When labour associated with goods and services purchased under a cash allowance is included within the Contract Price, the labour includes the Work of any associated or affected Sub-Contractor and the affected Sub-Contractors shall include within their portion of the Contract and Bid Prices for the Work all of the services required to:
 - .1 select products, and review product literature;
 - .2 to process shop drawings and other submissions;
 - .3 perform the Work required to conduct field measurement, layout of the Work in the field and to coordinate technical requirements with other parts of the Work;
 - .4 the work required to receive, unpack and, where specified, install, products including the cost of construction machinery and equipment, handling of materials on the job site, unloading, storage and other expenses incurred in performing Work in the field.
 - .5 Installation labour for cash allowance items includes the cost of services required to complete adjustments, balance, commission, clean and otherwise attend to the Work in progress as is consistent with the common requirements of the project.
 - .6 the cost of the Contractor's and the affected Sub-Contractors' site supervision, insurance, overhead charges, administrative charges and any allowance for profit.
 - .7 the value of bid bonds, performance and labour and materials payment bonds and insurance.

1.9 PROCEDURE FOR ALLOCATION OF COST TO ALLOWANCES:

- .1 The Contractor shall provide a detailed financial accounting of the expenditures allocated to the account of all cash allowances in accordance with the items assigned to the allowance and described below. This accounting shall include the submission of all relevant receipts, purchase orders, contracts and quotations associated with all items and services attributed for payment through application of a cash allowance. No overhead and profit shall be separately applied by the Contractor to the value of goods and services purchased through cash allowances, rather, all overhead and profit expense shall be embedded within the Contract Price.

- .2 The Contractor shall clearly identify expenditures allocated to the specified cash allowances that are not anticipated by this Section when the Contractor considers the expenditure to be eligible for inclusion within any specified cash allowance.
- .3 The Consultant and the Owner shall review all of the Contractor's detailed accounting of expenditures proposed for application against the value of any cash allowance and the Owner and the Consultant must approve the allocation and expense before the Contractor may allocate project funds to the account for any cash allowance.
- .4 The Consultant shall provide a Change Order to signify the Consultant's agreement with the Contractor's detailed accounting of expenditures made on account of allowances and the Owner may elect to execute the Change Order. The execution of the Change Order by the Owner signifies the Owner's authorization of the expenditure.
- .5 Following receipt by the Contractor of an executed Change order, the Contractor shall incorporate the accounting into the progress payment process and maintain this accounting continuously during the full course of the Work.
- .6 Any cash allowance that is not fully expended during the course of the Work may be assigned to pay the cost of Work that is found to have exceeded the value of any other cash allowance.
- .7 Contract Price will be adjusted by a written order to account for excess or deficit in the Contractor's expenditures related to the total aggregated value of all cash allowances taken together.
- .8 The accumulated value of unexpended cash allowances shall be removed from the Contract Price through written Changed Order. This accumulated value is therefore, a credit applied to the Contract Price in favour of the Owner.
- .9 When the Contractor incurs cost allocated to a cash allowance that exceeds the value of the cash allowance assigned within this Section, the Contractor will be compensated for the excess incurred and substantiated through allocation of the excess against the account of any or all other cash allowance values in the first instance or through issuance of a written order to increase the Contract Price if the value of all cash allowances has been expended under Contract.
- .10 Should the value of expenditures made against the accumulated total of all cash allowance values exceed the sum of value of all cash allowances, the contractor shall be eligible to receive overhead and profit calculated on the amount of the excess of expenditure compared to the aggregate balance of all cash allowances taken together, only. The value of the overhead and profit added to the amount shall be equal to the overhead and profit allocated under CCDC 2 - 2020 Changes in the Work.
- .11 Include within progress payment statements accounting for all Work authorized under cash allowances for all monthly applications for payment.
- .12 The Consultant shall provide a Change Order to document expenditures in accordance with the CCDC 2 - 2020, Part 4.

1.10 SCHEDULE OF CASH ALLOWANCES:

- .1 Amount of each allowance, for Work specified in respective specification Sections follows. All allowances shall be included within the Bid Price.
- .2 Contractor shall include a cash allowance value equal to the amounts listed below within the Bid and Contract Price. These allowances shall not include HST which will be accounted during the processing of claims made for payment of work associated with the Cash Allowances.
- .3 Field Engineering – Site Work:

.1 Materials Testing (building materials and concrete):	\$15,000.00
.2 Review of Bearing Capacity and sub-surface conditions:	\$20,000.00
.3 Testing of Excavated Soil and Excess Soil:	\$20,000.00
.4 Testing of existing paint for presence of lead:	\$20,000.00
.5 Removal of soil found to contain hazardous substances:	\$150,000.00
.6 Moisture emission from new concrete sub-floor:	\$10,000.00

1.11 SWINGING DOOR HARDWARE:

- .1** Finished **door hardware for swinging door openings** including hinges, electric strikes, magnetic locks, standard latch and lock sets, deadlocks, kick plates, push and pull handles, weather strips and sound seals, automatic door bottoms is included within the Cash Allowance item 2, below, JPW Security Device and Conductor Amendments. **\$250,000.00**
- .1** Hardware cash allowance effect on electrical divisions:
- .1** This cash allowance amount shall not include the cost of the following services and items, all of which are to be included within the Contract Price:
- .1** Conduit and pull strings must be supplied and installed by electrical divisions to magnetic locks, card reader, Intercom, and electrified hardware or electric strikes.
- .2** 120-volt conductors and associated connections to building electrical system, junction boxes, breakers and accessories required for magnetic locks, intercom, and electrified hardware or electric strikes shall be supplied and installed by electrical divisions.
- .3** Fire alarm conductors, conduit, low-voltage conductors, data conductors and all interconnection to hardware, duress and camera equipment as necessary.
- .4** Hardware associated with sliding doors and specified on Contract Documents shall be included in the Contract and Bid Price.
- .5** Hardware associated with Division 6 cabinetry and carpentry shall be included within the Contract Price.
- .2** **Audio/Visual System:** Dynamix.ca Cash Allowance of **\$150,000.00**
- .3** **Security Devices and Conductors:** cash allowance of **\$50,000.00**

1.12 CONTINGENCY ALLOWANCE

- .1** Include in the Contract Price a Contingency Allowance of **\$400,000.00**

PART 2 PRODUCTS - NOT USED; EXECUTION - NOT USED

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All Sections

1.2 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 Executed Contract.
 - .2 Executed CCA 1-2020 Stipulated Price Subcontract or similar agreement formed between Contractor and Sub-Contractor.

1.3 SUMMARY

- .1 This Section includes requirements allowing Contractor to propose substitutions for consideration by the Consultant that offer means or methods that differ from those within the Bid or Contract Documents.
- .2 This Section recognizes the Contractor's control over the Work and permits proprietary or unique solutions to the requirements of the Bid and Contract Documents provided that law associated with Copyright is respected and the products or methods can be used within the Project without limitations or continuous cost to the Owner including imposed royalty fees.

1.4 REQUIREMENTS ASSOCIATED WITH UNSOLICITED ALTERNATIVES:

- .1 Referenced specification Sections stipulate pertinent requirements for products and methods to achieve Work stipulated with the Contract and Bid Documents.
- .2 The Contract Documents provide the standard of acceptance applicable to the Work.
- .3 Unsolicited Alternatives proposed by the Contractor or any Sub-Contractor:
 - .1 Except where substitutions are specifically excluded from the work described within Sections, equivalent materials, products or systems may be acceptable as substitutions for specified products and methods provided that the following occurs:
 - .1 An Unsolicited Alternative must meet or exceed the properties, characteristics and appearance of the specified materials, products and systems in all respects and the Contractor is solely responsible to determine the consistency of the Unsolicited Alternative with the specified products, processes or methods replaced by the Unsolicited Alternative and
 - .2 the Consultant must review the Unsolicited Alternative offered and name it to be a Reviewed Alternate and acknowledge this status in writing.
 - .3 No change in the performance or warranty associated with the Product or process replaced by an Unsolicited Alternative is permitted and the Contractor bears responsibility to assure this.
 - .4 When a request is made to the Consultant to use an Unsolicited Alternative, the *Owner* or the *Consultant* may, in its sole discretion, consent to the incorporation of an Unsolicited Alternative and in such circumstances will issue a Supplementary Instruction or a Change Order that establishes the Unsolicited Alternative as a Reviewed Alternative material or process. The status of an Unsolicited Alternative as a Reviewed Alternative is the same as the status of a reviewed Shop Drawing or Product Data Sheet submitted under the Submittals Procedures Section 01 33 00.
- .5 All Unsolicited Alternatives incorporated in the Work through any means shall adhere to the following criteria:
 - .1 The use of the product or process shall cause no infringement of Copyright Law and

- .2 there shall be no restriction on the Owner's continued use of the Unsolicited Alternative including any continuing a payment of royalty, fee for use or similar cost of any kind.
- .3 There must be no restrictions on the use of the Unsolicited Alternative within the Project that would alter the Warranty associated with the Warranty required or implied or presented by use of the specified product, method or process replaced by the Unsolicited Alternative.
- .6 A request made by any entity to the Owner or the Consultant to consider an alternative material or construction method does not oblige the Consultant or the Owner to issue an instruction acknowledging the Unsolicited Alternative as a Reviewed Alternative or Reviewed Alternate.
- .7 Unsolicited proposals for alternative materials or construction methods that are not incorporated within Supplementary Instructions are considered to be rejected and these shall not form a part of the Work.
- .8 Substitutions which according to the judgement of the Consultant, do not satisfy the requirements of the Contract Documents, may be rejected.
- .9 In any instance of such rejections, any installed Unsolicited Alternative products or system shall be replaced by the specified items at no cost to the Owner or Consultant.
- .10 Whenever an Unsolicited Alternative is proposed, the entity making the proposal shall also co-ordinate changes to all affected related Work and coordinate required modifications to surrounding Work, complete with the itemized listing of all such modifications and the cost of each, in order to integrate Work under each Unsolicited Alternative proposed.
- .11 No work affecting the Unsolicited Alternative shall be prosecuted until the Consultant rejects or accepts the Alternative products or systems.
- .12 Any product or construction method that is the subject of a Separate Price, an Identified Price, an Itemized Price or a Unit Price or that is described by the *Owner* or the *Consultant* within an *Addendum* is considered to be a Reviewed Alternate.

1.5 UNSOLICITED ALTERNATIVES – THE BURDEN OF PROOF:

- .1 The burden of proof the efficacy of any Unsolicited Alternative is on the entity making the proposal in the first instance and the Contractor assumes this burden by permitting the proposal to occur.
- .2 In the event that the Contractor or the Consultant deems the information provided with the request for Unsolicited Alternative is inadequate to judge the merits of the Alternative, the proposer shall provide additional material or the Consultant may reject the proposition.
- .3 A request made to the Contractor or the Consultant for review of an Unsolicited Alternative constitutes a representation that the entity making the proposal had performed the following tasks:
 - .1 Investigated the proposed Alternative materials, systems and methods and determined that the performance of the Alternative will meet or exceed the characteristics, efficacy and quality of the specified materials, systems and methods.
 - .2 The Unsolicited Alternative will, if utilized, provide the same or a superior warranty when the offered warranty is compared with the stipulated warranty within the Bid or Contract Documents or the warranty associated with the specified materials, methods or systems, as the case requires.
 - .3 Coordinated the requirements of the entire installation and all parts affected by the Unsolicited Alternative and incorporate necessary changes to other Work which may be required for the efficacious installation of the Alternative.

1.6 PROCESS LEADING TO ACKNOWLEDGEMENT OF REVIEWED ALTERNATIVES:

- .1 The entity proposing an Unsolicited Alternative process or product shall make its identity clear and provide necessary submissions under letterhead identifying the product, process or material that would

be replaced by the Unsolicited Alternative and the following details must also be provided in the submission:

- .1 Provide product literature, explanatory materials and a complete, written and graphic assessment of the effect of the use of the Alternative on all work affected by the Alternative.
 - .2 Provide technical data sheets for the substituted product and any associated product substitutions necessitated by the use of the substitution.
 - .3 Provide a complete, written description of the proposed substitution.
 - .4 Provide a comprehensive, written comparison of the properties of the specified materials, products or systems with the commensurate properties of the proposed substitution, arranged coincidentally with the format and sequence of the manufacturer's literature for the specified products, services and systems, or as is appropriate to the circumstance.
 - .5 Provide Shop Drawings, product data, and certified test results demonstrating to equivalency of the Unsolicited Alternative to the work of the Bid and Contract Documents.
 - .6 A list of comparable installations that are similar size and complexity to the specified situation, complete with reference contact information.
 - .7 Indicate accurately and with detail any variation of Bid Price or Contract Price, as applicable to circumstance, should Unsolicited Alternative be accepted by the Consultant and the Owner.
 - .8 Indicate all warranty conditions and duration.
 - .9 Indicate installation conditions, including, but not limited to, necessary sequential work, necessary environmental conditions for efficacious installation and service life.
 - .10 Indicate all necessary amendments, adjustments and connections associated with adjacent materials and materials which affect the Unsolicited Alternative.
- .2 During the Bid Process, Unsolicited Alternatives will be reviewed by the Consultant, and, if found acceptable, the use of the Unsolicited Alternative process or product will be ratified through issued Addendum.
 - .3 Following execution of the Contract, an Unsolicited Alternative may not be incorporated within the Work without a written acknowledgement of the Review of the product or process by the Consultant.
 - .4 Should the Consultant elect to review an Unsolicited Alternative, the use of the product or process is signified to be acceptable for use through issuance of a written instruction which must be a Supplemental Instruction or a Change Order.

1.7 ADJUDICATION OF THE SUITABILITY OF UNSOLICITED ALTERNATIVES:

- .1 The Consultant shall be the judge of the propriety of submissions made by parties proposing Unsolicited Alternatives and the Consultant is entitled to request additional information of any nature or type.
- .2 Submission of an Unsolicited Alternative does not oblige the Consultant to consider the alternative.

1.8 PROHIBITED UNSOLICITED SUBSTITUTIONS SUBJECT TO AUTOMATIC REJECTION BY CONSULTANT AND OWNER:

- .1 Unsolicited Alternatives will not be considered by the Consultant in the following circumstances:
 - .1 When alternative products or methods are indicated or implied within the content of a Shop Drawing or product data submittal when no separate written request had been made for the consideration of the Unsolicited Alternative.
 - .2 When the acceptance of the Alternative will require revision to the Contract Documents or
 - .3 When the work of other Sections is not fully accounted for by any party should the substitution be instigated.

- .4 The terms "or equal", "or equivalent" or "Approved Alternate" or similar terms are used in the Bid and Contract Documents do not confer acceptance by the Consultant of an alternative material, product or system. The use of these terms within the Bid and Contract Documents does not relieve the Contractor from the responsibility to enact and enable the procedure outlined for approval of Unsolicited Alternatives specified herein.

Part 2 Products: NOT USED.

Part 3 Execution: NOT USED.

END OF SECTION

Part 1 General

1.1 CONTRACTOR'S ADMINISTRATION DUTES AND SUMMARY

- .1 This Section includes the process and requirements associated with any modification to the *Contract Documents, the Contract Price or the Contract Time* during the duration of the Work including during performance of administrative tasks by the Contractor prior to initiation of construction activity at the Place of the Work and following completion of construction activity at the Place of the Work.
- .2 The executed Contract between *Owner* and *Contractor* requires that adjustments to Contract Price and Contract Time shall be ratified through executed Change Order (CO), only.
- .3 Work associated with any Change in the Work shall not be prosecuted by the Contractor unless the work is the subject of an executed Change Order or the subject of a Change Directive.
- .4 This Section is intended to supplement the terms of the executed Contract. This Section is not intended to amend that Contract.
- .5 Refer to executed Contract for description of the process and terms associated with the Supplementary Instruction, the Change Order and the Change Directive. Documents issued by the Consultant that require administrative duties performed by the Contractor include:
 - .1 Supplementary Instructions also known as an "SI".
 - .2 Contemplated Change Orders, also known as a "CCO" and also known as a "proposed change" within this Section.
 - .3 A Change Notice or "CN" or Notice of Change shall have the same meaning as Contemplated Change Order or "proposed change"
 - .4 Change Directives also known as a "CD".
- .6 Time limitations applicable to the Contractor, the Owner and the Consultant for the preparation and submission of documents associated with Supplementary Instructions, Contemplated Change Orders, and Change Directives are stipulated within the executed Contract.
- .7 Contemplated Change Orders (CCO):
 - .1 Refer to executed Contract.
 - .2 A Contemplated Change Order is also known as a CCO and it is an instruction issued by the Consultant to the Contractor to assess the effect of a Change in the Contract Documents on both the Contract Price and the Contract Time.
 - .3 Work outlined within a CCO is not part of the Contract and not to be executed unless the work described is the subject of a Change Order which adds the Work described within a CCO to the Contract Documents and amends the Contract Price and the Contract Time as found mutually agreeable.
 - .4 When issued to the Contractor, a Contemplated Change Order requires the Contractor to perform the following tasks:
 - .1 Assess the full scope of the work associated with any CCO, including both the elements addressed within the CCO and the implications of the work identified within the CCO on any other aspect of the Work.
 - .2 Calculate the cost and the influence on the Contract Time of the work identified and implied within the CCO.
 - .3 Provide the influence of the Work described within the CCO on the Contract Price and Contract Time within time limits established on the CCO form or within the Contract.
 - .5 The Owner may issue a CCO to the Contractor regarding any potential Change in any aspect of the Work and at any time and without a limit number.
 - .6 A CCO has the following meaning and imposed the following duties upon the Contractor:

- .1 A CCO is a written form prepared by the Consultant and it may be supplemented with other documents including, but not limited to, drawings, specifications and product data sheets or other documents considered necessary to describe the contemplated Change to the Contract Documents.
 - .2 A CCO is the means used by the Owner to request from the Contractor the effect on the Contract Price and the Contract Time of a potential Change in the Work.
 - .3 A CCO obliges the Contractor to calculate the cost of the work associated with the CCO and to offer the cost of the contemplated Change to the Owner together with the Contractor's calculated effect on the Contract Time, both developed with the assumption that the contemplated change order would become a Change Order.
 - .4 The Contractor shall consider all CCO's, or any variation to them eventually found agreeable to the Consultant, the Owner and the Contractor, as though the work of the CCO will be implemented. As such, the Contractor is obliged to diligently consider the sequence of the Work together with the CCO as though the work within the CCO were to be executed and declare any time, space or delivery and supply effects or constraints arising from the Work in progress, as affected by the work of the CCO, or arising from the work within the CCO itself.
 - .5 A CCO is not a request to perform the work so described and illustrated on any documents associated with the CCO. However, the Owner may require the Contractor to effect the work associated with any CCO through the execution of a Change Order with the Contractor or through issuance of a Change Directive.
- .8 The Contractor, upon receipt of a CCO, shall calculate the Actual Cost of Material and Labour associated with work described or illustrated within the CCO and submit to the Consultant and the Owner a written and itemized quotation bearing a stipulated sum as the cost of the subject work. The Contractor shall also, and concurrently, evaluate the influence of the Contemplated Change Order on the Contract Time and disclose this effect on the Contract Time, in writing, to the Consultant and the Owner together with the effect of the proposed Change on the Contract Price. Following the Owner's evaluation of the Contractor's written response to the CCO, the Owner may request that the Consultant prepare a Change Order or a Change Directive, and, following execution of the Change Order form by Contractor and Owner, or the execution of the Change Directive, the Contractor shall cause the subject work to be prosecuted.

1.2 CHANGE DIRECTIVE (CD):

- .1 The Owner may require that the Contractor initiate the immediate prosecution of the work described within a Change Directive (CD) prepared by the Consultant. In this instance, the final accounting of the influence of the portion of the Work so directed, on both the Contract Price and the Contract Time, shall occur when the subject work is completed. The Contract Price and the Contract Time shall be subsequently adjusted through execution of a Change Order by the Owner and the Contractor.

1.3 OWNER'S AND CONSULTANT'S RIGHT TO REQUEST ADDITIONAL INFORMATION:

- .1 None of the foregoing shall limit or amend the Owner's right to request from the Contractor additional supporting information related to proposed adjustments in Contract Price or Contract Time, including, but not limited to, the itemized breakdown of the cost of any aspect of the work associated with a Supplementary Instruction, a Contemplated Change Order or a Change Directive.
- .2 Further, the Owner may request details and supporting information associated with any aspect of the work under discussion, including, but not limited to, bills of material, volumes of material, quantities claimed, and hourly and daily wage rates incorporated within the Contractor's documents associated with any Supplemental Instruction, Change Order, Contemplated Change Order or Change Directive, including, but not limited to, the following:
 - .1 Evidence of collective agreements and the rates associated with them;

- .2 Current Provincial wage rate data;
- .3 Data associated with wage rates customary in the region of the Place of the Work;
- .4 time sheets produced by the Sub-Contractor and the Contractor's written records and attendance logs used at the Place of the Work associated with hours or days invoiced or accounted against Changes.
- .5 Measured quantities of material or work accomplished based on the Contractor's records before commencement of any Change and after the Change had occurred, together with evaluation of same that may be conducted by the Consultant or the Owner's designated field engineer or testing agency.
- .6 Measured quantities of material or work accomplished based on the evaluation of same by the Owner's designated expert, Field Engineer or field testing agency.
- .7 Documents produced by the Contractor, completed with itemized accounting appropriate to the subject work, together with accounting for same at the Place of the Work, including but not limited to the following supporting documents:
 - .1 Evidence of purchase from suppliers and Sub-Contractors,
 - .2 Material lists with accounting associated to the Work and
 - .3 Material bills, bills of lading and tipping receipts associated with disposal or receipts associated with purchasing, delivery and receipt at the Place of the Work.
- .8 Any documents associated with Supplementary Instructions, Contemplated Change Orders or Change Directives, may be reviewed by the Owner, the Consultant, the Owner's designees or the Consultant's designees and the Contractor shall, where evidence offered by the Owner or other designees supports it, adjust claims made for the quantities of materials and the cost of material and labour associated with any Supplementary Instruction, Change Directive, or Contemplated Change Order.

1.4 RELATED REQUIREMENTS

- .1 Executed Contract and executed Subcontract.
- .2 Consultant's forms and requirements therein, prepared for Supplementary Instructions, Contemplated Change Orders, Change Directive and Change Order.

1.5 DEFINITIONS

- .1 **Actual Cost of Material and Labour:** within the Project Manual, Actual Cost of Material and Labour shall mean the aggregated sum of all cost for labour, materials and products or supplies directly related to or necessarily and properly incurred by *Contractor*, *Sub-Contractors* and *Suppliers* during performance of the work associated with a Change in the *Work* or that would be associated with a Contemplated Change in the *Work*.
- .2 **Direct Cost** shall mean the sum of costs associated with the following items:
 - .1 Materials Cost.
 - .2 Total Labour Cost.
 - .3 Travel and Subsistence Cost.
 - .4 *Temporary Work Cost*.
 - .5 *Construction Equipment Cost*.
 - .6 Direct Cost shall exclude values attributed to Overhead Cost and profit.
- .3 **Materials Cost:** shall mean the cost of *Products*, including transportation and storage thereof. Rebates, refunds, returns from sale of surplus *Products*, and trade discounts other than prompt payment discounts, shall be credited to *Owner*.
- .4 **Total Labour Cost:** shall mean the sum of the Direct Labour Cost and the Payroll Burden Cost, excluding Overhead Cost and profit arising from changes to the *Work*.
- .5 **Direct Labour Cost:** shall mean the cost of the base wages of employees, excluding Payroll Burden Cost.

- .6 **Payroll Burden Cost:** shall mean the cost of statutory charges and fringe benefits applied in addition to Direct Labour Cost together with the cost of Unemployment Insurance, Workers' Compensation charges, vacation pay, statutory holiday pay, the cost of health and welfare benefits, the cost of pension plan benefits, the cost of a training fund, and other payroll costs which are hourly wage-dependent and are paid by employer.
- .7 **Travel and Subsistence Cost:** Means travel and subsistence costs incurred by employees when working beyond a reasonable commuting distance from their normal place of residence.
- .8 **Temporary Work Cost:** Means cost of temporary structures, facilities, services, controls, and other temporary items used in performance of a change in the *Work*, including maintenance, dismantling and removal, less any residual value following dismantling and removal.
- .9 **Construction Equipment Cost:** Means cost of rented or owned equipment, including cost of loading, transportation, unloading, erection, maintenance, dismantling and removal. The cost of all rented or leased equipment shall be the cost set out in the Ontario Provincial Standard Specification #127 (April 2018).
- .10 **Overhead Cost:** means Contractor's, Subcontractors' and Suppliers' costs related to:
 - .1 Operation and maintenance of head offices, branch offices, and site offices,
 - .2 Administration at head offices, branch offices, and site offices,
 - .3 General management, legal, audit, and accounting services,
 - .4 Buying organization, corporate tax,
 - .5 Financing and other bank charges,
 - .6 Bonding and insurance,
 - .7 Salaries and other compensation of off-site personnel,
 - .8 Salaries and other compensation of on-site superintendents and other supervisory personnel,
 - .9 Planning, estimating, and scheduling of the *Work*,
 - .10 Expendable and non-expendable small tools, including maintenance thereof,
 - .11 Recruitment and training of on-site staff, and
 - .12 All other costs not defined as Direct Cost.

1.6 SUBMITTALS

- .1 Refer to executed Contract for definition of "Submittals".
- .2 Make Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Contractor shall submit the following Submittals before commencing prosecution of the work associated with any potential Change in the *Work* for which a Change Order has not been executed:
 - .1 An itemized stipulated sum quotation outlining in detail the effect on the Contract Price and on the Contract Time of work described within documents issued by the Consultant as follows:
 - .1 In accordance with executed Contract when the Contractor has determined that a Change in Contract Price or Contract Time will result from the prosecution of the work within any Supplemental Instruction.
 - .2 Work described within Contemplated Change Orders (CCO).
 - .2 Acknowledgement receipt and acceptance of the change to Contract Documents associated with Work which is part of an issued Change Directive (CD).

1.7 HOURLY AND DAILY WAGE RATES

- .1 Refer to executed Contract for wage rates associated with Unit Prices or Separate Prices.
- .2 Hourly or daily wage rates stated within executed Contract shall be calculated as the Total Labour Cost applicable to the labour for each person, assigned according to a system of classification of responsibility, skill or task, expressed as the value for each day or each hour of labour expended, as applicable.

- .3 A Working Day shall consist of 8-hours of labour per person, maximum, excluding lunch breaks or a number of hours stipulated in writing for the classification of labour affected.
- .4 The classification of labour is established by the Sub-Contractor and the Contractor and it shall be the customary division of the workforce of any particular Sub-Contractor or the Contractor according to the level of responsibility, or skill or the rate assigned to a particular task and this sub-division of the labour and the applicable rates must be stipulated within the Subcontract. Such classifications include, but are not limited to, Superintendent, Foreman, Safety Representative, Journeyman, or labourer and an identified, skilled tradesperson such as carpenter, welder, plumber, etc. all disclosed within the Subcontract.
- .5 The hourly and daily wage rates calculated as the Total Labour Cost for each classification or person, shall be used during the calculation of an increase or decrease in the Contract Price attributable to any Change or potential Change in the *Work*.
- .6 With respect to the cost of Changes or potential Changes in the Work, the Contractor will use the Construction Schedule reviewed by the Owner and the Consultant for evaluating Sub-Contractor quotations associated with Changes and potential Changes in the *Work* and to assess the impact of a Change or Contemplated Change on the Construction Schedule. Neither the submission of hourly or daily wage rates nor the cost attributable to equipment operation and rental of equipment by any party, and nothing within the Specifications shall be construed to mean that *Contractor* has established, or will establish, minimum wages or benefits applicable to the *Work*, other than those required by law.
- .7 Provide a breakdown indicating Total Labour Cost rates that will be applied to the labour of journeymen, apprentices, foremen, and other applicable classifications of labour within each Subcontract.
- .8 Total Labour Cost hourly or daily rates stated shall be consistent with rates that will actually be paid in normal performance of the *Work*, during regular working hours, and shall not exceed the following:
 - .1 Where collective agreements apply:
 - .1 Rates for Direct Labour Cost shall not exceed rates established by collective agreements.
 - .2 Rates for Payroll Burden Cost shall not exceed rates established by collective agreements and statutory charges.
 - .2 Where collective agreements do not apply, the hourly or daily wage rates used to determine the Total Labour Cost shall not exceed rates prevailing in locality of the *Project*.
- .9 *Contractor's* approval of Total Labour Cost hourly or daily wage rates provided by Sub-Contractors must comply with the current information available to *Contractor* in the Province of Ontario for construction industry wages and benefits.

Part 2 Products NOT USED;**Part 3 Part 3- Execution****3.1 CHANGE DIRECTIVES AND CONTEMPLATED CHANGE ORDERS**

- .1 *Consultant* will issue a Contemplated Change Order, including any supplemental or revised *Drawings* and *Specifications*, to the *Contractor* who will issue to all appropriate or affected Sub-Contractors a detailed description of the proposed changes in the *Work*.
- .2 A Contemplated Change Order issued by the Consultant is to be used by the Contractor as information, only and as such, a CCO shall not be considered as an instruction to either to stop work in progress or to execute the work described within the CCO.
- .3 The Contractor shall, as deemed necessary to the Contractor, request from the Consultant through written correspondence, clarifications or additional information, whenever the Contractor has formed the opinion that the instruction provided within a CCO is unclear or insufficient to calculate the effect on the Contract Price and the effect on the Contract Time of the work described within the CCO.

- .4 The Consultant shall receive and review such requests and respond with amendments to the CCO or with supplementary information, as he deems appropriate to the case. The Contractor shall not issue a CCO to Sub-Contractors and Suppliers when it is not satisfied that the content of the CCO is sufficient to accurately assess the effect of the work within the CCO on the Contract Price and the Contract Time.
- .5 Issuance of the Consultant's CCO by the Contractor to Sub-Contractors, Suppliers and any other entity determined by the Contractor to have a scope of work and services affected by the Content of the CCO, signifies that the Contractor is satisfied that the content of the CCO is sufficient to provide an accurate assessment of the effect of the CCO on Contract Price and Contract Time.
- .6 When, following due consideration by the Contractor, the Consultant and the Owner, it is agreed that a Change Directive would be an appropriate means to incorporate a Change in the Work into the Project, a Change Directive may be prepared by the Consultant for execution by the Contractor and the Owner. Such a directive requires the completion of the affected work prior to amending the Contract Price and the Contract Time through issuance of a Change Order.
- .7 A Change Directive will be prepared by the Consultant and accompanied by associated drawings, specifications, supplementary documents and other supporting materials. The Owner and the Contractor shall each review the materials provided by the Consultant and seek clarifications and additional information whenever either party considers the direction provided to be unclear. The Consultant shall make necessary, agreeable amendments. The CD shall be executed by the Contractor and the Owner in order to enable the prosecution of the work described.
- .8 When executed by the Contractor and the Owner, the work of the CD shall be commenced by the Contractor and evidence of the total amount of labour expended and the total quantity of materials utilized, including supporting documents associated with labour and materials expended as the work progresses shall be collected, tabulated and summarized by the Contractor and each affected Sub-Contractor and supplier as the work is prosecuted.
- .9 The Contractor shall issue the CD or CCO, together with any subsequent amendments made by the Consultant, to appropriate Sub-Contractors, suppliers and others whose work is affected by the content of the CD or the CCO.
- .10 Subcontractors, suppliers and others whose scope of work is affected by the work of a CCO shall submit a quotation for the proposed change in the *Work to Contractor* within the timeframe indicated in the Consultant's Contemplated Change Order stipulating:
 - .1 A lump-sum increase, decrease, or that there is no change in Contract Price.
 - .2 An increase in duration measured in business days or a decrease in duration measured in business days or that there would be no change in *Contract Time*.
 - .3 A detailed breakdown of lump-sum increase or decrease in the Contract Price.
- .11 The Contractor shall review all submissions associated with any CD or CCO, and summarize these in a formal response presented to the Owner and the Consultant, which stipulates the following features related to the effect on the Contract Price and the effect on the Contract Time of the work of the CCO:
 - .1 Itemized Direct Costs applicable to proposed work within the CD or CCO.
 - .2 Include a detailed breakdown of the Total Labour Cost and the total Construction Equipment Cost components in the CD or CCO indicating the rates applicable to each Sub-Contractor and for each classification of labour and equipment applicable, together with the number of hours used to calculate the Total Labour Cost or the means through which the Construction Equipment Cost is derived.
 - .3 Include a detailed breakdown of hourly or daily labour wage rates included within applicable CCA 1 Subcontracts and other hourly or daily wage rates previously approved by the Owner in writing, unless any identified additional Work cannot be performed during regular working hours and the Owner has given approval, in writing, for premium-time, labour rates.

.12 The Contractor shall ensure that the following occurs:

- .1 No person or entity includes a cost for labour or materials within the cost associated with the work of any CD or CCO that would otherwise be incurred in normal performance of the *Work*.

3.2 MINOR CHANGES IN THE WORK

When the Consultant considers that a Change to the Contract Documents will not affect the Contract Price or the Contract Time, the Consultant will issue to the Contractor, a Supplemental Instruction, which shall authorize a change in the Contract Documents and therefore, in the *Work*.

3.3 CHANGE ORDER ISSUANCE:

- .1 A Change Order shall be prepared by the Consultant in order to incorporate work which had not previously been a part of the Contract Documents into the Contract Documents and into the Work and into the executed Contract when:
 - .1 For the work described within a Supplemental Instruction, provided that the Owner and the Consultant both agree that the Contractor's claim for a Change in Work, and the details pertinent thereto, are acceptable. The resulting CO may be a credit to the Contract Price or an extra to the Contract Price or there may be no change to the Contract Price, but there may be an effect on the Contract Time, which will warrant issuance of a CO. The CO will incorporate any change in the Contract Time or the Contract Price into the Contract.
 - .2 The Owner has agreed to accept the Contractors stipulated price and the accompanying change in the Contract Time, if any, associated with a CCO. A Change Order is required if there is an amendment to either of the Contract Time or the Contract Price, before the work associated with a CCO can be incorporated into the Work. The change in Contract Price may be a credit to the Contract Price, an extra to the Contract Price or it may have no change to the Contract Price; however, there may be a change to the Contract Time in any of these cases. The Contractor may claim that the work associate with a CCO has an influence on the Contract Time (an increase or decrease the duration of the Contract Time or it may have no effect on Contract Time), regardless of a change to the Contract Price associated with a CCO. The work within the CCO shall be incorporated into the Contract Documents when the CO form associated with it is executed by both the Contractor and the Owner. Following execution of the CO form, the Contractor shall incorporate the work of the subject CO into the Project according to a schedule established by the Contractor.
 - .3 In the case of a Change Directive, following the Contractor's submission to the Consultant and the Owner of the final accounting for the cost of the associated work and the accounting for the influence on the Contract Time, together with any amendments and revisions submitted by the Contractor in response to the Owner's and the Consultant's queries and requests for additional information, as the case may be, provided that the Owner agrees to accept the associated terms. The CO will add to the Contract the effect of the work within the CD on the Contract Price and the Contract Time.

END OF SECTION

Part 1 General

1.1 CONTRACTOR'S ADMINISTRATION DUTES AND SUMMARY

- .1 The Contractor must utilize a Request for Information in order to receive a response from the Owner or the Consultant to queries regarding the content of the Contract Documents.
- .2 *The Contractor* will prepare RFI's for two specific categories of requests as follows:
 - .1 A request for interpretation which is a request made in writing by the Contractor to the Consultant arising from the Consultant's obligation to interpret the content of the Contract Documents.
 - .2 A request for clarification regarding the content of the Contract Documents concerning items, materials or products which may not be explicitly indicated on drawings or contained within specifications. Such requests may be made after the Contractor has exhausted its due diligence, both in review of the Contract Documents and in review of conditions in the Place of the Work, in a quest to discover the information.
- .3 The Consultant will not provide an interpretation of documents that are not part of the Contract Documents.
- .4 This Section includes administrative requirements intended to facilitate responses to Requests for Information known as an "RFI", and the Section defines the categories of requests and methods used to convey information between parties reading the Contract Documents with the following limitations:
 - .1 This Section does not apply to enquiries and requests for clarification arising during the *Bid Call Period*; RFI's submitted during the Bid Period will be managed by the Contractor.
 - .2 This Section does not apply to questions arising from *Submittals*, or from questions relating to alternatives or material and procedure substitutions. Refer to Section 01 25 00.
- .5 If, at any time, the Contractor has formed the opinion that the Contract Documents contain errors, inconsistencies, or omissions or if the Contractor has encountered a condition at the Place of the Work that is inconsistent with the Work intended by the Contract Documents or if the Contractor experiences doubt regarding the meaning or intent of any part of the Contract Documents, the Contractor shall immediately prepare and provide to the Consultant for review and commentary a Request for Information.
- .6 The following are the requirements the management of all documents associated with all Requests for Information:
 - .1 The Contractor bears responsibility for maintenance of a record of the Request for Information documents together with the responses associated with each during the full course of the prosecution of the Work. The Request for Information documents produced shall be kept current by the Contractor and retained together with the Consultant's responses and the Contractor shall order and schedule and monitor the status of all Request for Information events and documents throughout the duration of the Contract Time.
 - .2 The Contractor shall issue all Request for Information documents to the Consultant in a timely manner and with due consideration for the requirements of the Project Schedule and sufficiently in advance of the planned execution of the affected work so as to cause no delay in the Work or in the work of any Sub-Contractor or in the work of any supplier of products or any supplier of services. The Contractor shall incorporate the time required by the Consultant to prepare and issue a response to Request for Information documents when determining the issue date of any Request for Information.
 - .3 The Contractor shall review each Request for Information made by any party to the Contract between the Contractor and a Sub-Contractor or a supplier, together with the Contract Documents prior to issuance to the Consultant and ensure that information requested within the Request for Information is not within the Contract Documents.

- .4 The Contractor shall suggest alternative means, procedures, sequences and methods of construction when the content of an RFI has an influence on the means of construction, sequence of operations, methods, techniques, sequences and procedures, or if the RFI concerns an item or process involving the coordination of the various parts of the *Work*.
- .5 The Consultant shall review and respond to each Request for Information within a period of 7 Business Days or such longer period as may be reasonably required, next following the day upon which the Request for Information is received by the Consultant.
- .6 RFI's received after 2:00 PM on any day will be considered to be received by the Consultant on the Business Day next following.
- .7 Consultant's response to any RFI may include a request for additional information from the Contractor, which will result in a mutually agreeable increase to the time required to respond to the RFI.
- .8 RFI must state a date and time associated with the required response when this may differ from the response time indicated by the Consultant, or where greater urgency is required by the Contractor or Sub-Contractor.
- .9 Consultant's stated response time or other time proposed by Subcontractor or the Contractor does not represent a guaranty that RFI's will be resolved within the stated time period stipulated on the request.

1.2 COORDINATION:

- .1 Contractor shall coordinate requirements for the response period required of the Consultant with due consideration for the number and complexity of RFI's issued during the course of the *Work*.
- .2 The Consultant will request additional response time where multiple RFI's are received within a short period of time.
- .3 Record Keeping:
 - .1 Contractor shall be responsible for preparing and maintaining a log of RFI's and providing same to the Consultant. The log shall identify unanswered, incomplete or outstanding RFI's. The Contractor shall provide the log as an agenda point during meetings held during the construction period.

1.3 SUBMITTALS

- .1 Refer to executed Contract for definition of "Submittals".
- .2 Make Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Prior to commencing work associated with any RFI, conduct process indicated by this Section.

Part 2 Part 2 Products – Not Used

Part 3 EXAMINATION

- .1 Validity of Request: Consultant will accept requests when one or more of the following conditions have been met by the Contractor:
 - .1 Pre-Submission Review: Review requests from Sub-Contractors, manufacturers and suppliers before submitting any RFI to determine whether request is valid and that the information requested is not available within the Contract Documents.
 - .2 There is a demonstrated need to have an interpretation regarding the content of the Contract Documents and the intent cannot be reasonably inferred from information presented, including, but not limited to, the following situations:
 - .1 The Consultant's interpretation will address inconsistencies between the Contract Documents.
 - .2 The Consultant's interpretation will address omissions in the Contract Documents that lead to uncertainty of intent of the Contract Documents.

3.2 CONTRACTOR'S RESPONSIBILITIES

- .1 As the preferred alternative to an RFI, the Contractor shall:
 - .1 Determine urgency of all RFI's and wherever possible, include a Request for Interpretation or Clarification as a component of the next regularly scheduled Construction Progress Meeting.
 - .2 The Consultant will endeavour to provide a response to RFI's during the meeting or within correspondence following the meeting.
 - .3 The Consultant may accept that a special site meeting may be required to discuss coordination of complex or numerous RFI points.
- .2 Submit an RFI where item cannot be addressed during meeting, or where urgency of need or complexity of item cannot be adequately addressed during Construction Progress Meeting.
- .3 Contractor is responsible for review of RFI's received by Sub-Contractors, manufacturers and Suppliers for completeness and compliance with requirements of this Section in the first instance.
- .4 The Contractor will not forward any RFI to the Consultant for the sole reason of completing an implied obligation to submit to the Consultant an RFI received from a Subcontractor, manufacturers or Supplier when it is reasonably ascertainable that the RFI received does not conform with the requirements of this Section or when the RFI can be resolved by the Contractor.
- .5 The Contractor shall utilize a standard RFI Form which clearly states the nature of the request and it shall include, but will not be limited to, the following:
 - .1 Attach additional or covering information necessary to provide clarity to request or that does not fit on the standard form used by the Contractor.
 - .2 Accompany any RFI issued to confirm or coordinate the position of items or clearances between the parts of the Work or that are requests for specific locations of elements, with diagrams, drawings or sketches, prepared with dimensions derived from the Work at the Place of the Work, and indicate suggested solutions.
 - .3 Include requests from Sub-Contractors, Manufacturers and Suppliers as a part of the Contractor's submission.
- .6 The Contractor may accept an RFI from any entity provided that the following conditions obtain:
 - .1 All Sub-Contractor or Supplier RFI's must be sent to Contractor; RFI's sent directly to Consultant without the Contractor's prior review, will not be accepted by the Consultant and will not be answered.
 - .2 RFI's sent directly to Sub-Consultants (engineers engaged by the Architect) by any party, including the Contractor will not be accepted and will not be answered unless the Consultant has provided agreement to this process prior to the submission of the subject RFI.

3.3 CONTRACT CHANGES RESULTING FROM RFI RESPONSES:

- .1 The Consultant will respond to properly prepared RFI's with the assumption that no change to Contract Price or Contract Time is involved with any RFI.
- .2 The Contractor shall notify the Consultant immediately regarding any aspect of the Consultant's response to an RFI that could affect Contract Price or Contract Time.
- .3 Do not prepare RFI's with the anticipation that responses will automatically justify increased Contract Price or extensions to Contract Time.
- .4 If it is discovered that any RFI or the response to an RFI will result in a Change to the Contract Price or the Contract Time, do not proceed with any Work associated with the affected RFI until a Change Order is prepared and approved, or until a Change Directive is issued where urgency for continuation of the Work dictates.
- .5 The Contractor shall not submit claims for a Change to the Contract Price or the Contract Time that are the result of any RFI more than 10 Working Days next following the date upon which the RFI had been

submitted to the Consultant. Failure to identify changes to Contract Price or Contract Time within ten (10) Working Days will result in the rejection of the claim by the Owner.

3.4 CONSULTANT'S RESPONSE TO RFI'S:

- .1 The Consultant will respond to properly prepared RFI's by one of the following methods:
 - .1 Directly on the submitted form or using additional attachments as appropriate to address concerns identified where no Change to the Contract Price or the Contract Time is anticipated.
 - .2 Through issuance of a Supplemental Instruction where no space is provided on the Contractor's form to address concerns identified and where no change to the Contract Price or the Contract Time is anticipated.
 - .3 The Consultant may issue a Contemplated Change Order when the Consultant has formed the opinion that the RFI indicates that a Change to Contract Price or the Contract Time is required.
 - .4 The Consultant may respond by indicating that additional information or additional time is required to address the subject indicated in the RFI.
- .2 The completion of the Consultant's response will close the RFI.
- .3 The Consultant will identify inappropriate, improper or incomplete RFI's to the Contractor. The Consultant will not respond to an RFI deemed to be inappropriate or improper or incomplete; the Consultant will return such RFI's to the Contractor, unanswered and bearing a notation such as "Not Reviewed" or similar language. Return of such an RFI will close the RFI.
- .4 In a case where the Contractor disagrees with the Consultant's response to a properly prepared RFI, or with the Consultant's assessment of an RFI as improper or inappropriate, the Contractor may, at any time request the initiation of a meeting to discuss further resolution.
- .5 The Consultant will attempt to respond to an RFI when the content of the RFI does not relate to means and methods for delivery of the *Work*.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Executed Contract.

1.2 SUMMARY

- .1 This Section includes requirements for application of progress payments by the *Contractor*. This Section is not intended to amend the requirements of the executed Contract and related Supplementary conditions.

1.3 DEFINITIONS:

- .1 Ready for occupancy and occupancy: the terms “ready for Occupancy” and “Occupancy” used in this Section apply exclusively to the Construction Act.
- .2 Proper Invoice: Refer to executed Contract and in particular amendments made by Supplementary Conditions.

1.4 SUBMITTALS

- .1 Submit the following during the course of the *Work*:
 - .1 Schedule of Values:
 - .1 Submit Schedule of Values minimum twenty (20) calendar days before first Application for Progress Payment for review by the Owner and Consultant. Refer to requirements for the Schedule of Values provided in this Section.
 - .2 Itemize within the Schedule of Values, at the first part of the list; provide the Contractor's General Requirements expenditures on account according to a breakdown found agreeable to the Owner and the Consultant.
 - .3 Itemize Schedules of Values for Civil, Structural, Mechanical and Electrical portions of the Work as they occur in sequence of specifications number and according to division of work into Sub-Contracts to best mutual advantage.
 - .4 Owner and Consultant will review and comment on format, organization and content.
 - .5 Amend Schedule of Values according to comments and resubmit until an agreeable Schedule is established.
 - .6 Provide the total value (cost) for each sub-division of the Work described on the Schedule of Values expressed as 100% of the work for each sub-divided part of the work. The aggregated total value of the sub-divisions of the cost of the Work will be the current value of the Contract.
 - .7 Itemize the cost of changes as they occur at the bottom of the running list of categories of cost.
 - .2 Submit Progress Payment applications in accordance with requirements of executed Contract including all forms, declarations and supporting documents.
 - .3 Provide with each application for payment a current Schedule of Values with the work in progress identified associated with the current application separately from the running total of the work previously completed for each sub-division of the Work. Express dollar values of the work in progress and work previously completed as numeric values and as a percentage of the whole Contract Price completed.

1.5 MINIMUM REQUIREMENTS FOR THE SCHEDULE OF VALUES ASSOCIATED WITH EACH PROGRESS PAYMENT APPLICATION

- .1 Support claims for products delivered to Place of Work but not yet incorporated into Work by such evidence as the Consultant may reasonably require in order to facilitate the evaluation of the Contractor's current claim value or to serve as proof of delivery of products, as the case may require. Such support may consist of written delivery receipts, purchase orders, photographs and other documents.

- .2 Incorporate the value of as-built drawings and close out documents and submittals and procedures in the schedule of values.

1.6 APPLICATIONS FOR PROGRESS PAYMENT

- .1 Refer to requirements for "Proper Invoice for Progress Payments" within the executed Contract.
- .2 Submit applications for Progress Payment concurrently to the Consultant and the Owner.
- .3 Express the claim for work completed during each monthly period as the total amount of work completed to that date including all previous claims and disclose the total of previous payments and the total claimed for the current payment.
- .4 For each Progress Payment application, the Schedule of Values for the *Work* shall incorporate the aggregated percentage completed as of the date of the application expressed as a percentage of the total value for the line item, together with the dollar value completed to the date of the application and the dollar value for each sub-division of the Work within the current application. The headings, as a minimum, for each category of the work shall include:
 - .1 Initial contract value for each line item.
 - .2 Percent completed as of the date of the application for payment.
 - .3 The total dollar value completed as of the date of the application for payment.
 - .4 The aggregated total of the previous billings for each category of the work and
 - .5 The total dollar value of the category of the work completed as of the date of the application.
 - .6 Remaining balance of each category of the work.
 - .7 Final totals for each within the Schedule of Values shall identify the following:
 - .1 Total amount due.
 - .2 Holdback deducted.
 - .3 Holdback released.
 - .4 Amount invoiced to date.
 - .5 Net amount.
 - .6 *Value Added Taxes*.
 - .7 Amount due this Certificate for Payment.
- .5 Submit each application for payment on a date found mutually agreeable to the Consultant, the Owner and the Contractor. Provide all applications for payment on approximately this same agreeable date during each month.
- .6 Include with all Applications for Payment, documents required by the Contract provisions associated with Progress Payments.

1.7 STATUS AND VALUE ASSIGNED TO AS-BUILT DRAWINGS AND CLOSE OUT DATA:

- .1 As-built drawing and close out materials and submissions shall be determined to have a value of **\$3,000.00**.
- .2 As-built drawings and close out submittals specified are required as a prerequisite to substantial performance of the Contract.
- .3 If the as-built drawings and close out materials are not submitted by the Contractor, the value of As-built drawings and close out materials and submissions listed above shall be accounted as incomplete Work and the value will be deducted from any progress draw or application for substantial performance or final payment until they are submitted to the Consultant.

1.8 PROGRESS PAYMENT REVIEW BY OWNER AND CONSULTANT

- .1 Consultant will issue to Owner, subject to the conditions of the executed Contract, a Certificate for Payment indicating that the amount certified by the Consultant is a reasonable representation of the value of the work and products delivered to the Place of the Work on the day that the application for payment had been made.

- .2 If the Consultant has formed the opinion that there is reason to withhold the issuance of a Certificate for Payment, the Consultant shall provide a written explanation of the reasons to withhold the Certificate of Payment to the Owner and the Contractor no later than the expiration of the time allotted to the Consultant under the terms of the Contract to prepare a Certificate for Payment.
- .3 The Consultant's Certificate for Payment may Certify a dollar value for the completed work that is equal to the amount of the Application for Payment provided by the Contractor or it may Certify an amended value for the work completed to the date on the Certificate as Consultant reasonably determines to be due and payable in accordance with the Contract Documents and in accordance with the Consultant's evaluation of the condition of the Work found at the Place of the Work.
- .4 Should the Consultant amend the Contractor's Application for Payment, the Consultant will give notification in writing stipulating the reasons for the amendment.
- .5 In the case of an amended value, the Consultant may request that the Contractor amend the Application for Payment and resubmit it to the Consultant. In this instance, the Consultant shall, no later than the expiry of the 7 business days next following the date upon which the Consultant had received the amended Application for Payment, issue a Certificate for Payment associated with the Contractor's revised Progress Payment Application.

1.9 SUBSTANTIAL PERFORMANCE OF WORK

- .1 The measures used to determine Substantial Performance of the Contract shall be as established within the Construction Act of Ontario.
- .2 Refer to Substantial Performance of the Work within the executed Contract.
- .3 Work considered deficient or incomplete or work which had been executed incorrectly or otherwise found not to conform to the requirements of the Contract Documents, shall not be considered part of any repair, replacement or work associated with a warranty, but it shall be considered to be a part of the Contract used to calculate the achievement of the financial measure present in the Construction Act of Substantial Performance of the Contract.
- .4 When the Contractor has determined that the Work of the Contract might have achieved the status of Substantial Performance as defined within the Construction Act legislation, the Contractor shall:
 - .1 Collect and publish as-built drawings, Closeout Submittals, Operations and Maintenance Manuals, and other required Closeout documents completed using the specified formats.
 - .2 Prepare and submit to Consultant a comprehensive accounting of the project including a schedule of values associated with the Substantial Performance of the Contract together with a list of items that require completion or correction as a prerequisite to the final application for payment of the Contract.
 - .3 Attend the site with appropriate representatives of the Sub-Contractors and the site supervisor and the Contractor's project managers to develop a current list of deficiencies for publication to the Consultant and the Owner.
 - .4 Work considered being of poor quality by the Owner or the Consultant shall be considered deficient work.
 - .5 Apply values to deficient work itemized on a list of deficient work and provide a calculation demonstrating that the Project had met the financial test for Substantial Performance. Proceed to following steps if the financial limits for Substantial Performance are achieved. If the financial limit cannot be met, complete deficiencies and apply for substantial performance review when the project can meet the financial limits.
 - .6 Verify that sufficient fire alarm system verifications and certifications of life safety systems had been received and circulated so as to demonstrate that the project is ready for Occupancy by the Owner's furniture, fixtures and equipment and the Owner's personnel charged with installation of the furniture, fixtures and equipment. This verification must include operation of all security systems

- and devices connected under Contract. Data and communication cabling must be tested and found functional and free of interference after testing.
- .7 The Contractor shall make application for a substantial performance review to the Owner and the Consultant when the financial and functional measures for substantial performance are achieved.
 - .8 The value of the work completed as of the date of the Consultant's review of the work in the field shall be reduced according to the value of deficient Work, incomplete or incorrect work and all work for which the value or quality is the subject of a dispute. Should such reductions result in the calculation of a value for the completed work that does not achieve the value of completed work stipulated as a prerequisite of Substantial Performance of the Work, the Contractor shall complete the deficient work and request a subsequent review of the work by the Owner and the Consultant.
 - .9 The Consultant may subsequently issue a Certificate of Substantial Performance.
- .5 No later than 10 business days next following the date of receipt of the Contractor's Application for Substantial Performance review by the Consultant, the Consultant will review the Work to consider the validity of the Application for Substantial Performance of the Contract, and no later than 7 business days next following the review, the Consultant will notify Contractor if the Work or a designated portion of Work, is considered to be substantially performed.
 - .6 Consultant shall state date of Substantial Performance of Work or designated portion of Work on a Certificate for Substantial Performance (Form 9 provided in the Construction Act).
 - .7 Immediately following issuance of Certificate of Substantial Performance of Work, the Contractor shall, in consultation with the Consultant, establish a reasonable date for total completion of the Work.
 - .8 The value of incomplete Work and deficient Work shall be the value of finishing for which payment will be withheld by the Owner and this shall be accounted separately from lien Holdback applied under the Construction Act. Payment withheld for finishing shall not be released unless all Work determined to be deficient or incomplete is completed. Payment of the value assigned to closeout documents and as-built documents shall also be withheld if such documents are not submitted to the Owner and the Consultant.

1.10 PAYMENT OF LIEN HOLDBACK FOLLOWING SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 Following issuance of the Certificate of Substantial Performance of Work:
 - .1 Contractor shall submit application for payment of holdback amount due on the 61st day next following the date of the publication made in accordance with the Construction Act, of the Certificate of Substantial Performance.
 - .2 Contractor shall submit sworn statement that accounts for labour, subcontracts, products, construction machinery and equipment, and other indebtedness which may have been incurred up to the date of the Substantial Performance of the Work and for which Owner might be held responsible, have been paid in full, except for amounts properly retained as holdback or retained to pay the cost of completing the Work or retained as an identified amount in dispute.
- .2 After receipt of Application for Payment and the Contractor's sworn statement, Consultant will issue a Certificate for Payment associated with release of the holdback amount to the Contractor.
- .3 Amount stipulated within the Consultant's Certificate for Payment associated with Release of Holdback is due and payable on the business day next following expiration of the holdback period stipulated within the Construction Act of Ontario. Owner may retain out of holdback amount, sums required by law to satisfy liens against Work or, if permitted by Lien legislation, other third-party monetary claims against Contractor which are enforceable against Owner.

1.11 PROGRESSIVE OR PHASED RELEASE OF HOLDBACK

- .1 Refer to Contract. Phased release of holdback is not permitted.

1.12 FINAL PAYMENT AND DEEMED COMPLETION:

- .1 Submit application for Final Payment and Deemed Completion when Work and deficiencies are completed and the Work has, in the opinion of the Contractor, reached a stage of readiness for Occupancy.
- .2 This submission shall not be made unless as-built drawings and close out submittals are complete and submitted to the Consultant and the Owner.
- .3 Consultant will, no later than 10 business days next following date of receipt of Contractor's Application for Final Payment and Deemed Completion, review, together with the Owner, the Work to verify validity of application. Consultant will give notification that application is valid or give reasons why it is not valid, no later than 7 business days next following the Consultant's review of the Work.
- .4 Should the Consultant or the Owner form the opinion that the work will not reach the status of Deemed Completion, the Contractor shall correct deficient work reported by the Consultant or the Owner as the reasons for the failure to achieve the status of Deemed Completion and request an additional review of the Work by the Owner and the Consultant.
- .5 The process outlined for each subsequent request for a review associated with Deemed Completion or Final Payment shall be the same as the process initiated for the first application for Deemed Completion made by the Contractor.
- .6 Consultant will issue final Certificate for Payment when the Contractor's Application for Final Payment is found valid.

Part 2 Products NOT USED; Part 3- Execution - NOT USED.

END OF SECTION

PART 1 General

1.1 RELATED WORK:

- .1 All Sections.

1.2 DEFINITIONS:

- .1 Refer to executed Contract.
- .2 "Project Schedule" used within the Contract Documents shall have the same meaning as "Construction Schedule". The Project Schedule shall be developed, documented and maintained by the Contractor.

1.3 WORK INCLUDED IN THIS SECTION:

- .1 Establish *Commencement of Construction* Date and Construction Schedules illustrating the distribution of Contract Time attributed to identified tasks and activities and incorporating the following additional allowances of Contract Time, as a minimum:
 - .1 *Commencement of Construction* Date must be shown on the *Contractor's* Construction Schedules.
 - .2 The Contractor shall establish the list of tasks and activities and assign durations associated with each.
 - .3 The Contractor shall establish and incorporate the delivery dates associated with products and equipment when the receipt of such will influence the duration of the Contract Time (have an effect on the duration of the Critical Path). Note the following:
 - .1 Following development of the initial Construction Schedule that incorporates delivery dates, the Contractor shall not be entitled to compensation for the cost incurred to the Contractor of a delay in the prosecution of the Work due to delivery of products when the realization of a known delivery date (delivered when the item had been expected) occurs.
 - .4 The duration of all activities shall be expressed in days or weeks selected according to the level of detail illustrated by the schedule.
 - .5 The Contractor shall determine the critical path for the Construction Schedule and establish the sequence and duration of tasks and activities such that the time expended during execution of the activities and tasks will not result in an increase in the total Contract Time when the events on the critical path occur when they are anticipated.
- .2 Report anticipated start and finish dates for the activities that comprise the Work.
- .3 Provide milestone dates for key activities to permit monitoring of construction progress relative to the Critical Path.
- .4 Schedule submission of Shop Drawings, product data, samples, material and colours selection; commissioning plans, tests and inspections and other specified tasks and documents in such a manner as to maintain the time associated with the critical path throughout the duration of the Work.
- .5 Prepare written and graphic tools that illustrate and describe the Project schedule, the critical path and master and detailed schedules.
- .6 Report on the status of the construction relative to the published construction schedules at least once during each month in the form of a revised, printed schedule and supplement this with reports made about the work underway during each site meeting. Written, narrative reports shall accompany revised, printed construction schedules and these shall be supplemented with references to the construction schedule within the minutes recorded for site meetings.
- .7 Maintain all scheduling information, minutes, text reports, etc., current throughout the entire course of the work.

- .8 Report any delay or the absence of float caused for any reason that may change the completion date originally estimated for the construction. Contractor shall report during site meetings, the absence or reduction of float time or the occurrence of delays.

1.4 CONTRACT TIME ASSIGNED AS REQUIRED, MINIMUM "FLOAT" TIME:

- .1 The Contractor shall determine and allocate to best advantage float time distributed throughout the planned duration of total Contract Time. Float time shall be distributed at the Contractor's discretion to coincide with tasks, activities or anticipated delivery dates for products and equipment when there is a reasonable expectation of a delay, loss of productivity or there is an anticipated risk that the established period of time for the task, activity or delivery period will be longer than planned. Note the following:
 - .1 Incorporate a general float time, distributed in accordance with the Contractor's judgement, equal to at least 20% or some other greater percentage selected by the Contractor, of the total estimated time required to complete the Work. This float time is in addition to time allocated against Work Restrictions associated with weather described below.
- .2 Incorporate into the schedule and maintain a separate and distinct float time associated with periods of low productivity or no productivity due to the effect of weather to at least the following extent:
 - .1 Normal productivity for exterior works and interior works is anticipated to occur during the months of May, June, July, August and September of each year. No work restriction or period of low or no productivity would be anticipated in the schedule unless the Contractor wishes to apply such a period. The productivity associated with these months shall be considered a baseline condition against which the periods of low or no productivity due to weather and other impacts are to be considered.
 - .2 Float periods added to the Project Schedule due to work restrictions described below must be separately identified on the project schedule.
 - .1 **Interior Work Restrictions for Fall and Winter Period:**
 - .1 The time allocated for task and activities and delivery of materials and equipment associated with **interior work** planned to occur during October, November, December, January, February, March and April shall be subject to a total reduction of 10%, or some higher percentage determined by the Contractor, of the total estimated Contract Time to accommodate loss in productivity compared with similar work occurring during May, June, July, August, and September.
 - .2 The loss of productivity or periods of low productivity during this time period is anticipated to arise due to road closures and poor driving conditions resulting in difficult access to the Place of the Work by the Contractor's and Sub-Contractor's labour force; late and delayed delivery of materials; disruption in material supply due to weather conditions and power failure at the Place of the Work.
 - .3 The minimum acceptable additional and separately calculated float time required for the Construction Schedule is 1 full working day lost for each 10 working days planned.
 - .2 **Allowance for Reduced trucking Loads on Roads:**
 - .1 The Contractor shall incorporate into the construction schedule and the calculated duration of the Contract Time consideration for periods of the calendar year subject to reduced loads on local roads, regional roads and highways.
 - .2 The Owner will pay no claim for additional cost associated with trucking or transportation of materials when the cost is attributable to known and customary periods of load reduction for trucking commonly applied in the region of the Place of the Work.
 - .3 Periods of low or no productivity referenced above are separate from and in addition to any period of low or no productivity the Contractor may anticipate for any other reason including, but not limited to, known delivery dates for materials and equipment when continuance of the Work depends upon the receipt of such products.

1.5 MILESTONE EVENTS AND DATES PROVIDED IN THE PROJECT MANUAL OR BY THE OWNER:

- .1 Any description of a sequence of activities provided by the Owner or the Consultant or that is described within the Project Manual shall not be construed to mean that the Owner or the Consultant restricts the Contractor's ability to plan the Work. Such descriptions are intended to be general in nature and to highlight specific aspects of the Work as suggested sub-divisions of the Work or the Contract Time. These descriptions do not provide an exhaustive list of critical tasks and products required for the Work as a whole, and the establishment of the list of all critical tasks and events and their sequence is the responsibility solely of the Contractor.
- .2 Specified Milestone events included herein provide a guideline to assist the Contractor in the development of an understanding of the nature of the events which facilitate the Owner's planning process, that may affect potential sequential Occupancy or that constitute anticipated restrictions on Occupancy and use of the facility.
- .3 A list of specified milestones also facilitates the coordination of inspection of the Construction by various parties including the Field Engineer and the general review of the construction by the Consultant according to the progress of the Work.
- .4 The Contractor shall establish milestone dates for the Work that include dates associated with specified milestones.

1.6 DEFINITIONS

- .1 Activity: An element of Work performed during course of Project for which has an expected duration, cost and an assignment of resources.
- .2 Actual Finish Date (AF): The point in time that Work actually ended for an activity
- .3 Actual Start Date (AS): The point in time that Work actually started for an activity.
- .4 Bar Chart (Gantt chart): A graphic display illustrating the relationship between construction activities undertaken in sequence and the duration of each.
- .5 Baseline: Original Project schedule found agreeable with the Owner. This becomes the standard schedule. The attendant supporting materials and documents prepared by the Contractor for the Project are also part of the Project Schedule in each of its versions and interactions.
- .6 Constraint: Applicable restriction that will affect performance of the activities in the Project: any factor that affects when an activity can be started or completed.
- .7 Construction Schedule: also known as "Project Schedule" throughout the Contract Documents, is a bar chart which correlates the passage of time with the prosecution of the Work and the Work is sub-divided into various tasks and arranged on the chart to suit the intended sequence of operations. A Detail Schedule is also a bar chart, but the particular selection of tasks is further sub-divided to enhance the accuracy of the schedule over a portion of the total Contract Time. The Construction Schedules are produced by the Contractor to illustrate the sequence of operations and activities together the time required for the activities.
- .8 Critical activity: Any activity that is identified to be part of the critical path. The activity is critical when the activity must be completed to enable the prosecution or commencement of subsequent critical activities. Activities that may occur concurrently and they may not be critical activities with respect to one another; however, one or more concurrent activities may be critical if commencement of subsequent activities is contingent upon completion of one or more of the concurrent activities.
- .9 Critical Path: The sequence of activities and their accumulated durations arranged in order to achieve successful completion of the Work following consideration of the relationship of constraints associated with each activity in order to establish the longest duration for the Project as a whole. The Critical Path

is usually defined by those activities with float time less than or equal to a specified value which is commonly established as "zero" days. It is longest path through Project.

- .10 Critical Path Method (CPM): the analysis of activities, their duration and the activities prerequisite to the successful completion of each that enables prediction of the Critical Path. The analysis determines which sequence of activities has the least amount of flexibility in duration and constraint (least amount of float).
- .11 Finish Date: A point in time associated with an activity's completion. Finish Dates are usually qualified by one of following: actual, planned, estimated, scheduled, early, late, baseline, target, or current.
- .12 Milestone: A significant event in Project which is usually the completion of an activity which permits the commencement of other critical activities of the Critical Path. A milestone may also be an inspection task that delivers approval to advance the Work beyond the time of the inspection.
- .13 Monitoring: the act of observation of Work in progress, analysis of the Work relative to the Critical Path sequence, reporting and portrayal of construction progress, usually to develop a comparison between actual progress and the planning embedded in the standard schedule or a detailed schedule.
- .14 Non-critical activities: activities which when delayed, do not affect specified Contract Time.
- .15 Project Plan: is the project's Critical Path schedule, detailed schedules, supporting documents and all monitoring activity which together comprise the Standard Schedule which is used to guide both Project execution and Project control. Primary uses of Project plan are to document planning assumptions and decisions, facilitate communication among stakeholders and to document approved scope, cost, and schedule baselines. A Project plan may be summary or detailed.
- .16 Project Planning: Development and maintenance of Project Plan.
- .17 Project Time Management: is the process required to ensure completion of Project according to the Critical Path or earlier. The process must be developed to ensure that the various activities and tasks of the Project are efficaciously coordinated. The process includes, but is not limited to, analysis of activities and resources, logistical planning, estimating of task duration, preparation of schedules, monitoring of construction progress and effective control of variables.
- .18 Day: a business day occurs on any day except Saturdays, Sundays and statutory holidays. A calendar day is any day including Saturdays, Sundays and statutory holidays. For the purposes of developing a schedule, the working period for each day is an eight-hour duration which may be allocated to any part of the 24-hour day unless restricted by legislation.
- .19 Week: for the purposes of developing a schedule, a week is a period of 5 consecutive business days.
- .20 Risk: An uncertain event or condition that, if it occurs, has a positive or negative effect on Project's objectives.
- .21 Schedule: The planned dates for performing activities and the planned dates for achievement of milestones which together comprise a dynamic, detailed record of tasks or activities that must be accomplished to satisfy project objectives set out in the Critical Path. The record of tasks is the primary expression of the monitoring and control process and involves using the project schedule to control execution and sequence of activities and it is used as the basis for decision making throughout project life cycle. This word has shared meaning of Project Schedule and Construction Schedule.
- .22 Scheduled Finish Date (SF): Point in time designated as planned completion of an activity. A finish date is normally designated within a range of potential dates delimited by early finish date and late finish date.
- .23 Scheduled Start Date (SS): Point in time designated as the planned commencement date for an activity. A start date is normally designated within range of dates delimited by early start date and late start date.
- .24 Start Date: Point in time associated with an activity's start, usually qualified by one of the following: actual, planned, estimated, scheduled, early, late, target, baseline, or current.

- .25 Work Breakdown Structure (WBS): a record of activities described within graphic and narrative reports that displays the sequence of activities and their durations throughout the total duration of Project.

1.7 SYSTEM DESCRIPTION

- .1 Project planning documents and all constituent components including the construction schedule (Project Schedule), are the Contractor's documents and it is the Contractor's responsibility to ensure accuracy of these as the project proceeds.
- .2 Review of the schedule by the Owner or the Consultant is intended to be general in nature and the commentary provided, if any, is not an approval or endorsement of the planning documents submitted and the commentary or the absence of any commentary, does not signify that the Owner or the Consultant had considered the documents to portray a practical, feasible or realistic projection of events.
- .3 Contractor shall be responsible for Project Planning and Project Time Management as follows and in accordance with the particular details of the Project:
 - .1 Implement a strategy which will result in the establishment of the Critical Path: Identify tasks and activities and establish which activities must be complete as a prerequisite to commencement of other activities to establish a sequence. Evaluate the resources required and calculate the duration for each task and activity in order to discover the longest potential total Contract Time. Identify assumptions made about future results during the planning process in order to enable the evaluation of risk, and make judgements associated with the potential range of dates for start and completion of the tasks and activities.
 - .2 Prepare a Project Plan using a format of the Contractor's choice. The Plan will include the Project Schedule together with any document, description, diagrams, drawings, etc. considered to be prudent and necessary by the Contractor for effective communication of the Plan to all parties concerned, including the Consultant and the Owner.
 - .3 The Contractor shall use the Project Plan as a guide for the execution of the Project and the Contractor shall amend the Project Plan as the actual execution of the Work influences the Plan for the Project.
 - .4 The Contractor shall undertake a continuous, interactive process involving the following tasks:
 - .1 Observation of work in progress;
 - .2 Evaluation of requirements for resources;
 - .3 Scheduling implementation of resources;
 - .4 Continuous analysis of circumstances emerging and evaluation of their influence on the Project Plan and in particular, on the Project Schedule;
 - .5 Anticipating future effects on the Project Plan of emerging circumstances;
 - .6 Monitoring of the actual progress of the Work and comparison with the Project Schedule, the Project Plan and the critical path established by the Contractor.
 - .7 Amending all Project Plan documents as appropriate.
 - .8 Reporting to the Owner, the Consultant and all parties deemed to benefit by the reporting, the influence of work in progress or anticipated deliveries on the status of float time.
 - .9 Reporting of amendments to the Project Plan and particularly, the Project Schedule during construction meetings.
- .4 Contractor's Project Schedule shall list activities that will deliver performance, products and constructed results for the Work in accordance with Contract requirements.

1.8 ITERATIVE PROCESS AND DEVELOPMENT OF DETAILED SCHEDULES:

- .1 Contractor shall ensure that the planning process is iterative and that detailed schedules are developed as follows:

- .1 Rank activities proceeding from those of a general nature to those of a specific nature.
- .2 Develop detailed task lists within discrete segments of the Work and incorporate their sequence and duration as planning progresses.
- .3 Modify planning documents as the selection of options and alternatives are made or assumptions are rendered obsolete.
- .4 Develop scheduling information that is progressively more reliable.
- .5 Detail Project Schedules are used for analysis and monitoring progress.
- .6 The efficacy of schedule documents will be measured by the Owner and the Consultant through demonstrated accuracy in practice.
- .2 Contractor shall ensure accuracy of project schedule through monitoring of actual construction progress.
- .3 Contractor is responsible for the efficiency of the prosecution of the Work and for the accuracy of Project Schedule and the following are tasks and precepts inherent in this responsibility:
 - .1 When activities begin on time and are performed according to estimated durations without interruptions, the original Critical Path will remain accurate.
 - .2 Changes and delays, regardless of cause, create an essential need for continual monitoring of Project activities. Contractor remains solely responsible to monitor actual progress and compare this with planned progress shown on schedules.
 - .3 Contractor shall monitor progress of Project in detail to ensure integrity of Critical Path by comparing actual completions of individual activities with their scheduled completions, and review progress of activities that have started but are not yet completed.
 - .4 Monitoring shall occur continuously to permit immediate identification of the cause of any delay. The Contractor shall be responsible to provide remedial means to rectify delays.
 - .5 Current schedules that reflect accurately the progress of the work are required once each month for presentation during a scheduled construction site meeting.
- .4 Reporting:
 - .1 Contractor shall keep site meeting attendees and complete project construction team aware of changes to schedule, and possible consequences.
 - .2 In addition to Bar Charts, use narrative reports in the form of site meeting minutes to advise on seriousness of difficulties and measures implemented to overcome them.
 - .3 Narrative reporting shall begin with statement on general status of Project followed by a summarization of delays, potential problems, corrective measures and status of the Critical Path.
 - .4 Distribute amendments to graphic representations of the project schedule once each month or, if it is evident that a delay or extension of the contract time is required, more frequently.
 - .5 Establish detailed task schedules when ever there is risk of failure to achieve a milestone Finish date.
 - .6 Distribute detailed schedules of tasks required to complete deficiencies or incomplete work as the project approaches substantial performance or final completion.

1.9 GENERAL REQUIREMENTS ASSOCIATED WITH CONTRACT TIME:

- .1 Refer to Section 01 00 00 General Requirements.
- .2 The Owner requires that the Work is completed as quickly as possible and time is of the essence of the Contract.
- .3 Adjustments to Contract Time identified within the Contract may be made through written Change Order, only.
- .4 The Contractor shall declare all required adjustments to Contract Time that are attributable to Changes in the Work when the monetary value of any Change is presented to the Owner.

- .5 Absence of a declaration of a required adjustment to Contract Time attributable to Changes in the Work shall permit the Owner to consider that no change in Contract Time has occurred.
- .6 The Contractor shall document within detailed schedules prepared by the Contractor the estimated Changes in Contract Time attributable to Work that is to proceed under the terms of a Change Directive prior to commencing the Work associated with the Change Directive. Such schedules shall be amended as the work progresses under the same terms as are set out within this Section.
- .7 Make allowances in the Contract Time for inclement and disruptive weather as described within this Section.
- .8 Make allowances in the Contract Time for reduce trucking loads on roads and highways as described within this Section.
- .9 Commencement of Construction:
 - .1 Refer to Section 01 00 00 General Requirements.
- .10 Co-ordination of the Work undertaken for the Project:
 - .1 Establish a sequence of operations and mobilization for all Sub-Contractors. This is the Contractor's sole responsibility.
 - .2 Written and graphic documents describing the Construction Schedule shall be drafted by the Contractor and subsequently amended throughout the course of the Work and the schedule shall be designed to clearly illustrate the scope and extent of the Work and its entire duration.
- .11 Warranty:
 - .1 The Contractor's warranty period for the Contractor extends for 12-months next following the date established for Substantial Performance of the Contract.
 - .2 Defects found during the warranty period shall be corrected by the Contractor at no additional cost to the Owner or Consultant.
 - .3 The warranty associated with specific materials exceeds the warranty offered by the Contractor according to the requirements of the Section associated with the product or according to the warranty offered by the manufacturer of the product.

1.10 REVIEW OF SCHEDULES AND PROJECT PLAN BY OWNER AND THE CONSULTANT:

- .1 Allow Owner and Consultant 7 business days to review submitted Schedule.
- .2 Review of the schedule by the consultant or the Owner is intended to provide the Owner with information concerning aspects of the work that affect the Owner's use and occupancy of the building and to facilitate appropriate notification of those who are required to interact with the Contractor during the course of the work.
- .3 Consultant's and Owner's review of schedule does not constitute endorsement of the accuracy of the schedule or a judgement regarding its practicality or a validation of the accuracy of the dates and the efficacy of the sequence of activities provided.
- .4 Inaccurate or poorly conceived construction schedules shall not be justification for claims made by the Contractor for additional cost arising from delay or the contractor's failure to achieve the objectives incorporated into the schedule.
- .5 The Owner and the Consultant do not bear responsibility for the Contractor's inefficiencies in the prosecution of the Work or the Contractor's failure to plan the work appropriately.
- .6 If the Consultant or the Owner has formed the opinion that the Project Plan, a schedule or a detail schedule appear to be impractical, the Contractor shall re-consider the schedule and promptly provide additional information to validate practicality of Schedule.
- .7 Owner and Consultant are entitled to assume that all aspects of the work had been included and considered when Schedule is established.

1.11 AMMENDMENTS TO CONTRACT TIME AND CLAIMS FOR COST ASSOCIATED WITH AMENDMENTS TO CONTRACT TIME:

- .1 Delays experienced for non-critical activities (activities that do not influence the Critical Path) and for activities with float time do not form justification for claims for an extension in the duration of the Contract Time or for an increase in Contract Price associated with an extension to the duration of the Contract Time.
- .2 Extension of the duration of the Contract Time (increase in the total in Contract Time) may be applied to the Construction Schedule through mutual agreement, only. Agreement is signified by executed Change Order.
- .3 A change in Contract Price attributable to an extension in Contract Time shall occur through mutual agreement, only. Agreement is signified by executed Change Order.
- .4 A contraction (reduction) in Contract Time will not result in a change to the Contract Price and a Change Order is not required to contract the Contract Time.
- .5 The Owner's and the Consultant's review and commentary regarding the Project Plan, the construction schedule or a detail schedule showing scheduled Contract duration shorter or longer than specified Contract Time does not constitute a change to Contract Time.
- .6 A claim made by the Contractor for additional cost attributable to extension of Contract Time must be supported with written narrative descriptions identifying the circumstances, a detailed bar chart schedule illustrating influence of the circumstances on the Critical Path and the Contract Time and an itemized breakdown of the cost claimed according to specific occurrences. The particulars of the circumstances described must clearly show a need to amend the Critical Path and demonstrate that the Contractor could not control the circumstances that cause the extension of Contract Time in order for the Owner, the architect, the payment certifier and the Consultant to consider the claim.
- .7 A claim made by the Contractor for additional cost attributable to extension of Contract Time does not oblige the Owner to pay an additional cost.
- .8 Changes in the Work described within Contemplated Change Orders, Supplemental Instructions, Change Directives and Change Orders may incorporate an increase in the Contract Price attributable to the extension of Contract Time if the Owner and Contractor amend the Contract Time and the cost associated with the amendment is disclosed, clearly stipulated and itemized within the cost breakdown provided together with the cost of the work identified within the Change Order.
- .9 An increase in the Contract Price claimed by the Contractor to be attributable to an increase in the Contract Time associated with the work of any Change Order previously executed and for which such an increase is not stipulated, identified and disclosed with the executed Change Order will not be paid by the Owner.
- .10 A claim made by the Contractor for additional cost attributable to extension of Contract Time will not be paid by the Owner if the claim alleges that the extension of Contract Time is due to the accrual of increases in Contract Time attributable to multiple Changes or Change Orders for which an increase in Contract Time was not previously disclosed within the executed Change Orders.
- .11 Delay experienced at the Place of the Work or in manufacturing occurring at a location other than the Place of the Work, shall not be attributed by the Contractor to the Owner without appropriate, written evidence substantiating such a claim.
- .12 Duration of Contract Time may be changed through bilateral agreement, only, signified by executed Change Order. Change of duration does not result in a change in Contract Price without acknowledgement of the Owner through executed Change Order.
- .13 Extension of Contract Time shall neither be construed as a delay nor form the basis for a claim for additional cost attributable to the extension of Contract Time or a claim for lost productivity that is not

within the control of the Contractor, unless the Contractor provides supporting documentation and there is bilateral agreement to the Change in the Contract Price signified through execution of a Change Order.

- .14 No claim for delay or extension of Contract shall be considered if such a claim arises from the Contractor's failure to conduct the work in accordance with the Contract Documents and all applicable legislation.
- .15 Contractor is obliged to report the necessity to extend contract time as soon as the requirement for such an extension is apparent.
- .16 Changes to the Work:
 - .1 Change Orders and Change Directives may be executed through bilateral agreement without extension of contract time or additional cost associated with delay, extension of contract time, impact cost of changes or loss of productivity; however, no right to accrue additional cost for later claims is inferred, intended or implied through execution of any single Change Order that does not disclose applicable extension of Contract Time or the cost associated with delay, extension of Contract Time or lost productivity.
 - .2 Individual Change Orders and subsequent amendments to Change Orders, regardless of occurrence, frequency or sequence or cost shall not constitute in their aggregate, a single incident of delay or extension of Contract Time and thereby waive any requirements for notification of delay or extension associated with each individual change.
 - .3 Changes in project duration attributable to work described within executed Change Orders may result in a cost associated with project duration extension provided that Owner and Contractor amend the Contract Time and the cost associated with the amendment to the Contract Time, within the same Change Order.
 - .4 Change Directives may result in an extension to Contract Time, subject to mutual agreement between Owner and Contractor and determined in accordance with requirements of the executed Contract and provided that such claims are appropriately supported by written material.
- .17 Loss of Productivity:
 - .1 Show within Master Plan and Detail Schedule, effect on productivity caused by adverse weather conditions normally anticipated, cessation in the Work caused by the Owner's activities and cessation in the Work provided to permit transitions between construction phases.
 - .2 The Contract Time declared on the Bid Form is deemed by the Owner to have included periods of lost or low productivity associated with normal occurrence of adverse weather conditions, interruptions in the Work caused by the Owner's Occupancy and reductions in permitted loads on local, County and Provincial roads as described within this Section.
 - .3 The Contractor shall utilize the Contract Time declared on the Bid Form in the establishment of the Construction Schedule unless Post Tender Addenda amend the Contract Time written on the executed Bid Form provided by the Contractor at Bid Closing.
 - .4 Contract Time and the anticipated duration of construction from commencement to Substantial Performance of the Contract must be declared on a Project Schedule produced following the execution the Contract.
 - .5 Insufficiency of labour force to effectively prosecute Work in accordance with the Contractor's schedule and work plan shall not constitute justification of a claim for extra cost associated with loss of productivity. Provide necessary crews and manpower to achieve milestone goals recorded on schedule documents and to perform Work within planned Contract Time. Simultaneous implementation of multiple crews working on multiple fronts and according to multiple critical paths may be required.
 - .6 Loss of productivity claims shall not be considered by the Owner or the Consultant without supporting documents listed within this Section as a minimum.

- .7 Existence of Contemplated Change Orders, executed Change Orders, Supplemental Instructions or Change Directives does not constitute lost productivity or justification of extension of Contract Time without mutual agreement.
- .8 Loss of productivity may amend the Contract of such an amendment is through a mutual agreement signified by execution of a Change Order.
- .18 Sub-Contractors and Suppliers:
 - .1 The contractor is solely responsible for communication of work plan, Project Schedule and production requirements associated with the work schedule to all persons providing services for the prosecution of the work.
 - .2 Arrange participation both on site and during factory or shop production of the work of subcontractors and suppliers, as required, for purpose of network planning, scheduling, updating and progress monitoring.
 - .3 Ensure that it is understood by all Sub-Contractors and Suppliers that all milestone dates, including commencement, and culminating with achievement of Substantial Performance, Deemed Completion and Final Payment, as defined within the Contract Documents, are critical for this Contract and of the essence of the Sub-Contract.
- .19 Delay and Changes to Contract Time and Contract Price - General:
 - .1 A change in the Contract Price shall not necessarily constitute justification to change the Contract Time.
 - .2 A delay may result in a Change to Contract Time if the time lost cannot be recovered.
 - .3 A delay in completion of Work that does not influence the Critical Path does not result in a change to the Contract Time or the Contract Price.
 - .4 A delay that extends Contract Time and that is found mutually agreeable and accepted through executed Change Order need not result in a change to the Contract Price.
 - .5 A delay arising from inefficiency in the prosecution of the Work or that is found to be due to the Contractor's failure to plan appropriately shall not result in an increase in the Contract Price.
 - .6 A delay arising from circumstances demonstrably out of the control of the Contractor may result in a Change to the Contract Price.
 - .7 Changes to Contract Time and Contract Price are effected through written Change Order as described above.
- .20 Through execution of the Contract, the Contractor acknowledges that delay in the Contractor's planned prosecution of the Work may be caused by inefficiency inherent in the methods used by the Contractor or the Sub-Contractors or both.
- .21 The Contractor is obliged to demonstrate that inefficiency in prosecution of the Work is not the cause of a delay using the means customary in the Construction Industry and as noted below.

1.12 PROCESS FOR A CLAIM FOR ADDITIONAL COST ASSOCIATED WITH DELAY OR EXTENSION OF CONTRACT OR IMPACT COST

- .1 Submit to Consultant, justification for delay and circumstances involved, a revised Schedule, and other supporting evidence for the requirement to extend Contract Time.
- .2 No claim for additional cost associated with an alleged delay incurred by means or reasons beyond the control of the contractor or additional cost associated with the extension of contract time, however caused, or a claim for additional cost incurred to the Contractor or its sub-contractors due to an alleged loss of productivity shall be accepted for consideration by the Consultant or the Owner without sufficient supporting documents. Supporting documents shall include, but are not limited to:
 - .1 Written or published evidence of a labour dispute, weather event or found condition which, consistent with provisions of the Contract and the Contract Documents, might constitute reason for

- a claim for cost associated with a delay or extension of contract time or support a claim for cost associated with loss of productivity.
- .2 Time sheets and written records providing identities, locations, duties or tasks performed consistent with time periods associated with a claim related to extension of contract time, delay or loss of productivity and other pertinent details associated with persons performing work or tasks associated with such a claim expressed in hours of work performed and substantiated, as integral to the claim. Such records shall include, but shall not be limited to the following:
- .1 A written record of all person hours expended on the site in accordance with the planned execution of the work up to the date of the incident or occurrence alleged to have caused a delay or extension of the contract time or a loss of productivity.
 - .2 A written record of all person-hours expended to effect changes made to the project, regardless of cause for the change.
 - .3 A written record of person-hours directly attributable to the cause of the alleged delay, extension of contract time or loss of productivity.
 - .4 Records documenting any materials used in the construction of work associated with the claim.
 - .5 An appropriate bar (Gantt) chart analysis of the effect of specific instances alleged to have caused the claim for delay or extension of contract or loss of productivity supported by a narrative description of events and evidence of the efficacy of project planning undertaken prior to the occurrence giving rise to the claim and demonstrating the logical outcome had the event not occurred.

1.13 CRITICAL PATH REQUIREMENTS:

- .1 Contractor shall ensure that Master Plan and Detail Schedule are practical and remain within specified Contract duration.
- .2 Whenever the Project Plan, the schedule or a detail schedule indicate that any activity had been completed in less time than the anticipated duration, the reduction in time applicable shall be deemed by the Owner, Consultant and Contractor to result in additional "float" time for any other activity on the schedule.
- .3 The first Milestone on the standard schedule will be the Commencement of Construction date and it shall have an early start (ES) constraint date equal to the Commencement of Construction date.
- .4 Calculate dates for completion milestones using the Project Plan and the specified Contract Time on the executed Contract.
- .5 Accommodate within the Critical Path, the effect on productivity caused by adverse weather conditions specified within this Section. Specified Contract duration noted on Bid Form executed by Contractor and the Contract Time is deemed to have been predicted by the Contractor to include periods of lost or low productivity associated with the occurrence of adverse weather conditions with an influence on the Contract Time that is at the least, equal to the value derived through the addition of time stipulated within this Section.
- .6 The Contractor shall include a reduction in productivity arising from restrictions on permitted loads on local road network within the calculation of the Critical Path.
- .7 Provide necessary crews and manpower to achieve milestone goals recorded on schedule documents and to perform Work within specified Contract duration for stipulated phases. Simultaneous implementation of multiple crews working on multiple fronts and according to multiple detailed schedules may be required.
- .8 Arrange participation both at the Place of the Work and during factory or shop production of the work, of Sub-Contractors and suppliers, as required, for purpose of Project planning, scheduling, and monitoring.

- .9 Insert Change Orders and Change Directive work within the Critical Path as these are executed and, where applicable, show completion dates.

1.14 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00.
- .2 Submit to Consultant the Project Control System for planning, scheduling, monitoring and reporting of project progress.
- .3 Include cost associated with execution, preparation and reproduction of schedule submittals required by Bid Documents within the Bid Price.
- .4 Submit letter ensuring that schedule has been prepared in coordination with major sub-contractors.
- .5 Refer to article "Progress monitoring and reporting" of this section for frequency of Project control system submittals.
- .6 Submit Project planning, monitoring and control system data as part of initial schedule submission and monthly status reporting in following format:
 - .1 Bar Chart Project Schedule (Gantt Chart).
 - .2 A list of project activities including milestone events extending from Commencement of Construction to Final Certificate of Payment. Sort activities by activity identification number and accompany with descriptions. List early and late start and finish dates together with durations.
 - .3 Report by listing activities and milestones for ready identification of Critical Path through entire project. List early and late starts and finishes dates, together with durations, codes and float for critical activities.
 - .4 Report progress by listing for each trade activities due to start, to be underway or finished within two months from monthly update date. List activity description and duration. Provide columns for entry of actual start and finish dates, duration remaining and remarks concerning action required.

1.15 QUALITY ASSURANCE

- .1 Use experienced personnel, fully qualified in planning and scheduling to provide services from start of construction to Final Payment Certificate, including Commissioning.

1.16 PRE-CONSTRUCTION PROJECT MEETING

- .1 Establish a pre-construction meeting with Consultant and all significant trades including the Owner within 10 working days of the date upon which the Contract was executed to establish scope of Work and achieve agreement on the construction sequence, the Contractor's use of the site and to establish communications protocol.

1.17 PROJECT MILESTONES

- .1 The Contractor shall determine the required number of milestone dates to coincide with the Schedule and the limits of the Project including Phasing. Show start date for each component of the work indicated below together with completion dates in a bar chart format.
- .2 Include as the minimum number of milestone items or events, the milestone items, together with their associated dates for each Phase of the Construction:
 - .1 Mobilization and completion for each Phase;
 - .2 Erection and completion of infection control barriers for each Phase;
 - .3 Owner's approval of infection control barriers for each Phase;
 - .4 Completion selective demolition;
 - .5 Commencement of steel stud framing.

- .6 Commencement and completion dates for rough-in of electrical devices and services;
- .7 Commencement and completion dates for rough-in of mechanical services and equipment;
- .8 Commencement according to Phase of the Work, of establishment of infection control barriers for other Phases.
- .9 Installation of interior doors and interior windows;
- .10 Commencement and completion of application of gypsum board panels;
- .11 Commencement and completion of application of suspended ceiling framing;
- .12 Commencement and completion of application of paint;
- .13 Commencement and completion of application of interior trims and finishes;
- .14 Commencement and completion of application of flooring;
- .15 Completion of mechanical work and balancing;
- .16 Installation of electrical fixtures;
- .17 Submission of closeout documents;
- .18 Substantial performance of the Contract;
- .19 Completion of commissioning plan and associated forms and reports;
- .20 Final completion of the Contract.

1.18 DETAILED SCHEDULES:

- .1 Provide detailed schedules for the Work associated with parts of the Project listed below, as a minimum, in addition to Standard Schedule developed for the entire scope of the Work.
- .2 Present detail schedules during site meetings.
- .3 Provide, as a minimum, the following detailed schedules:
 - .1 Supply and installation of the following:
 - .1 Detailed schedules associated with phases following the first phase.
 - .2 Detailed schedules associated with work on Level 3 according to each affected room or space.
 - .3 Medical Gas commissioning, testing, and
 - .4 Electrical commissioning including security items and door controls.
 - .5 Fire alarm verification, final electrical safety authority inspection, sprinkler system integration with fire alarm and hardware (electronic locks and security systems) commissioning.
 - .6 Inspections by the Owner and authorities having jurisdiction.
 - .7 Final finishing prior to application for substantial performance of the Contract.
 - .8 Final cleaning by Contractor's forces.
 - .9 Completion of deficiencies arising from inspections related to application for Substantial Performance.
 - .10 Work occurring between Substantial Performance and deemed completion.
- .4 Relate Detail Schedule activities to Standard Schedule and milestones established.
 - .1 Include sufficient detail to assure adequate planning and execution of Work. Activities should generally range in duration from 3 to 15 workdays each.
- .5 Provide level of detail for project activities such that sequence and interdependency of Contract tasks are demonstrated and allow coordination and control of project activities. Show continuous flow from left to right.
- .6 Insert Change Orders in appropriate and logical location of Detail Schedule. After analysis, clearly state and report to Consultant for review any effect created by insertion of new Change Order.

1.19 COMPLIANCE WITH SCHEDULE AND DETAILED SCHEDULE

- .1 Comply with established Schedule and Detailed Schedule between site meetings and report minor variances at subsequent meetings.
- .2 If a significant change is required between site meetings, notify consultant of the nature of the change.
- .3 Identify activities that are behind schedule and causing delay. Provide measures to regain lost time.
 - .1 Corrective measures may include:
 - .1 An increase of personnel on site for effected activities or work package.
 - .2 An increase in materials and equipment.
 - .3 Overtime work or additional work shifts.
 - .2 Corrective measures will be undertaken at the Contractor's expense unless a Change in Contract Price associated with these measures is made through executed Change Order.

1.20 PROGRESS MONITORING AND REPORTING

- .1 Submit initial schedule no later than 10 business days next following the execution of the Contract.
- .2 Revise and re-issue project Schedule as Project proceeds.
- .3 Once each month throughout the duration of the Work, submit to Consultant, Owner, and all attendees at site meetings copies of updated Detail Schedule via hard copy or email in advance of meeting.
- .4 Requirements for monthly progress monitoring and reporting are basis for progress payment request.
- .5 Submit within site meeting minutes written progress report based on Construction Schedule, showing Work performed to date of the meeting, compare actual Work progress to planned progress, and present forecast for future Work.
- .6 Report must identify and isolate risk, threats to progress and define problem areas and anticipated delays relative to the Schedule and the Critical Path.
- .7 Explain recommended alternatives for recovery of lost time relative to the Schedule as means to mitigate any potential delay.
- .8 Include in report:
 - .1 Description of progress made.
 - .2 Pending items and status of permits, shop drawings, schedules, material selections, Change Orders, possible time extensions.
 - .3 Status of Contract completion date and milestones.
 - .4 Current and anticipated problem areas, potential delays and corrective measures.
 - .5 Review of progress and status of Critical Path activities.

1.21 BASIC CONDITIONS FOR SCHEDULE AND SEQUENCE OF OPERATIONS

- .1 Refer to Section 01 73 00 Execution for requirements to protect the work. Incorporate tasks within project planning and schedule that will deliver the work in a condition appropriate for its design and intended use. Plan and schedule activities to satisfy the fundamental requirement for protection of the work and its contents
- .2 No sequence or procedure shall be implemented that could result in detrimental effects to the new construction as it progresses.
- .3 The Contractor shall not knowingly commit an action or sequence of actions or omit action or permit action or omission of action that could, as a result of detrimental effects arising from the act or omission, delay the progress of the Contractor's Work.
- .4 The contractor shall not execute actions or cause the execution of actions that would cause a detrimental effect on the Work in progress whether new or existing.

- .5 The Contractor shall not deliberately fail to undertake work that would reasonably be considered standard construction practice including protection all parts of the work from the effects of weather, temperature, fire, theft and vandalism. Protection in this case also includes the requirement to maintain conditions appropriate for the work in progress at all times, regardless of the attendance at the site by the Contractor or persons under their control, for prosecution of the work.
- .6 The Contractor shall not abandon the work at any time during its execution. In this sense, failure to protect the work or parts of the work during periods of time outside of the Contractor's established working hours constitutes abandonment.
- .7 Contractor shall schedule and sequence work to permit appropriate remedial work required by the nature of any process or implementation process in the work, including but not limited to the following:
 - .1 Time, resources and equipment to effect cleaning, curing or drying of materials exposed to weather or wet processes;
 - .2 Make allowance the establishment of appropriate humidity and temperature at the Place of the Work for various operations and
 - .3 Implement measures to effect diligent removal of water, dust or other conditions or elements resulting from the Work during the course of the Work, that would be detrimental to subsequent parts of the Work.
- .8 Contractor shall schedule and sequence work to maintain sufficient heat within the building to prevent freezing of water within existing or new plumbing. Contractor remains solely responsible for damage due to freezing of water within plumbing.
- .9 Contractor shall schedule work to maintain all areas that could be damaged in any way by exposure to precipitation through direct or indirect means or damaged due to low temperature, free of such exposure throughout the entire course of the Work.
- .10 The Contractor shall be solely responsible for maintaining rooms and spaces or new Work as it progresses, free of detrimental effects of temperature and weather and to prevent ingress of water into the building or its various components, and with particular diligence for those components that would be concealed by finishes.
- .11 Detrimental effects of temperature and weather shall include:
 - .1 Ingress of precipitation by any means whether directly or indirectly including by penetration through temporary weather protection established by the Contractor.
 - .2 Mould and mildew growth attributable to exposure of the interior of the building, whether part of the existing or new construction, to precipitation or water from any source that arises from the work or failure to protect the work sufficiently.
 - .3 Delays in the work caused by removal of potable water or electricity or other utilities supplied to the site.
 - .4 Temporary heating that results in formation of condensation within the building.
 - .5 Insufficient temporary heat to ensure progress of the work in accordance with material manufacturer's instructions.
 - .6 Insufficient protection of materials from detrimental effects of sunlight, weather, temperature and humidity outside of the manufacturer's specified range for efficacious use of any product.

1.22 OWNER'S CONSTRUCTION REQUIREMENTS:

- .1 The Owner reserves the right not to occupy parts of the work that the Contractor might consider to be completed.
- .2 Any plan to occupy any part of the scope of the Work prior to the completion of all parts of the Work shall not oblige the Owner to apply the substantial performance process and closeout or commissioning or turn over process to less than the entire Contract.

- .3 The Contractor shall include all required temporary barricades or hoarding to separate the areas under construction from the areas occupied. This provision includes the reconfiguration of exterior barricades to restrict access to parts of the work under construction and positioning of interior dust tight barriers between the work and occupied areas.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 This section includes submittal procedures and requirements for all submittals, including, but not limited to the following:
 - .1 Contract administration forms: responses to SI, CCO and CD; RFI forms, Project Schedule, various reports, minutes of meetings, health and safety policy, the Owner's forms executed by the Contractor and other correspondence.
 - .2 Payment request documents.
 - .3 Shop drawings and product data.
 - .4 Samples.
 - .5 Certificates and transcripts.
 - .6 Field Review Reports by designers of systems subject to delegated design responsibility, and review reports from Testing and Inspections undertaken by Field Engineers.
 - .7 Testing, Adjusting and Balancing Reports.
 - .8 Testing and Field Engineering Reports.
 - .9 As-Built Drawings and Record Drawings.
 - .10 Project Closeout submittals.

1.2 RELATED REQUIREMENTS

- .1 All Sections

1.3 ADMINISTRATIVE

- .1 The Consultant and the Owner are entities which may receive submittals. These entities are known in this section as "reviewers". The Contract Documents describes the role for each entity.
- .2 Submit payment request documents stipulated within other Sections and the executed Contract to the Consultant and the Owner.
- .3 Arrange and schedule submissions in a sequence determined by the Contractor as most efficacious for their schedule to prevent a delay in Work.
- .4 Present shop drawings, product data, samples and mock-ups in metric units.
- .5 Do not proceed with Work affected by submittal until Consultant's review of any submittal is complete.
- .6 Contractor shall be solely responsible for the management, control and distribution of all submittals and all instructions or requirements found in this Section are directed to the Contractor.
- .7 Contractor's review shall result in rejection of submissions containing insufficient or incorrect information or data.
- .8 Contractor's review and subsequent transmission of submittal documents to the Consultant shall constitute acknowledgement by the Contractor that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents; that field measurements had been made and requirements of other sections coordinated and incorporated into the submittal provided.
- .9 Submit materials and documents to the Consultant, and the Owner as necessary for each item. Contractor may submit materials concurrently to the design engineers if such an arrangement is found mutually agreeable before the submission is transmitted. However, copies of submittals made to design engineers shall be provided to the Owner and the Consultant according to the protocol identified within the executed Contract.
- .10 To be accepted by the Consultant, all submittals shall be:

- .1 Stamped or marked through equivalent means by a device testifying that the Contractor had reviewed the submittal;
- .2 Signed by the Contractor's project manager;
- .3 Stamped with a device bearing the date of receipt and review of the submission by the Contractor;
- .4 Identified according to the project and the name of the agency who submitted the item.
- .5 Supplemented or annotated with dimensions and other relevant information required by the installation depicted or described.
- .6 Supplemental materials including colour charts or associated samples are present with the drawings if selection of the items associated with supplemental information is to be part of the review of the submission.
- .11 Submissions that do not have these elements may be returned to the Contractor without examination and, in that case, they shall be considered rejected.
- .12 Any submittal review and distribution process arising from receipt of shop drawings or any other submittal, bearing incorrect, incomplete or insufficient information and that thereby results in a delay or disruption to the Contractor's Construction Schedule or that precipitates a delay associated with fabrication, installation or execution of any other aspect of the work related to or dependent upon a particular inappropriate submittal, shall not constitute justification of a claim for extension of contract duration or a claim for delay beyond the Contractor's control.
- .13 Work affected by submittal shall not proceed until Consultant's or the Owner's review of submittal is complete.
- .14 Submit colour charts or colour samples together with shop drawings for all products that require colour selections. Contractor shall be solely responsible for ensuring that all colour charts or colour samples and other supplementary information is provided to the consultant together with the shop drawing submission. The Contractor shall not have a claim for delay as a result of a delay in the shop drawing review process if submissions made to the Consultant were incomplete or if colour charts or colour samples had not been provided in the first instance.
- .15 Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .16 Contractor shall verify through review of site conditions including measurement in field, all constraints, opportunities, clearances and conformance with Contract Documents for the components and assemblies affecting the installation of the item described by the submission. Ensure that all affected adjacent Work is coordinated with requirements of the item described within the submission.
- .17 Review of submittals of any kind by the Consultant or the Owner is for the sole purpose of ascertaining that the products illustrated meet the general intent of the Contract Documents. The review of any submittal shall not signify that the Consultant or the Owner approve the detail design inherent in the submission, responsibility for which shall remain with the Contractor submitting same. Review of shop drawings by the Consultant or the Owner shall not relieve the Contractor of their responsibility for errors and omissions on the shop drawings nor shall this review diminish their responsibility for meeting all requirements of the shop drawings. The Contractor is responsible for correlating and confirming all dimensions at the site; for information that pertains to fabrication processes or to techniques of construction. The Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant's or the Owner's review of submittals.
- .18 Keep one reviewed copy of each submission on site together with electronic copies.

1.4 PROJECT MANAGEMENT ITEMS

- .1 **Administrative Items:** Submit via electronic transmissions to the office of the Consultant and the Owner:
 - .1 Health and Safety Plan meeting or exceeding requirements of Section 01 35 29 Health and Safety.
 - .2 Minutes of site meetings,

- .3 Project Construction Schedule in accordance with Section 01 32 20 Project Planning and Time Management.
- .4 Applications for payment complete with supporting documents.
- .5 RFI forms,
- .6 Contemplated Change Order pricing and back-up materials related to proposed changes.
- .7 Responses, if any, to Supplemental Information (SI's),
- .8 Notices or other correspondence from sub-trades requiring response from the Owner, Authorities Having Jurisdiction or the Consultant.
- .9 Inspection reports received from Authorities Having Jurisdiction or Field Engineer or testing agency.
- .10 Moisture emission test results on any placed concrete sub-floor or patch within the Place of the Work.
- .11 Field Engineer's compaction testing reports and
- .12 Inspection reports associated with reinforcing steel, structural steel and welded connections.
- .13 Testing and verification reports for HVAC and electrical systems.
- .14 Submission of shop drawings and product data sheets according to the requirements of this Section.
- .15 Samples in accordance with Section 01 45 00 Quality Control and individual technical Sections.
- .16 Submission of a schedule of submittals: samples, mock-ups, product data sheets and shop drawings when such submissions and the review time associated with each will affect the project schedule.
- .17 Manufacturer's Product testing:
 - .1 Field Reports for requirements requested in specification Sections and requested by Consultant.
 - .2 Reports documenting testing and result of the testing or
 - .3 Verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .18 Closeout information at substantial performance of the contract.
- .19 Operation and Maintenance Data for requirements requested in specification Sections and requested by Owner or Consultant.
- .2 **Proposed Alternates:** Submit copies of all product data related to proposed alternate materials and products to the Consultant and the Owner.

1.5 ELECTRONIC DRAWING FILES AVAILABLE FROM CONSULTANT

- .1 Electronic drawing files will be made available to Contractor by Consultant for preparation of Shop Drawings specific to this Project subject to the following conditions:
 - .1 The Contractor and any Sub-Contractor receiving the files will sign a limitation and declaration form that also contains an agreement concerning limitation on use of the electronic documents provided by the Consultant.
 - .2 The following electronic Drawing files will be made available at no cost to Contractor:
 - .1 Floor Plans, Reflected Ceiling Plans, and similar drawing types.
 - .2 Other Drawings may be made available at the sole discretion of the Consultant, provided that Contractor makes a request outlining a specific need that benefits Project.
 - .3 Electronic drawing files will be provided in AutoCAD software using a version of the Consultant's choosing. As necessary, the Contractor shall be responsible to hire an outside service to change documents where formats do not meet their ability to read them.
 - .4 Direct requests for electronic drawing files from *Subcontractors* will not be considered by the Consultant.
 - .5 The Consultant will alter electronic drawing file information not essential to the Work and the Contract when electronic files are shared with the Contractor including, but not limited to, the following:
 - .1 Remove title blocks and logos.
 - .2 Remove Professional Seals.
 - .3 Bind external files and blocks.

- .6 Contractor will coordinate all Sub-Contractor requests for specific electronic drawing files and make requests for specific electronic drawing files at the beginning of the *Work*.
- .7 The Consultant makes no warranty or guaranty that dimensions provided or established from electronic drawing files represent actual site conditions.
- .8 Contractor will remain responsible for establishing and confirming site dimensions and Project conditions, and for providing this information to affected Sub-Contractors, except as limited below.
- .9 In event that there is a discrepancy between electronic drawing files provided to Contractor and documents used during a Bid process (including addenda), Bid Documents and Addenda shall govern.
- .10 In the event that dimensions are not indicated, they shall not be scaled electronically from electronic drawing files. Missing dimensions shall be brought to the attention of Consultant, who will determine dimensions or direct method for determination of missing dimensions.
- .11 The Contractor uses electronic drawing files at their own risk and accepts the following conditions associated with the use of the drawings:
 - .1 Contractor, Sub-Contractor, sub-subcontractor, Supplier, manufacturer, or other third-party agent agrees to indemnify and hold harmless Consultant from any damage, liability or cost arising from the use of electronic drawing files conveyed in file format provided.
 - .2 Consultant will not be held liable of any unauthorized use of modification of electronic drawing files provided.
 - .3 Consultant expressly disclaims any warranty or assurance that electronic drawing files will remain accurate beyond date that files were created.
 - .4 Consultant assumes no responsibility and disclaims any liability to any person or entity for any loss or damages including any special, indirect or consequential damages caused by error or omissions in electronic drawing files and format provided, whether resulting from negligence, accident or any other cause.
- .12 The Consultant reserves the right to withdraw an offer of electronic drawing files where an excessive number of drawings is requested.
- .13 The Consultant reserves the right to reject Shop Drawings prepared from electronic drawing files submitted to them by Contractor that have not been substantially altered from electronic drawing files provided, and that do not exhibit the following characteristics:
 - .1 Shop Drawings shall reflect constructability requirements in general and in detail.
 - .2 Shop Drawings shall be detailed in accordance with requirements listed in technical Specifications Sections, or where no instruction is provided, according to customary standards in the industry associated with the subject work and to enable effective prosecution of the Work.
- .14 The Consultant retains the copyright for electronic drawing files made available to Contractor.
- .15 Use of supplied electronic drawing files for any subsequent project is strictly forbidden without express written consent of the Consultant.

1.6 SHOP DRAWINGS AND PRODUCT DATA

- .1 Required shop drawing and product data sheet submissions are stipulated within technical specification Sections, stipulated within notations made on drawings and within this Section. A requirement for a submission listed within any of these documents obliges the Contractor to make the submission.
- .2 Acting reasonably, the Owner or Consultant may request a product data sheet or a shop drawing for any element or material or assembly that requires particular coordination whether the submission is stipulated or not within the Contract Documents.
- .3 The Contractor shall prepare and distribute to all affected parties, a schedule identifying all shop drawings and product data sheets required together with the timing associated with each.
- .4 Product data sheets or brochures may be submitted rather than detailed, drafted shop drawings when standardized manufacture of product is used. Delete information not applicable to project.

- .5 Submit all shop drawings in electronic, digital PDF file format to the Owner and the Consultant. Submissions shall be in digital format for all submissions and transmitted via electronic mail unless file size dictates that digital files are best recorded on other media and sent via prepaid courier.
- .6 Supplement standard information to provide details applicable to project; delete information not applicable to project.
- .7 Shop drawings will be returned to the Contractor in PDF digital format bearing marks made by the Consultant or his designees.
- .8 Compile shop drawings into digital project manual files as work progresses and drawings are reviewed.
- .9 On shop drawings, indicate:
 - .1 Make and model where applicable to products.
 - .2 Materials and their particular characteristics including finish, colour, dimensions, optional finishes, direction of directional finishes, etc.
 - .3 Methods of fabrication and construction in the field including attachment or anchorage, connections and fastener locations and fastener type.
 - .4 Erection diagrams appropriate for the elements depicted.
 - .5 Explanatory notes, orientation diagrams, assembly diagrams and other information necessary for completion of Work.
 - .6 Indicators and annotations associated with the position, extent and orientation of materials and the position of changes in material or their character and features.
 - .7 Depict changes in profiles and cross-section or composition of products and the relationship of these to the whole product or part.
 - .8 Indicate hardware, connections and connectors, joint treatment and interface with fixed building components such as structure.
 - .9 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.
 - .10 Indicate cross-references to design drawings and specifications.
 - .11 Indicate optional and specified features.
 - .12 That glass and framing system for openings required to function as guards will achieve compliance with Ontario Building Code requirements for guards, complete with structural engineering seal.
- .10 Allow **ten (10)** business days for Consultant's or Owner's review of each submission.
- .11 Adjustments made on shop drawings by Consultant or Owner are not intended to change the Contract Price. If adjustments affect value of Work, state such in writing to Owner and Consultant prior to proceeding with Work.
- .12 Make changes in shop drawings as Consultant or Owner may require, consistent with Contract Documents. When resubmitting, notify reviewer in writing of any revisions other than those requested.
- .13 Accompany submissions with transmittal letter containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .14 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.

- .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Engineering seal as required for systems subject to delegated design. Refer to Section 01 35 73 Delegated Design Procedures.
- .6 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .15 Following Owner's or Consultant's review and return of reviewed materials to the Contractor, the Contractor shall distribute copies of annotated drawings via electronic transmission to relevant parties.
- .16 Consultant's Shop Drawing Review Annotations:
 - .1 If the review results in checking of the "**Reviewed**" box on the shop drawing review stamp, drawings may be returned to the Contractor and fabrication and installation of Work may proceed.
 - .2 If the "**Reviewed as Noted**" box on the shop drawing stamp is checked, drawings may be returned to the Contractor and the drawings shall be modified as required by the notations and fabrication and installation work may proceed while a final, amended version of the shop drawings shall be returned to the reviewer Consultant for the project files.
 - .3 If shop drawings are rejected or the "**Revise and Resubmit**" option on the shop drawing review stamp is checked, noted copy of drawing or submission will be returned to the Contractor and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed. This process may be repeated until a "Reviewed" or "Reviewed as Noted" status is received following the review process.
- .17 Shop drawings shall be submitted for the following items:
 - .1 Architectural:
 - .1 All miscellaneous metal items, brackets, stands and loose steel lintels.
 - .2 Fine carpentry wood trims and associated trim products.
 - .3 Millwork cabinets and the associated hardware, countertops, all shelving built in, all closet shelves and rods.
 - .4 All acoustic insulation products product data sheets.
 - .5 All closures and their hardware (doors and windows).
 - .6 All glass products.
 - .7 Door hardware product data sheets and finish schedules.
 - .8 All metal or PVC trims and transitions associated with flooring or baseboard or ceramic tile.
 - .9 All specialties – washroom accessories, signage, wall protection.
 - .2 Mechanical shop drawings required are listed within mechanical specification sections or stipulated on mechanical drawings.
 - .3 Electrical shop drawings required are listed within electrical specification sections or stipulated on electrical drawings.

1.7 SAMPLES

- .1 Submit for review samples in duplicate to Owner, Consultant or other entity identified as the reviewer, as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to reviewer's business address.
- .3 Notify reviewer 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 reviewer are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to reviewer prior to proceeding with Work.
- .6 Make changes in samples that reviewer may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.
- .8 Provide samples for the following items:
 - .1 finish paint colour (draw down cards),
 - .2 flooring, flooring wall base, flooring transition products,
 - .3 cabinetry finishes - doors and drawer fronts and countertops.

1.8 FIELD REVIEW BY ENGINEERS WHO SEAL SHOP DRAWINGS AND PRODUCT DATA SHEETS:

- .1 Refer to Section 01 35 73 Delegated Design Procedures.
- .2 Engineers who have applied seals to the design of building components depicted on shop drawings and product data sheets shall attend the site during construction to conduct a review of the parts of the work in progress depicted on the sealed shop drawings and sealed product data sheets. Following visits made to the construction site, the design engineers shall produce written reports which shall be submitted to the Consultant. The engineers attended the site to review the installation of the materials, assemblies, products or systems shall conduct a sufficient number of review visits so as to provide field review services for the building components within their design responsibility commensurate with the professional field review responsibilities undertaken by the associated mechanical, electrical or structural engineer of record's field review and reporting of the project as a whole within the design discipline appropriate to the items illustrated on the shop drawings or product data sheets.
- .3 Engineers who provide seals on shop drawings for mechanical, electrical or structural items that rely upon the quality or efficacy of the installation in the field to function as intended by the design shall inspect the installation in progress and upon completion during the installation of the products and the engineers shall provide written reports documenting findings following the field review visit.
- .4 Materials, systems and products depicted on shop drawings and product data sheets that rely upon characteristics and features of adjoining or related products and assemblies in the field that are not part of the design depicted on shop drawings or product data sheets shall be reviewed by the designer of the system depicted on the shop drawings or product data sheets to the extent necessary to ensure the efficacy of the parts of the work under their design responsibility and any concerns related to these other components shall be documented in the field review reports.

1.9 TESTING AND FIELD ENGINEERING REPORTS

- .1 Submit copies of all testing and field engineering reports to consultant and Owner concurrently.
- .2 Include copies of all reports within project close out architectural manual.
- .3 Field Engineering Reports are required for the following:
 - .1 Test results of moisture emission tests for concrete surfaces prior to application of flooring.
 - .2 Disinfection testing reports for interior domestic water plumbing system.
 - .3 Review of changes to sprinkler system; installation and operation.

- .4 Testing and verification of fire alarm system.
- .5 Testing and sampling of interior air quality prior to occupancy.
- .6 Test reports and certificates associated with changes to Medical Gas system.

1.10 RECORDS AND RECORD DRAWINGS

- .1 Maintain a complete, accurate log of control and survey work as construction progresses.
- .2 On or about the substantial performance date of the contract, and when major site improvements are complete, prepare a drawing showing dimensions, locations, angles and elevations of Work.
- .3 Record locations of maintained, re-routed and abandoned service lines.
- .4 Record all adjustments made to all drawings included in the Contract on as-built drawings as the work progresses complete with dimensions for concealed elements.

1.11 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit to Payment Certifier electronic digital photography in jpg format, standard resolution, monthly with progress statement and application for payment.
- .2 Mark on photographs project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: minimum of 12 locations distributed inside and exterior to the building.
 - .1 Viewpoints and their location determined by Payment Certifier and Owner.
- .4 Frequency of photographic documentation: during each Phase of the Work on 4 occasions and as follows:
 - .1 Prior to concealment of completed electrical and mechanical and medical gas rough-in.

1.12 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit Certificate of Insurance immediately after award of Contract.
- .3 Submit warranty Certificates applicable for each technical specification section requiring a warranty for a product or an assembly.
- .4 Submit Verification reports for medical gas, fire alarm, sprinkler system, electrical system inspection, battery powered emergency lighting, inspection reports by TSSA.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All Sections
- .2 Owner's specific requirements including execution of forms associated with Contractors.

1.2 REFERENCES

- .1 Refer to most recent published legislation regarding construction safety and safety associated with handling materials
- .2 Canada Labour Code, Canada Occupational Safety and Health Regulations
- .3 Province of Ontario O. Reg. 213/91 – Construction Projects, under the Occupational Health and Safety Act, R.S.O. 1990, c. O.1
- .4 Refer to all current legislation regarding COVID 19 measures and comply continuously throughout the execution of the Work.
- .5 Refer to Owner's requirements associated with COVID 19 and execute forms and attestations according to Owner's policy. Submit to COVID testing when requested to do so by the Owner.

1.3 GENERAL

- .1 Construction safety is responsibility of the Contractor and no other entity. Contractor shall continuously and vigilantly adhere to all construction safety measures and applicable legislation in the Province of Ontario and the Government of Canada.
- .2 Contractor shall assign responsibility for Health and Safety to personnel in accordance with applicable legislation.
- .3 Contractor shall declare its understanding and commitment to adhere to the requirements of the Owner's Health and Safety Policy in a format acceptable to the Owner.
- .4 Contractor shall comply with Owner's health and safety policy whenever the Contractor or the Contractor's Sub-Contractor's forces are within the Occupied areas of the facility.

1.4 SAFETY ASSESSMENT

- .1 Perform site specific safety hazard assessment related to project.
- .2 Prepare site specific health and safety plan.

1.5 CONTRACTOR'S SITE-SPECIFIC HEALTH AND SAFETY PLAN

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Submit plan for review by Owner.
- .3 Owner may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.6 SUBMITTALS

- .1 Receive and review Owner's Health and Safety documents. Submit to the Owner executed document attesting to the Contractor's understanding of the Owner's Health and Safety Policy and the Contractor's promise to adhere to all of the Owner's Health and Safety Procedures while the Contractor is outside of the work area controlled by the Contractor. Contractor shall require Sub-Consultants to provide same.
- .2 Submit site-specific Health and Safety Plan: Within 10 business days next following date of Notice to Proceed or execution of the Contract, whichever first occurs and prior to commencement of Work. Health and Safety Plan must include:

- .1 Results of site-specific safety hazard assessment.
- .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3 Submit 2 printed copies together with digital copy of Contractor's authorized representative's work site health and safety inspection reports to Owner monthly.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets for all materials.
- .7 Submit requests for Hot Work Permit and associated fire watch description.

1.7 OWNER'S REVIEW OF CONTRACTOR'S HEALTH AND SAFETY PLAN:

- .1 Owner will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 10 business days next following receipt of plan.
- .2 Contractor shall revise plan as appropriate and resubmit plan to Owner within 5 business days next following receipt of comments from Owner.
- .3 Owner's review of Contractor's final Health and Safety plan shall not be construed as approval and does not diminish the Contractor's responsibility for construction Health and Safety.

1.8 ON-SITE CONTINGENCY AND EMERGENCY RESPONSE PLAN:

- .1 Meet with Owner to discover standard operating procedures that must be implemented during emergency situations including injury, fire or natural disaster.
- .2 Make mutually agreeable and site-specific alterations to standard emergency procedures and describe all emergency procedures for the work site in writing.
- .3 Post emergency procedures conspicuously for all workers on site and describe same during all safety meetings.

1.9 FILING OF NOTICE – MOL:

- .1 File Notice of Project with Ministry of Labour prior to beginning of Work.
- .2 Contractor shall be responsible and assume the Principal Contractor role (constructor). Contractor shall provide a written acknowledgement of this responsibility within 10 business days of execution of the Contract.

1.10 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Owner prior to commencement of Work.
- .2 Maintain regular schedule of health and safety meetings for the Work throughout the course of the work.

1.11 REGULATORY REQUIREMENTS

- .1 Perform Work in accordance with Contract Documents and Section 01 41 00 - Regulatory Requirements.

1.12 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Contractor will be responsible and assume the role Constructor as described in the Ontario Occupational Health and Safety Act and Regulations for Construction Projects.

- .3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.13 COMPLIANCE REQUIREMENTS

- .1 Comply with Ontario Occupational Health and Safety Act, latest edition.

1.14 UNFORSEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of province of Ontario and advise Owner verbally and in writing of decisions taken or actions planned.

1.15 HEALTH AND SAFETY COORDINATOR

- .1 Employ and assign to the Place of the Work, a competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must:
 - .1 Have working experience specific to activities associated with construction.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel who have not successfully completed the required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing and monitoring on a daily basis the Contractor's site-specific Health and Safety Plan.
 - .5 Be present at the site during execution of Work and report directly to site supervisor.
 - .6 The health and safety coordinator may also be the supervisor.

1.16 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of province of Ontario, and in consultation with Owner.
- .2 Post Hot Work permits issued by Owner and all associated requirements.

1.17 CORRECTION OF NON-COMPLIANCE

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

1.18 BLASTING

- .1 Blasting or other use of explosives is not permitted.

1.19 POWDER ACTUATED DEVICES

- .1 Use powder actuated devices after receipt of written permission from Owner, only.

1.20 HOT WORK PERMITS:

- .1 Submit to Owner request for authorization to conduct welding and other hot work at this Place of the Work.
- .2 Obtain Owner's written consent for the Hot Work and do not proceed with Hot Work until consent is obtained.
- .3 Provide fire watch at Contractor's expense associated with all Hot Work authorized.

1.21 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.

END OF SECTION

Part 1 General

1.1 FIRE DEPARTMENT BRIEFING

- .1 Contractor shall arrange a Contractor's briefing attended by all persons providing construction services at the Place of the Work to communicate Fire Safety measures applicable at the Place of the Work prior to commencing construction and at appropriate stages as the work progresses.
- .2 Contractor shall invite the attendance of Fire Chief or Fire Prevention Officer, as directed by Municipal fire department to each briefing session convened.

1.2 REPORTING FIRES

- .1 Know location of nearest fire alarm box and telephone, including emergency telephone number.
- .2 Report immediately fire incidents to Fire Department as follows:
 - .1 Activate nearest fire alarm box; or
 - .2 Telephone
- .3 When reporting fire by telephone, give location of fire, name or number of building and be prepared to verify location.

1.3 INTERIOR AND EXTERIOR FIRE PROTECTION AND ALARM SYSTEMS

- .1 When complete and activated, fire detection and alarm system will not be:
 - .1 Obstructed;
 - .2 Shut-off; and
 - .3 Left inactive at end of working day or shift without authorization from Fire Chief.
- .2 Fire hydrants shall not be:
 - .1 Obstructed.
 - .2 Disconnected or otherwise impaired unless approved by Municipality.
 - .3 Damaged during the course of the work.

1.4 FIRE EXTINGUISHERS

- .1 Supply 4-10 lb ABC fire extinguishers distributed throughout the Place of the Work.

1.5 BLOCKAGE OF ROADWAYS

- .1 Advise Fire Chief of work that would impede fire apparatus response. This includes violation of minimum overhead clearance, as prescribed by Fire Chief, erecting of barricades and digging of trenches.

1.6 SMOKING PRECAUTIONS

- .1 Observe smoking regulations – smoking prohibited on project site.

1.7 RUBBISH AND WASTE MATERIALS

- .1 Keep rubbish and waste materials at minimum quantities.
- .2 Burning of rubbish is prohibited.
- .3 Removal:
 - .1 Remove rubbish from work site at end of work day or shift or as directed.
- .4 Storage:
 - .1 Store oily waste in approved receptacles to ensure maximum cleanliness and safety.
 - .2 Deposit greasy or oily rags and materials subject to spontaneous combustion in approved receptacles and remove specified.

1.8 FLAMMABLE AND COMBUSTIBLE LIQUIDS

- .1 Handling, storage and use of flammable and combustible liquids shall be as regulated by current Ontario Fire Code and in accordance with product manufacturer's instructions.
- .2 Keep flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing Underwriters' Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires permission of Fire Chief.
- .3 Transfer of flammable and combustible liquids is prohibited within buildings or jetties.
- .4 Transfer of flammable and combustible liquids will not be carried out in vicinity of open flames or any type of heat-producing devices.
- .5 Do not use flammable liquids having flash point below 38 degrees C such as naphtha or gasoline as solvents or cleaning agents.
- .6 Store flammable and combustible waste liquids, for disposal, in approved containers located in safe ventilated area. Keep quantities minimum and Fire Department is to be notified when disposal is required.

1.9 HAZARDOUS SUBSTANCES

- .1 Work entailing use of toxic or hazardous or materials that may emit volatile, flammable gases or that may cause flash-over, involves the use of hazardous or volatile chemicals and explosives or materials that constitute a hazard to life, safety or health, shall be handled in accordance with the Ontario Fire Code and manufacturer's instructions.
- .2 Work involving dangerous or hazardous processes or materials describe above including the use of heat or welding requires that the Contractor provide fire watchers equipped with sufficient fire extinguishers the number of which shall be calculated to be in proportion to the volatility of the substances in use. The duration of such fire watch is established by the Owner and communicated within the Owner's policies.
- .3 Determination of dangerous or hazardous areas along with level of protection necessary for Fire Watch is at discretion of Owner and Contractor shall adhere to Owner's policy with respect to same.
- .4 Contractor shall have representative(s) present at all times during such operations and for 2 hours following welding operations. Contractor is responsible for providing fire watch service for work on scale established and in conjunction with protocols discussed during pre-work conference with Fire Prevention Officer.
- .5 Provide ventilation where flammable liquids, such as lacquers or urethanes are used, eliminate sources of ignition and Contractor shall ensure appropriate ventilation. Inform Fire Prevention Officer prior to and at cessation of such work.

1.10 QUESTIONS AND/OR CLARIFICATION

- .1 Direct questions or clarification on Fire Safety in addition to above requirements to Fire Chief.

1.11 FIRE INSPECTION

- .1 Coordinate site inspections by Fire Prevention Officer through Owner.
- .2 Allow Fire Prevention Officer unrestricted access to work site.
- .3 Cooperate with Fire Prevention Officer during routine fire safety inspection of work site.
- .4 Immediately remedy unsafe fire situations observed by Fire Prevention Officer.

END OF SECTION

Part 1 General

1.1 REQUIREMENTS OF THIS SECTION:

- .1 This Section delegates the responsibility for design to various Sections and the sub-contracted parts of the Work together with the responsibility to conduct review of the installation of the materials, products and assemblies associated with the design responsibility conferred.
- .2 The design and field review responsibility delegated shall be conducted in general conformity to the responsibilities and best practices outlined for engineering services provided to the public as they are published by the Professional Engineers Ontario (PEO) as they related to the duties of specialty professionals appointed during the construction period.
- .3 Design responsibility is delegated to an engineer by the affixing of the engineer's professional seal to any document associated with the Project. However, design responsibility may be delegated to a professional or other qualified person for specific elements noted in this Section.
- .4 The Contractor shall ensure that all engineers who have affixed a seal to any design prepared for the Project by any Section, Sub-Contractor or the Contractor, also conduct review at the Place of the Work of the subject parts of the Work during its installation or execution.
- .5 This Section requires the Contractor to ensure that the following conditions apply:
 - .1 All professionals accepting design responsibility ensure compliance of the products, assemblies and the completed installation with all governing legislation including the Ontario Building Code and
 - .2 That the building components, connections and components to which the designed elements are connected conform to all relevant legislative, practical and technical standards and performance requirements implied or present in the design and
 - .3 That the installation observed on site is also in conformance to the design standards and applicable legislation and
 - .4 That the design engineer certifies that the installation will perform as intended by the design.
- .6 This Section requires the Contractor to perform the following duties:
 - .1 Ensure that professional design responsibility is properly delegated to and conferred upon appropriate and qualified persons by the appropriate Sub-Contractor, and where there is no appropriate Sub-Contractor, the Contractor, whenever in the Contract Documents it is stipulated that shop drawings, product data sheets, reports and certificates must bear an engineering seal.
 - .2 Ensure that each person to whom responsibility for design is delegated also conducts inspections of the work during its installation at appropriate times at the Place of the Work and that the obligations associated with reporting conferred on the designer, are fulfilled.
 - .3 Facilitate and ensure the effective execution of administrative tasks associated with the submittals of shop drawings and product data sheets, certificates and other declarations and
 - .4 Ensure that the review of the subject work during its installation at the Place of the Work is conducted by those to whom design responsibility is delegated.
 - .5 Ensure that the reporting submissions associated with the installation are completed in accordance with the Contract Documents by those to whom design responsibility is delegated.
- .7 The requirements of this Section do not diminish the authority of the Consultant established by the executed Contract.

1.2 RELATED REQUIREMENTS

- .1 All Sections.

1.3 DEFINITIONS

- .1 Delegated Design Professional Engineer: The professional engineer hired or contracted by the Subcontractor or fabricator or manufacturer to design specialty elements, produce delegated design Submittals and Shop

Drawings to meet the requirements of the Project; who has experience in the design of specified specialty components, who is registered in the province of the Work; and who is not the Consultant.

- .2 Letters of Commitment and Letter of General Conformance: Documents prepared by the Delegated Design Professional Engineer as recommended by PEO's Guidelines Professional Engineers Providing Professional Services in Building Projects using Manufacturer Designed Systems and Components and Professional Engineers Providing General Review of Construction as required by the Governing Building Code.

1.4 REFERENCE STANDARDS

- .1 Professional Engineers Ontario (PEO): PEO Guideline: Professional Engineers Providing Professional Services in Building Projects using Manufacturer Designed Systems and Components (September 1999)
- .2 PEO Guideline: Professional Engineers Providing General Review of Construction as Required by the Governing Building Code (April 2008, Revised November 2008).
- .3 Ontario Building Code, current version.

1.5 SUBMITTALS

- .1 Make Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Informational Submittals: Provide the following submittals during the course of the *Work*:
 - .1 Letter of Commitment: Submit a signed and sealed Letter of Commitment on company letterhead addressed to the Consultant prior to starting portions of the *Work* requiring delegated design.

1.6 CLOSEOUT SUBMITTALS

- .1 Make Closeout *Submittals* in accordance with Section 01 78 00.
- .2 Provide Letter of General Conformance: Submit a signed and sealed Letter of General Conformance on company letterhead addressed to Consultant and Construction Manager following on completion of portions of the *Work* requiring delegated design.

Part 2 Products

2.1 DELEGATED DESIGN

- .1 Performance and Design Criteria: Provide *Product* and systems complying with performance and design criteria specified where professional design services or certifications by a Delegated Design Professional Engineer are specifically required of Sub-Contractor by Contract Documents and these are listed below.
- .2 Submit a notice in writing to the Consultant requesting additional information if criteria included in Contract Documents is not sufficient to perform services or certification required.
- .3 Delegated design is assigned to sub-contractors engaged by the Contractor for the following elements and an engineer's seal is not required on designs; however, Certificates must be executed by appropriately trained and designated persons:
 - .1 Door and building security and electronic hardware and door controls including magnetic locks.
 - .2 Fire suppression sprinkler system work if any aspect of the system must be amended.
 - .3 Fire alarm system adjustments including those adjustments required to connect new door controls and magnetic locks integrated into the fire alarm system. The completed system incorporating new and renovation work must be verified by a qualified person.
 - .4 Design of all electrical elements including circuiting required to perform the electrical work which is part of the Contract or implied by the Work of the Contract. This may be performed by a licensed electrician,
- .4 Delegated design will be required for elements designed by a specialty professional, which may include:
 - .1 Elements normally fabricated off-site.
 - .2 Elements that require specialized fabrication equipment or a proprietary fabrication process not usually available at job site. Examples include, but are not limited to prefabricated concrete elements, structural

steel elements, structural guards or balustrades, glazed aluminum curtain wall systems, noise and vibration isolation devices, elevators, etc.

- .3 Elements requiring engineering, not normally a part of scope of services performed by architectural, structural, mechanical, electrical disciplines of the Consultant. Examples include, but are not limited to, structural steel connection design, design of pre-cast concrete elements, detailed design of fire suppression sprinkler systems, medical gas elements and parts of the fire detection and alarm systems.

Part 3 Execution

3.1 IMPLEMENTATION OF DELEGATED DESIGN BY ENGINEERS:

- .1 Provide the required Letter of Commitment from designers of systems for which design responsibility is delegated.
- .2 Provide shop drawings sealed by a professional engineer for the following elements which are delegated design items:
 - .1 Medical Gas work including zone valves, piping, devices and installation and certification of installed components to meet or exceed requirements of Authority Having Jurisdiction.

3.2 DELEGATED DESIGN BY SUB-CONTRACTORS:

- .1 Building security system amendments, electronic locks and hardware selection, design, supervision and installation shall be completed by JPW who is the designated vendor for these systems. All Contractors shall employ JPW to provide these elements.
- .2 Fire Alarm System amendments required to integrate new door hardware, devices, horns, magnetic locks and other elements connected to the fire alarm system and the verification of the fire alarm system when Work is completed.
- .3 Electrical Devices and electrical work shall be undertaken by qualified electrical sub-contractors engaged by the Contractor who will provide all necessary design and Electrical Safety Authority submissions. The electrical sub-contractor shall provide necessary engineering design including drawings bearing engineering seal of a professional engineer or letters bearing seals of professional engineers attesting to propriety of installed systems and their compliance with applicable codes and standards.

Shoring to support demolished concrete, steel and masonry structures.

END OF SECTION

Part 1 General

1.1 REFERENCES AND CODES

- .1 Perform Work in accordance with Ontario Building Code (OBC) including amendments in force as of tender closing date.
- .2 Perform work in accordance with Standards and Codes referenced within the OBC, noted on the drawings or listed in Specification Sections.
- .3 Perform work in accordance with all applicable Provincial or Municipal regulations including, but not limited to Planning and Engineering Departments at the Municipality of the Place of the Work, TSSA, Ministry of Labour, Electrical Safety Authority.
- .4 Contractor shall make all applications, provide all notices and pay application fees associated with Ministry of Labour and plumbing, electrical, communications (telephone service provider) and natural gas work and demonstrate all required training associated with these agencies.
- .5 For named reference standards listed in Section, the current or most recent reference standard for the named standard shall be deemed to be referenced, regardless of the date or designation number used within the Project Manual.
- .6 In the case of conflict or discrepancy between standards, regulations and the specifications or drawings, the more stringent requirements apply.
- .7 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.

1.2 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions and municipal by-laws. Smoking is prohibited on the construction site.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All sections.

1.2 SECTION INCLUDES

- .1 Inspection and testing, administrative and enforcement requirements:
 - .1 All items subject to delegated design in Section 01 35 73.
 - .2 Fire suppression systems.
 - .3 Design of elements illustrated and described on shop drawings bearing an engineer's seal.
 - .4 Installation and testing and verification of building systems and fire alarm.
 - .5 Building security devices including CCTV, magnetic locks, electronic hardware and door hardware.
 - .6 Field Engineer.
- .2 Tests and mix designs.
- .3 Mock-ups.
- .4 Samples.
- .5 Equipment and system adjustments and balancing.

1.3 PROJECT MANUAL

- .1 Coordinate the requirements of Divisions 00 and 01 as they apply to this section.

1.4 INSPECTION AND TESTING INCLUDED WITH CONTRACT PRICE:

- .1 Verification of fire alarm and
- .2 testing of emergency lighting and battery operation time.
- .3 Conductivity testing of all data and communication conductors installed.
- .4 HVAC equipment and system testing, adjustments and balancing.
- .5 Electrical system testing required by Electrical Safety Authority.
- .6 Testing conducted by agencies commissioned by manufacturers:
 - .1 Testing undertaken routinely during manufacturing to demonstrate compliance with various standards established by independent testing agencies such as ASTM, CGSB, CSA, ULC, UL, etc. Such items will include, but are not limited to, the following which are generally selected from manufacturer's catalogues and advertised inventory:
 - .1 Fabricated or formed steel elements that are not supporting building structure, including cold formed steel elements, formed or fabricated channels, angles, tubular sections bearing evidence of compliance with specified standards.
 - .2 Various fasteners: screws, nails, bolts, washers and nuts.
 - .3 Welding supplies and accessories.
 - .4 Sawn lumber bearing grading marks and wood panel products bearing evidence of compliance with specified standards.
 - .5 Adhesives and joint sealants unless specifically named.
 - .6 Specialized membranes such as air retarder sheets, sheet plastics and membranes of a variety of types bearing evidence of compliance with specified standards.
 - .7 Windows, doors and their frames and glass.
 - .8 Finishes including ceramic floor and wall tiles, floor covering products and flooring base.
 - .9 Paints and coatings that are selected from suppliers' catalogues.

- .10 Washroom accessories.
- .11 Paints and other coatings,
- .12 Plumbing fixtures, faucets, piping and accessories.
- .13 Plastic and metal piping and adhesives and joint solder.
- .14 Electrical device, light fixture or switch and device boxes.
- .15 Electrical conductors and raceways (conduits).
- .2 The Cost of such testing shall be paid by manufacturers and they shall include mill tests and testing conducted following manufacture. Test reports associated with such tests shall be provided to the Consultant upon request.

1.5 GENERAL REQUIREMENTS FOR TESTING OCCURING AT THE PLACE OF THE WORK:

- .1 The contractor is solely responsible for the quality of the work and its efficacious prosecution.
- .2 The testing agency may be the Consultant or his designees, the Field Engineer or a separate agency engaged for testing.
- .3 Any fabricated component or group of components or assembly may be tested in the field by a testing agency engaged specifically for this Contract.
- .4 The cost of field testing or laboratory testing of samples taken in the field shall be paid out of cash allowance amounts assigned for the Contract.
- .5 Samples collected at the place of the work may be tested off site in laboratories through the agencies assigned to test the work in the field.
- .6 Provide safe access and working areas for consultant and his designees, the field engineer and testing agencies on site and to all locations which require testing or that may reasonably be requested by these parties. The Consultant or his designees, the field engineer or the testing agency shall determine number, location and nature of each required test unless otherwise specified.
- .7 Submit test reports describing results of field or laboratory tests to Consultant within 2 weeks of completion of inspection. Should field conditions found by the testing agency cause the requirement for review, design work or commentary by design engineer, the Contractor shall report this requirement immediately.
- .8 This section does not contain a complete list of review requirements and the Consultant reserves the right to review all aspects of the work at any time.
- .9 Defects found during any review of the work shall be remedied in accordance with the Contract documents regardless of when they are found or previous review visits by the Consultant or his designees.
- .10 Testing undertaken routinely during manufacturing of standard structural components, paints and coatings that are typically selected from suppliers' catalogues and inventories, including, but not limited to, bolts, washers, nuts, fabricated or formed steel beams, columns, channels, angles, tubular sections and plates, welding supplies, paints and other coatings shall not be tested by a testing agency engaged under this Contract, but shall be paid by manufacturers. Such tests include all tests associated with compliance to CSA, ASTM, mill tests and any institution, association or agency responsible for establishing the standard for manufacturing, material performance or material quality and material properties. Test reports associated with such tests shall be provided to the Consultant upon request.
- .11 The cost of field testing or laboratory testing not specified as a part of the scope of work for this section shall be paid out of cash allowance amounts assigned for the Contract.
- .12 Inspection and testing of materials, assemblies and workmanship undertaken at the place of the work will be carried out by testing agency designated by the Consultant.

- .13 Samples of materials collected at the Place of the Work for special testing may be tested off site in laboratories through the agencies assigned to test the work in the field.
- .14 Submit test reports describing results of field or laboratory tests to the Consultant within 2 weeks of completion of inspection. Should field conditions found by the testing agency cause the requirement for review, design work or commentary by design engineer, the Contractor shall report this requirement immediately.
- .15 Contractor shall ensure that design engineer responsible for the following elements attends the site at appropriate intervals and provides a declaration at the completion of the work associated with the element that it has been supplied and installed as intended by the design and that it will function as intended:
 - .1 Fire suppression system (sprinkler system) and the connection to the fire alarm system.
 - .2 Disinfection of domestic water system interior to the building.
 - .3 Inspection of piping and drains by camera as stipulated by applicable legislation or engineering design.

1.6 INSPECTION AND FIELD REVIEW BY CONSULTANT AND OWNER

- .1 Allow Owner and Consultant and their designees 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 Contractor is solely responsible to give timely notice of the imminent required inspection, review or test for any Work that is designated for special tests, inspections or approvals by Authorities Having Jurisdiction, Owner, Consultant or Field Engineer.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before it is covered, the Contractor shall uncover such Work, have inspections or tests satisfactorily completed and make good such Work following the inspection or review and completion of any remedial work required.
- .4 Owner or Consultant will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.
- .5 Consultant and Owner shall, from time to time, designate specific testing and review agencies to act on its behalf. Field engineering, testing consultants, and manufacturer's technical representatives shall be afforded the same status as defined within the Contract as is provided to the Consultant.
- .6 The Consultant shall review representative samples of the work in accordance with the standards established by the Ontario Association of Architects. Such sample areas shall become the standard by which the balance of the work is evaluated. The review of the Work by the Consultant does not relieve the Contractor from his responsibility for the entire Project.
- .7 The Consultant's designees or any mandatory agency shall conduct their respective inspections and testing in accordance with their own standard considered acceptable within the construction industry or in accordance with legislation.
- .8 Legislated review, testing or inspection and the orders arising from these actions shall take precedence over any other review unless requirements of the Contract exceed requirements of the legislation.
- .9 The Owner and Consultant shall receive copies of all reports issued by any designee or mandatory reviewing agency.
- .10 Inspection agency review and certification that is mandatory for the various parts of the work shall be undertaken as required by the progress of the work and the arrangement of the required review and establishment of the state of the work required to facilitate the review is the Contractor's sole responsibility.

- .11 Mandatory inspection agencies include, but are not limited to, the following:
 - .1 Infection Control Measures inspected by the Owner.
 - .2 Electrical Safety Authority.
 - .3 Ministry of Labour.
 - .4 TSSA.
 - .5 Municipal Building Department and Fire Prevention Officer.
 - .6 Fire alarm certification agency.
 - .7 Natural Gas amendments inspected by TSSA.
 - .8 Telephone, Internet and Cable Television Utility (data and communications main service) inspected by experts engaged by the Contractor.
 - .9 Medical Gas system inspector engaged by the Contractor.
- .12 Contractor is solely responsible to give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by law of Place of Work including Chief Building Official in the Municipality where the work occurs.
- .13 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before these are conducted, uncover designated Work; facilitate inspections or tests expeditiously and do not restore Work until owner or Consultant provides notice that the Work may be covered. Work associated with uncovering, selective demolition or disassembly and the subsequent restoration of the Work shall be undertaken entirely at the Contractor's expense.
- .14 Work designated for special testing and inspection by the Consultant and shall include, but will not be limited to, the following elements:
 - .1 Infection Control Measures.
- .15 Owner or Consultant may order any part of Work to be examined at any time if there is reason to believe that the work may not be executed in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement as a Change Directive or Change Order.
- .16 Contractor shall ensure that inspections and testing associated with all sub-contracted work occurs. This includes all independent or consultant review throughout the work.
- .17 Contractor shall consult with Chief Building Official and obtain explicit instruction regarding the Municipality's review and inspection process including any requirement to leave specific parts of the work exposed to view in order to facilitate this review,
- .18 All review undertaken by the Owner or Consultant shall, unless previously and mutually agreed, occur during site meetings.
- .19 Review undertaken by Owner's or Consultant's designee (Field Engineer, manufacturer's technical representatives, testing and balancing agent, moisture emission testing for concrete) may occur at the convenience of the Contractor through his arrangement directly with these designees.
- .20 Sub-trades shall ensure that electrical inspections are undertaken by appropriate authorities having jurisdiction prior to covering the work in question.

1.7 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection and Testing Agencies will be engaged by Owner for purpose of inspecting and testing portions of Work. Cost of such services will be borne by Owner.
- .2 Contractor bears responsibility to notify all testing and inspection agents to suit the construction schedule and in such a way as to not delay the progress of the work. Contractor shall bear cost of removal of material or uncovering work requiring a test or inspection if appropriate notification is not given.

- .3 Provide equipment required for executing inspection and testing by appointed agencies including ladders, lifts, scaffolds and access to the site. Provide equipment for executing testing limited to typical construction tools.
- .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 Owner or Consultant at no cost to project or Owner or Consultant. Contractor shall pay costs for retesting and inspection.
- .6 The Contractor shall notify the consultant of the commencement and completion of work associated with all of the above elements and he shall not cover or conceal such work without the approval of the consultant.
- .7 The Consultant shall review representative samples of the work in accordance with the standards established by the Ontario Association of Architects. Such sample areas shall become the standard by which the balance of the work is evaluated. The Consultant's review of representative samples of the work does not reduce the Contractor's responsibility for the whole of the Work and its quality.

1.8 LAYOUT CONTROL:

- .1 Conduct location and layout work using laser equipment, tape measures and similar means and mark critical locations using chalk lines, string lines and other means. Establish a bench mark associated with height using existing permanent features and establish accurately the intended position all new construction associated with building, services and finished ceiling heights. Clearly mark all services in the Place of the Work including overhead services. Establish route for building services (water, sanitary sewer, natural gas, medical gas communications and electricity) and mark same where these intersect with existing walls affected by the Work. Convey locations of all items located to all Sub-Contractors and personnel on site. Report discrepancies between site conditions and drawings to the Owner and the Consultant.

1.9 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.

1.10 PROCEDURES

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

1.11 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 Owner or 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 Owner, it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value

between Work performed and that called for by Contract Documents, amount of which will be determined by Consultant.

1.12 REPORTS

- .1 Submit digital copies of inspection and test reports to Owner and Consultant.
- .2 Provide copies to subcontractor of work being inspected or tested and manufacturer or fabricator of material being inspected or tested.

1.13 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Consultant and may be authorized as recoverable.
- .3 In the case of test results that do not meet installation requirements for products or work associated with the element being tested, do not install such elements. Re-test following remedial measures or suitable passage of time. Repeat remedial work or

1.14 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations specified as representative samples of the work.
- .3 Prepare mock-ups for Owner and Consultant's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Remove mock-up at conclusion of Work or when it is found acceptable to Owner unless Consultant determines that it may remain as part of the work.
- .6 Specification section may also identify whether mock-up may remain as part of Work or if it is to be removed and when.

1.15 MILL TESTS

- .1 Submit mill test certificates when required of technical sections.

1.16 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical and other building systems.
- .2 Submit reports associated with testing of electrical systems.
- .3 Submit verification reports for fire alarm system.
- .4 Submit testing and verification reports prepared by sprinkler system installer.
- .5 Submit potable water disinfection and test results.
- .6 Provide project close-out materials.

Part 2 Products - NOT USED

Part 3 Execution - NOT USED

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All Sections

1.2 PERMANENT HEATING EQUIPMENT

- .1 Permanent heating equipment shall not be used by the Contractor to provide heating for construction purposes.
- .2 Any use of permanent equipment for construction heating is done at the risk of the Contractor, including voiding of warranties resulting from such use.

1.3 INSTALLATION AND REMOVAL

- .1 Provide temporary heating, if necessary, temporary ventilation suited to Infection Control Measures and temporary water supply as necessary at the Place of the Work together with their controls, ducts, hoses and power supply in order to execute work expeditiously.
- .2 The Contractor shall provide and pay all cost associated with all means and equipment and supplies necessary to deliver the utilities (water, natural gas, electricity and communications utility) at the Place of the Work including, but not limited to the following:
 - .1 Piping, hoses and ducts intended for potable water and Infection Control ventilation system.
 - .2 Backflow preventers installed as temporary measures in water supply pipe.
 - .3 Temporary conductors and construction power service complete with Authority approval, devices, etc.
- .3 Remove from site all such work after use.

1.4 WATER SUPPLY

- .1 Contractor will provide potable water for construction use connected to the building's system. Contractor shall provide all labour and materials, hoses and temporary valves for the connection to water source and provide temporary backflow preventers on temporary piping and hoses. Remove valve and reinstate altered piping to Owner's requirements upon completion of Work or establishment of permanent water supply at the Place of the Work.
- .2 Provide clean fittings, piping and hoses to transport water to Place of the Work for use until new water service is connected inside renovated premises. All hoses and fittings shall be suitable for potable water use within new building.
- .3 Remove hoses, fittings, etc. and restore materials or elements damaged by use of temporary hoses and fittings to Owner's specification following establishment of permanent water supply and completion of Work.
- .4 A janitorial sink connection may be used as source of potable water, when one is available within the Place of the Work under construction during a Phase. Provide temporary tub or basin for use during construction if janitorial sink is not available within the Place of the Work during a Phase.
- .5 Lavatories and water closets within Owner's washrooms shall not be used by Contractor during the course of the work unless Owner provides explicit consent in writing.
- .6 All washroom, janitorial area, fixtures and finishes shall be cleaned thoroughly as part of final cleaning regardless of use of these facilities by Contractor.
- .7 The Owner shall pay cost of the metered water supply and no other cost associated with water use during construction.

1.5 TEMPORARY HEATING AND VENTILATION

- .1 Provide temporary heating required during construction period, including attendance, maintenance and electrical power routed from building's service.

- .2 Include in Contract Price, cost to supply and connect construction heaters and cost to remove temporary heaters at completion of the Work.
- .3 Sources of heat required for construction purposes using liquid or gaseous fuel shall not be used.
- .4 Appliances used as source of heat required for construction purposes powered by electricity may be located within the building envelope.
- .5 Construction heaters used inside building must be electric resistance heaters equipped with fans.
- .6 Contractor shall provide ventilation fans equipped with HEPA filters and ducted in accordance with requirements of Infection Control Measures Section 01 15 00. Ducts shall be routed to exterior together with means to permit ingress to the Place of the Work of fresh air. Ventilation system must move a sufficient quantity of air to prevent condensate from forming on any surface.
- .7 Contractor shall provide suitable fans as part of the temporary ventilation work, if necessary, to ensure air movement throughout the Work and in particular, on faces of window glass positioned in exterior walls.
- .8 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Protect Work and products from the effects of humidity and low temperature or freezing.
 - .3 Prevent occurrence of condensation on surfaces.
 - .4 Establish the specified efficacious temperature and humidity values for storage, acclimatisation and installation or application and curing of materials, all as prescribed within manufacturer's instructions for the various materials of the Work. Temperature and humidity tolerances of various materials vary. Contractor shall review product data and shop drawings for such tolerances and verify that job site environment is appropriate for each case.
 - .5 Contractor shall provide thermometer and humidistat within the work place to permit monitoring of work place environment.
 - .6 Provide ventilation in accordance with applicable Ministry of Labour and applicable health regulations, as a minimum, to establish and maintain a safe working environment at all times and increase ventilation when required by application of substances for which manufacturer has recommended ventilation.
- .9 Maintain temperature of minimum 10 degrees C in areas where construction is in progress at all times. Increase temperature to achieve temperature within place of work that will satisfy tolerance or manufacturer's recommendations for various materials as they are delivered to site.
- .10 In the case of acclimatisation of materials, increase temperature to appropriate level at least 24 hours in advance of delivery of such materials and maintain temperature at manufacturer's recommended level throughout acclimatisation, installation and curing.
- .11 Once temperature is raised to suit any material or installation, do not permit temperature to drop unless such a drop would have no detrimental effect on any installation, as determined with manufacturer's recommendations, within the place of the work.
- .12 Heat temporary sanitary facilities when required by legislation or Authority Having Jurisdiction.
- .13 Ventilating Requirements:
 - .1 Meet or exceed applicable legislation at all times.
 - .2 Effect ventilation to meet or exceed requirements of Infection Control Measures prevent accumulations of dust, fumes, mist, vapour (including water vapour) or gases in areas occupied by construction personnel.
 - .3 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of areas occupied by construction personnel.

- .4 Dispose of exhaust in manner that will not result in harmful exposure to persons or installed equipment. Cover installed ducts, intake-air vents, grills and louvers when dust is being produced.
- .5 Ventilate storage spaces containing hazardous or volatile materials.
- .6 Ventilate temporary sanitary facilities.
- .7 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .14 Permanent cooling, heating and ventilation system of building may be used by Contractor during construction with the following provisions:
 - .1 Use of permanent systems for temporary heating shall not modify terms of warranty at time of Substantial Performance of the Work.
 - .2 Operate system to prevent temporary or permanent damage.
 - .3 Operate fans at proper resistance with HEPA and MERV 14 filters installed.
 - .4 Change filters at regular intervals.
 - .5 Operate with proper safety devices and controls installed and fully operational.
 - .6 Operate systems only with treated water as specified.
 - .7 *Contractor* will provide filter media on return and exhaust air outlets.
 - .8 *Contractor* will thoroughly clean and overhaul and have worn or damaged parts replaced before final inspection.
 - .9 *Contractor* will provide an alarm indicating system failure.
 - .10 *Contractor* will coordinate replacement of mechanical seals, regardless of condition, with new mechanical seals where pumps are used during temporary heating.
 - .11 Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
 - .1 Sub-Contractors shall keep temporary services and facilities assigned to them clean and neat.
 - .2 Sub-Contractors shall relocate temporary services and facilities installed by them as required by progress of the *Work* and as directed by the Contractor.
- .15 Date of Substantial Performance and Warranties for heating system commence concurrently with substantial performance of the entire contract.
- .16 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform to applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
- .17 Contractor shall be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.6 TEMPORARY POWER AND LIGHT

- .1 Provide means to route electricity from temporary source for Contractor's use during construction throughout the construction period. Provide necessary temporary work within panels including breakers. Provide temporary devices and cords or conductors required to operate tools, temporary heating, temporary ventilation, temporary lighting and other necessary equipment.
- .2 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors is not less than 162 lx.
- .3 Connect all temporary electrical service items including cords and conductors and outlets in accordance with Electrical Safety Authority regulations and Ministry of Labour regulations.

- .4 Electrical power and lighting conductors and permanent device boxes installed under this Contract may be used for construction requirements with prior approval of Owner and consultant, only, and provided that guarantees associated with electrical conductors remain in place and are not otherwise affected thereby. Make good damage to electrical system and devices caused by use under this Contract.
- .5 Permanent lighting fixtures, when installed, shall not be used during construction for any purpose while operations that create dust are underway and fixtures installed must be covered with plastic sheeting or similar protection. Contractor may use permanent lighting fixtures for illumination during construction when all preparation for painting and the primer coat is applied to gypsum board within the entire interior.
- .6 The Owner will pay the metered cost of electricity delivered to the Place of the Work. The Owner will pay no other cost associated with electricity used during construction.

1.7 TEMPORARY COMMUNICATION FACILITIES

- .1 Provide and pay cost associated with data services and telephone including accessories and equipment necessary for use of the service.
- .2 Owner does not guarantee cellular telephone service at the site. Contractor may be required to provide wired connection to ensure adequate service.
- .3 The Owner will pay no construction cost and no metered cost billed by a utility for service associated with the Contractor internet services, cellular telephones and telephones connected to the local wired network.

1.8 PART 2, PRODUCTS AND PART 3, EXECUTION ARE NOT USED

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All Sections

1.2 REFERENCES

- .1 CAN/CSA-S269.2-M, Access Scaffolding for Construction Purposes
- .2 CAN/CSA-Z321-96, Signs and Symbols for the Occupational Environment

1.3 INSTALLATION AND REMOVAL

- .1 Provide construction aids and facilities in order to execute work expeditiously.
- .2 Remove from site all such work after use.
- .3 Protect portion of the Owner's property not within the established limit of Work marked on drawings or found mutually agreeable, using fencing that is resistant to wind and weather.
- .4 Surround Place of the Work with access control barriers that meet or exceed requirements of Infection Control Measures Section 01 15 00. Barriers must also be constructed in accordance with applicable legislation.
- .5 Install access and Infection Control barriers within additional rooms, corridors and spaces as construction proceeds and phases of the Work are advanced.
- .6 Do not allow Work or construction activities to interrupt or impair function of existing utilities within existing occupied building and within the confines of the Place of the Work when they are installed.
- .7 Protect all installed doors and windows from damage due to prosecution of the work. Pay particular attention to weather stripping and hardware and damage caused by hoses and electrical cords routed through doors. Prohibit wedging of doors.

1.4 SCAFFOLDING

- .1 Scaffolding shall be employed in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, ladders to support construction work in progress according to Contractor's best advantage.

1.5 HOISTING AND LIFTING MACHINERY

- .1 Provide, operate and maintain hoisting and lifting machinery required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2 Hoist and lifting machinery shall be operated by qualified operator.

1.6 SITE STORAGE/LOADING

- .1 Confine work and operations of employees to minimum extent required to execute work illustrated and described within Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.7 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided that it does not disrupt performance of Work or encumber operations.
- .2 Provide and maintain adequate access to project site including access for fire and emergency services vehicles at all times.

1.8 OFFICES

- .1 At the discretion of the Contractor, provide temporary office heated and lighted and ventilated appropriately and of sufficient size to accommodate site meetings and furnished with drawing laydown table.

- .2 Subcontractors to provide their own offices as necessary. Direct location of these offices in accordance with Owner's instructions.
- .3 Site meetings may be held in Owner's premises with prior consent of Owner.

1.9 MANDATORY ADMINISTRATIVE ITEMS

- .1 Provide marked and fully stocked first-aid case in a readily available, dry location.
- .2 Provide notice board and post documents required by applicable legislation.
- .3 Maintain site and access record including list of persons entering and leaving site.
- .4 Adhere to Owner's protocol for sign-in and notice of presence in Owner's facilities and to COVID 19 measures enacted by Owner.
- .5 Ensure that attestations associated with COVID 19 vaccination are made.

1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof containers for storage of tools, equipment and materials.
- .2 Locate materials that do not require weatherproof containers on site in manner to cause least interference with work activities.

1.11 SANITARY FACILITIES

- .1 Owner may elect to provide sanitary facilities near the place of the Work.
- .2 Contract shall include provision of temporary sanitary facilities positioned outside the building. Remove same following completion of the Work.
- .3 Post notices and take precautions as required by local health authorities including notices regarding non-potable water as necessary.
- .4 Keep area in sanitary condition.

1.12 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Owner.
- .2 Provide measures for protection and diversion of traffic, including provision of barricades, and erection and maintenance of adequate warning, danger, and direction signs.

Part 2 Products- NOT USED

Part 3 Execution

3.1 CLEAN-UP

- .1 Remove construction debris, waste materials, from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Temporarily store materials resulting from demolition activities that are salvageable.
- .4 Neatly stack all stored new or salvaged material that is not retained within the construction facility in a location determined by Owner. Cause removal of same within 48 hours of storage time unless longer storage duration is acceptable to Owner.
- .5 Temporarily store packaging material (card stock, corrugated cardboard and paper) on site and ship to appropriate recycling facility.
- .6 Temporarily store metal waste on site and ship to appropriate recycling facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All Sections
- .2 Refer to Section 01 15 00 Infection Control Measures for minimum standards associated with temporary barriers that isolate construction area from Occupied Area. Note that Infection Control Barrier may also be the access control and temporary enclosure around the Place of the Work.
- .3 Refer to applicable legislation for protection of workers and public during prosecution of construction.

1.2 INSTALLATION AND REMOVAL

- .1 Provide temporary guards, barriers, Infection Control Barriers and access controls in order to execute Work expeditiously and to maintain a safe and secure environment for building users, public access to the site and buildings, and safe working conditions for construction workers.
- .2 Reposition all guards, barriers, Infection Control Barriers and access controls to facilitate progress of the work. When building is ready for occupancy, maintain safe, protected access routes into the Place of the Work for the Owner and other building users.
- .3 One or more barriers must be relocated during each phase of the work and additional barriers will be required in order to accommodate Owner's and the public access to the rooms and spaces adjacent to the Work during construction.
- .4 Co-ordinate all barrier locations on site with Owner, Building Official and Fire Prevention Officer. Do not install barriers that will impair fire fighter access, means of egress or exit from building. Owner and Fire Prevention Officer shall be issued keys for all locked barriers.
- .5 Remove from site all barriers after use.

1.3 FIRE ROUTES

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

Part 2 Products

2.1 RED CONSTRUCTION TAPE:

- .1 Acceptable Materials:
 - .1 Tuck Tape – red sheathing tape to meet CMHC report No. 11955.
 - .2 3m red sheathing tape to meet CMHC report no. 11955.

2.2 POLYETHYLENE FILM:

- .1 To CAN/CGSB-51.34, 0.15 mm thick 6 mil (6/1000 of an inch) and as follows:
 - .1 Minimum weight of materials: not less than 0.0915 kg/square metre (2.7 oz./square yard).
 - .2 Vapour transmission using Method A, ASTM E96, not to exceed 23 perms.
 - .3 Abrasion and tear resistance to ASTM D1117
 - .4 Completed assembly water penetration resistance to result in zero leakage.

2.3 WOOD OR STEEL STUDS:

- .1 Stud grade, SPF or better.
- .2 Steel studs selected to suit span and exposure conditions including duration of partition.

2.4 PANEL MATERIALS

- .1 Reference Standard:
 - .1 Plywood, particleboard, OSB shall be free of added urea-formaldehyde and meet or exceed requirements of CAN/CSA-Z809 or FSC or SFI certified.
 - .2 Panel materials shall meet or exceed CSA O325.0

- .3 Douglas Fir Plywood (DFP): to CSA O121, standard construction.
- .4 Canadian softwood plywood (CSP): to CSA O151, standard construction.
- .5 Poplar plywood (PP): to CSA O153, standard construction.
- .6 Mat-formed structural panel boards (OSB): to CAN O437.
- .7 Refer to Section 01 15 00 for additional materials.
- .8 Paint all panel materials with two coats of white paint.

Part 3 Execution

3.1 SITE STORAGE, SITE ACCESS CONTROLS AND FENCING

- .1 Construction site fencing shall be erected around temporary exterior storage areas using means and techniques acceptable to the Owner. Provide keys to locked gates to fire-fighters and police. Provide weather-tight, exterior containers secured with locks for Contractor's materials and tools stored outside of the building.
- .2 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress to fenced area and details of fence installation.
- .3 Indicate use of supplemental or other staging area.
- .4 Do not obstruct fire hydrants with fencing. Maintain fire fighter access between fire hydrant and building at all times.
- .5 Provide secure, on-site storage facilities for use by Contractor and Sub-Contractors. Lock such facilities when not in use.

3.2 SAFETY BARRIERS

- .1 All guards, temporary railings and other safety devices shall be erected in conformance to Ministry of Labour regulations and include fall prevention measures.
- .2 Provide secure, rigid guard rails and barricades around excavations and voids in floors.
- .3 Provide temporary guards around all floor openings and at changes in floor levels, at shafts, at doorways more than 203mm (8") above adjacent surfaces throughout the course of the work.
- .4 Apply plywood and temporary floor joists to support at least 50 lbs. per square foot of live load over any void in any floor or flat roof assembly such that no space between temporary floor joists exceeds 610mm (24") in any direction. Temporary floor assemblies shall be used until installation related to the void is completed and otherwise secured or protected by permanent work. Mark all such plywood sections with warnings in spray paint.
- .5 Install temporary railings and guards at stairs used for construction access, and adjacent to ladder access points.
- .6 All guards, temporary railings and other safety devices shall be erected in conformance to Ministry of Labour regulations including provision of fall prevention measures.
- .7 Install temporary safety harness tie-off points appropriate for fall arrest measures to approval of Ministry of Labour. Remove all tie-off devices where these are not specified as permanent and where they will be exposed to view in the completed work.

3.3 BARRIERS TO ISOLATE FINISHED AREAS:

- .1 If dust generating Work is being commenced within or near finished or existing spaces unaffected by the Work, erect suitable dust-tight partitions between the Place of the Work and finished or unaffected areas to avoid contamination of the areas outside of the Place of the Work by construction dust and the effects of construction activities including spray-applied products, paints and other coatings.

3.4 BARRIERS SEPARATING OCCUPIED FROM UNOCCUPIED SPACES:

- .1 In the case of occupancy of any room or space by the Owner or the Owner's equipment, isolate the rooms or spaces from the construction activity.
- .2 For single rooms: Close door and tape all penetrations around door frame. Cover exhaust fan duct, return air and supply air grilles and any voids between the room and adjacent occupied areas with plastic sheet taped air-tight.
- .3 For work not contained in a single room erect partitions meeting or exceeding requirements of Section 01 15 00 and supplement as follows:
 - .1 Erect air-tight barrier supported by wood or steel studs erected 610mm (24") on center and clad studs with panel materials with joints taped using red construction tape or cover studs with two layers of 6 mil thick polyethylene sheet plastic or two layers of rip-stop nylon tarp between work site and occupied areas. Erect barrier from floor surface to underside of structure above such that the barrier passes through temporarily modified existing or new suspended T-bar ceiling systems.
 - .2 Panel materials shall be used to cover temporary partition framing and these may be Aspenite, OSB, plywood or gypsum board covering the lowest 1220mm (48") of the partition. Install two layers of sheet 6 mil polyethylene plastic with joints staggered and taped with red construction tape on construction side of barrier. Lap all joints in plastic min. 100mm (4") and tape joints continuously. Apply rip-stop nylon tarp over occupied side of barrier.
 - .3 Paint Occupied side of all barrier panels with two coats of white paint.
 - .4 Seal all temporary barriers at all service penetrations that cannot be removed (ducts, conduits, piping), air tight.
 - .5 Seal all penetrations occurring in chases, shafts and other concealed service spaces joining the work area to occupied areas.
 - .6 Install door between work area and occupied area or use mutually agreeable zippered opening or similar lapped sheet goods found agreeable to the Owner. Position vacuum equipped with HEPA filters near openings to facilitate dust removal from workers' clothing.
 - .7 Install barriers at all connection points with the existing, occupied building within the field of construction.

3.5 PROTECTION OF BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary masking, screens, covers, and hoardings. Protect all installed flooring with appropriate walkways created using cardstock or heavy craft paper. Protect all installed cabinets and countertops through coverings such as tarps and card stock or corrugated cardboard. Do not permit persons to store, stockpile or set tools and supplies on finished countertops, shelving or plumbing fixtures.
- .3 Isolate finished areas from dust generating activities using dust-tight partitions constructed of stud-grade lumber covered with polyethylene plastic sheets, both sides, all joints taped.
- .4 Contractor shall be responsible for damage caused to finishes during construction.

3.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 21 – Construction Waste and Disposal.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All Sections

1.2 REFERENCES

- .1 Each specification section stipulates reference standards for products, services and assemblies associated with that Section.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 Where specifications or drawings describe or illustrate materials, assemblies, services or processes that exceed the referenced standard, the specifications shall govern.

1.3 OWNER'S AND CONSULTANT'S RIGHT TO COMMISSION TESTING OF MATERIALS

- .1 The Owner and Consultant reserve the right to have products, materials, assemblies or results of service rendered tested to prove conformance with standards referenced.
- .2 Cost for such testing will be paid by Owner if it is established that the tested item is found to conform with Contract Documents or, in the case of findings showing non-conformance, by the Contractor.

1.4 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections or field review by Owner, his designees or the Consultant and his designees. Neither inspection nor field review by any party relieves the Contractor of his responsibility for the execution of the work in conformance to the Contract Documents. Inspection and Field Review are precautions against oversight or error and supplement rather than replace, the contractor's role as overseer. Contractor shall remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Owner's procurement policy is to acquire, within the scope of the project's budget, items containing highest percentage of recycled and recovered materials practical and consistent with maintenance of satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials in execution of work.
- .4 Should disputes concerning quality or fitness of products, decision rests strictly with the 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.

1.5 AVAILABILITY OF PRODUCTS AND MEASURES ASSOCIATED WITH SUBSTITUTION AND PREVENTION OF DELAY

- .1 Review product delivery schedules prior to commencement of the Work, embed these into construction schedule and anticipate foreseeable risk of delay associated with supply of items. If delays in supply of products are foreseeable, notify Owner and Consultant of such and cooperate in the consideration of substitution or other remedial action and, if such an action is found mutually agreeable, implement it in ample time to prevent delay in performance of Work.

- .2 In event of Contractor's failure to notify the Owner or Consultant of foreseeable supply delays for specified items at commencement of Work, and, should it subsequently appear that Work may be delayed for such reason, Owner reserves the right to substitute more readily available products of similar character, at no increase in Contract Price or extension of Contract Time.

1.6 INSPECTION AT TIME OF THE RECEIPT OF PRODUCTS

- .1 Inspect products immediately upon receipt and notify supplier of defective materials. Arrange for replacement materials and return defective products to supplier.
- .2 Conduct inspection of products prior to storage at the Place of the Work.

1.7 STORAGE, HANDLING AND PROTECTION

- .1 General:
 - .1 Ensure that manufacturer's storage and handling instructions are provided with products.
 - .2 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions.
 - .3 Remove and replace products damaged during storage or handling or found damaged or defective when removed from packaging at Contractor's expense.
 - .4 Obtain Owner's and Consultant's consent for proposed repair to items found damaged or damaged during storage and handling.
 - .5 Ensure satisfaction of Owner when using repaired or replacement items.
 - .6 Packaging:
 - .1 Contractor shall recycle or return for re-use packaging materials whenever feasible.
 - .2 Contractor shall pay the cost of labour and transportation associated with removal and disposal of packaging including the cost of transport of packing to recycling facility.
 - .3 Contractor shall separate for recycling all metal, corrugated cardboard, fine paper, kraft paper and card stock and extruded or expanded polystyrene.
 - .4 Contractor shall pay the cost associated with disposal of waste materials including temporary storage, transport and tipping fee at landfill.
 - .5 Contractor shall return pallets to supplier.
 - .6 Contractor shall pay cost of labour associated with separating and handling pallets.
- .2 Factory Applied Finish:
 - .1 Consult with manufacturer to determine feasibility of site-applied touch-up methods.
 - .2 When authorized by manufacturer, the Owner and Consultant, apply touch-up products using methods authorized by manufacturer to damaged surfaces and ensure that results are satisfactory to Owner.
 - .3 Use touch-up materials recommended by manufacturer, only.
 - .4 Do not apply paint over name plates, warnings or certification labels.
- .3 Packaging:
 - .1 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact.
 - .2 Do not remove from packaging or bundling until required in Work unless unwrapping during an acclimatisation period is required prior to installation.
- .4 Weather and Light Exposure during Storage:
 - .1 Store products, subject to damage from weather, in weatherproof enclosures.
 - .2 Store products subject to degradation due to exposure to ultra-violet radiation according to manufacturer's instructions.

- .3 Adhere to manufacturer's instructions regarding storage conditions and exposure to daylight and weather.
- .5 Cementitious Products:
 - .1 Store cementitious products in dry environment, clear of earth or concrete floors or exterior walls not completely weathertight and clear of activities involving the utilization of liquids if stored in containers that are not waterproof.
- .6 Sand:
 - .1 Keep sand, when used for grout or mortar materials, clean and dry.
 - .2 Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .7 Masonry Units:
 - .1 Store on pallets and wrapped to prevent wetting prior to use.
 - .2 Whenever feasible store masonry units and mortar materials within weather resistive enclosure or indoors.
 - .3 Prevent exposure of new masonry materials to liquids other than potable water required during or for a stipulated period prior to installation.
 - .4 Heat and wet masonry units in accordance with manufacturer's recommendations and as necessary to cope with weather circumstances experienced during installation.
- .8 Rough Carpentry Items:
 - .1 Store plywood and OSB sheet materials, lumber, and other rough carpentry products on flat or as directed by manufacturer, such that they are resting on solid supports spaced no further apart than 915mm (36") on centre and high enough to keep these products clear of earth, concrete slabs and water resting on surfaces.
 - .2 Slope coverings for these products to shed moisture and cover completely.
- .9 Gypsum Board Panels:
 - .1 Store gypsum board panels including panels intended to resist the effects of moisture on flat or as directed by manufacturer, such that they are resting on solid supports spaced not more than 610mm (24") on centre and high enough to keep these products clear of earth, concrete slabs and water resting on surfaces.
 - .2 Slope coverings for these products to shed moisture and cover completely.
- .10 Millwork and Wood Doors:
 - .1 Ensure that manufacturer's storage and handling recommendations are delivered with products.
 - .2 Store millwork and wood doors in strict accordance with manufacturer's recommendations and within temperature and humidity range specified by manufacturer within published recommendations.
- .11 Paint and Coatings:
 - .1 Store and mix paint and coatings in heated and ventilated room.
 - .2 Remove oily rags and other combustible debris from site daily.
 - .3 Take every precaution necessary to prevent spontaneous combustion.

1.8 TRANSPORTATION AND LIFTING COST INCLUDED WITHIN CONTRACT PRICE

- .1 Pay transportation and lifting or hoisting of all products required in performance and prosecution of the Work.
- .2 Pay importation duties, delivery charges, stand-by charges and unloading charges for all products and equipment supplied by the Contractor or Sub-Contractors required in performance of the Work.

- .3 Pay charges associated with "cash on delivery" for all products purchased under this condition by the Contractor or Sub-Contractors.
- .4 Pay cost of cranes, hoists and lifts, scaffold and other aids to construction not provided by product suppliers, but necessary for the loading, unloading, handling and installation of any product or assembly or material when the cost of installation is included within the Contract Price.
- .5 Pay cost of labour and lifting aids required to unload materials and products supplied by Owner when such materials and products are installed by the Contractor.

1.9 TRANSPORTATION AND LIFTING COST FOR ITEMS SUPPLIED BY OWNER

- .1 Transportation cost of products supplied by Owner will be paid by the Owner.
- .2 Cost of lifting and hoisting and all labour required to unload, handle and store such products is included in the Contract Price for all materials and products installed by the Contractor when the installation is included within the Contract Price.
- .3 Owner shall pay cost associated with materials, equipment and assemblies provided by the Owner for installation by the Contractor as follows:
 - .1 Direct cost of purchase, including applicable taxes.
 - .2 Importation duties, delivery charges, stand-by charges and unloading charges for all products and equipment that are to be provided by the Owner.
 - .3 Charges associated with "cash on delivery" for all products purchased under this condition.

1.10 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely solely 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 and do not proceed with affected work until receipt of written instruction provided by Consultant.
- .3 Improper installation or erection of products arising from failure to attend to these requirements authorizes Consultant to require removal and re-installation of affected work with no increase in Contract Price or Contract Time resulting from the removal and remedial work.

1.11 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 Owner and Consultant if specified requirements for the Work cause intended result to be impractical.
- .2 Do not employ anyone unskilled in their required duties. Owner reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions regarding attainment of specified standard or adequacy of the quality of work in cases of dispute, rest solely with Consultant whose decision is final.

1.12 COORDINATION

- .1 Maintain efficient and continuous supervision.
- .2 Anticipate conflicts in the prosecution of the parts of the Work.
- .3 Ensure that installation instructions and shop drawings are available to those executing the work.
- .4 Ensure co-operation of workers in laying out and installing the work.
- .5 Contractor shall be responsible for coordination and placement of mounting hardware, openings, sleeves and accessories, device boxes, fasteners and hardware with the requirements of the Contract Documents.

1.13 CONCEALMENT

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where contract documents indicate otherwise.
- .2 Before installation of services, inform Consultant of interference among components that would prevent efficacious use of any component. In such instances, amend installation as directed by Consultant.

1.14 REMEDIAL WORK

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

1.15 LOCATION OF FIXTURES

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate. Where centre lines and alignments to other parts are indicated, field verify exact positions on site.
- .2 Obtain direction from Consultant regarding the position of any elements when the position is not clearly indicated.
- .3 Inform Consultant of conflicting installation. Amend installation planned and install as directed.

1.16 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 Pre-drill holes for fasteners whenever conditions warrant or when recommended by material manufacturer. Always pre-drill fasteners used to secure materials to concrete or masonry.
- .5 Space anchors within individual load limit or shear capacity and ensure they provide rigid, permanent anchorage unless accommodation of movement is required.
- .6 Wood, or any other organic material plug used as an insert within a bored hole created for an expansion anchor is unacceptable. Use metal expansion anchor or obtain Consultant's approval for use of non-metallic, inorganic material.
- .7 Keep exposed fastenings to a minimum, space evenly and installed neatly and plumb or square to surfaces being fastened unless specifically noted otherwise.
- .8 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.17 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.
- .5 Counter-sink, route or shape lumber to accommodate bolts and permit clearance for subsequent installations or framing.

1.18 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of parts of building. Spread materials including sheathing panels and roofing materials across framing members to distribute loads and maintain loading within tolerance of framing.
- .2 Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Consultant.

1.19 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.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Mark and record location of capped service.
- .3 Do not interrupt building electrical power supply without consent of Owner.
- .4 Do not interrupt building natural gas supply without consent of Owner.
- .5 Do not interrupt building water supply without consent of Owner.
- .6 Do not cut data and communication conductors without explicit approval by Owner.

Part 2 Products and Part 3 Execution: NOT USED

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All Sections

1.2 EXISTING SERVICES - GENERAL

- .1 Before commencing work, establish location and extent of utilities and services in area of Work and notify Owner and Consultant of findings.

1.3 CONSULTANT MEASUREMENTS

- .1 The Owner has developed dimensions for rooms and spaces that must be respected unless reason to deviate arises due to findings in the field, changes arising from review of shop drawings or product data or discovery of inconsistency among documents. Dimensions of rooms and spaces is critical and of great importance to the Owner at all times. Contractor must review dimensions and take utmost care during layout and partition installation to ensure that locations, floor area and dimensions in field match Contract Documents. Contractor shall account for finishes when considering dimensions of rooms and spaces.
- .2 Owner or Consultant may attend the site at any time to conduct laser measurement of partition locations.
- .3 When partition framing is erected, consultant will measure stud locations and compare the findings to dimensions shown on Contract Documents.
- .4 If discrepancies between partition locations found on site and contract documents are found, Consultant will direct the Contractor to adjust partition locations.
- .5 If adjustment to previously installed partitions is required, this shall be completed at no cost to the Owner or Consultant.
- .6 The Contractor is solely responsible for initial layout of partitions, devices and all parts of the work. The Contractor must notify the Consultant if he discovers that dimensions shown on drawings cannot be achieved regardless of the reason for this. The Contractor shall halt work in the subject area and seek direction from the Consultant before proceeding with work in that region of the project.
- .7 Report discrepancies between Consultant's measurements and Contractor's measurements to Consultant immediately and do not proceed with work in the affected area until direction is received from Consultant.
- .8 Failure to advise Consultant of dimensional discrepancies between contract documents and as-constructed dimensions shall result in modifications, adjustments, removals and reinstallation as directed by Consultant and all such work shall not be the subject of a claim for extension of contract time, delay, loss of productivity or a claim for additional labour and material cost.
- .9 Measurement of partition locations by Consultant must, in every instance, be independently verified by Contractor. Contractor remains responsible for location of partitions in accordance with dimensions shown on drawings. Report discrepancies between Consultant's measurements and Contractor's measurements to Consultant immediately and do not proceed with work in the affected area until direction is received from Consultant.
- .10 Consultant's attendance at the site and measurement work shall not relieve the Contractor from his responsibility to complete the work in accordance with Contract Documents, shop drawings, manufacturer's instructions and product data sheets.

1.4 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

- .2 Where drawings illustrate alignments (centre, edge or surface of adjacent or associated material) determine locations with field measurements. Inform Consultant of discrepancies from these alignments that cannot be resolved without adjusting dimensions provided.
- .3 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.
- .4 Inform Owner and Consultant of impending installation and obtain approval for actual location including all electrical devices and lighting, data and communication outlets and diffuser locations.
- .5 Submit field drawings to indicate relative position of various services and equipment when required by Owner or Consultant.

1.5 FIELD ENGINEERING:

- .1 The Contractor shall engage the Field Engineer to perform the following services, as the minimum required services:
 - .1 Conduct moisture emission testing for new concrete floor slabs or new concrete fill within existing concrete floor slabs.
 - .2 Conduct moisture emission testing for new self-levelling products applied over existing concrete floors.

1.6 RECORDS

- .1 Maintain a complete, accurate log of control and as-built location of all elements of work as it progresses.
- .2 Record locations of main service lines within new construction including cable trays and hooks, hot and cold water distribution, main electrical conduits, and HVAC duct routes.
- .3 Locate electrical junction boxes larger than 100mm x 100mm (4"x4"), dampers, access panels and plumbing system valves when positioned above ceilings.

1.7 CONCEALED CONDITIONS

- .1 Promptly notify Consultant in writing if concealed conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.
- .2 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

Part 2 Products - NOT USED

Part 3 Execution - NOT USED

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All sections

1.2 SUBMITTALS

- .1 Provide information to Owner and Consultant in accordance with Section 01 33 00.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Owner or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.
- .4 Closeout Submittals
 - .1 Recorded Construction Processes: Submit as-constructed information in accordance with Section 01 78 00.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: Deliver Products in original wrapping or containers, with manufacturer's labels and seals intact; comply with requirements of Workplace Hazardous Materials Information System (WHMIS) as required by local Authorities Having Jurisdiction, and as follows:
- .2 Time deliveries and unloading to prevent traffic congestion; do not obstruct the use of adjacent buildings.
- .3 Time deliveries to avoid interference and delays to the Project Schedule; order Products to ensure delivery when required for use:
 - .1 Provide for continuity of supply to avoid change of Supplier or Products during any phase of the Work.
 - .2 Obtain an acceptable substitute at no extra cost to the Owner, or obtain the specified Product and accept full liability for any delay in completion as directed by the Consultant where Consultant determines that delay could have been avoided by prudent scheduling and order placement.
- .4 Storage and Handling Requirements: Handle and store Products in accordance with manufacturer's recommendations and prevent damage, inclusion of foreign matter, rusting, staining and defects which will affect performance and appearance, and as follows:
 - .1 Products having high performance factory finishes such as baked enamel, porcelain enamel or polished metal shall be adequately and continuously protected from scratches or other damage while in transit, during installation, and until Substantial Performance of the Work.

1.4 SITE CONDITIONS

- .1 Smoking Policy: Facility is a smoke free environment; personnel engaged at the Place of the Work will not be allowed to smoke anywhere on site, both inside and outside of buildings except in area as directed by the Contractor; keep designated smoking areas clean and sanitary, do not permit cigarette butts to accumulate or enter the watershed.
- .2 Consumables Policy: Food or drink consumption by personnel engaged at the Place of the Work will only be permitted within areas designated by Contractor; keep designated eating areas clean and sanitary; use closed waste receptacles and remove trash on a daily basis.
- .3 Overloading of Structures: Take precautions to prevent any part of the structure from being loaded with a load greater than its calculated bearing capacity until completion of construction:
 - .1 Make every temporary support as strong as permanent support.
 - .2 Do not place load on cast concrete until it has obtained their permanent set and Consultant's authorization has been received.

1.5 GENERAL REQUIREMENTS FOR COORDINATION OF THE WORK

- .1 It is the responsibility of the Contractor to ensure compliance by the various Sub-Contractors with all applicable general requirements of the Specifications Sections contained in the Project Manual.
- .2 Contractor is responsible for the review of all Contract Documents, conditions on the site and establishment of the assignment of the work to Sub-Contractors and other personnel.
- .3 Contractor shall review all Contract Documents together with all submittals as they occur and adjust the work and its scope as required to achieve an efficacious implementation of the entire scope of the work as it occurs.
- .4 Contractor shall report all conditions detrimental to the final result of the work or its parts while in progress.
- .5 Contractor shall not act unilaterally with respect to any condition that alters the final appearance, function or efficacy of the work when it is in its completed state.
- .6 Contractor shall, through the course of the work, effect appropriate and timely communication of conditions and events occurring that have an effect on the final result of the work and request information or clarification appropriate to issues arising during the work.
- .7 The Contractor shall employ persons competent and experienced in their roles and in particular, for persons responsible for coordination of the work.
- .8 The Contractor shall plan the work and direct it with due consideration for all existing conditions and adapt the work to suit these within the limits and tolerances for the work shown on the drawings.
- .9 Contractor shall diligently plan the work through anticipation of tasks required to complete the work and accommodating the requirements for the efficacious execution of all tasks within project planning and communication processes.
- .10 The Contractor is solely responsible for the appropriate layout, measurement and positioning for the elements of the work to achieve the intended result.

1.6 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination of Site Security: Full protection of the Work from damage and theft is the Contractor's responsibility; furnish a watchman if necessary to prevent damage and theft when the site is unoccupied.
- .2 Coordination of Owner's Occupancy: Owner reserves the right to occupy the building and site for installation of equipment and storage of supplies at any time prior to date of Substantial Performance of the Work. Such possession or use shall not be construed as final acceptance of the Project or any portion thereof.
- .3 Publicity: All publicity relating to this Project is subject to the approval of the Owner:

- .4 No mention of the Project in advertising or articles in any publication will be permitted unless approved by the Owner. Publicity or advertising implying an endorsement by the Owner will not be permitted.

Part 2 Materials

2.1 MATERIALS

- .1 Contract Documents indicate new materials in all cases.
- .2 Use new materials meeting or exceeding quality standards specified unless noted otherwise.
- .3 Relics and Antiquities: Protect relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets and similar objects found at the Place of the Work:
 - .1 Items will remain the property of the Owner.
 - .2 Give immediate Notice in Writing to Consultant if evidence of archaeological finds is encountered during construction, and await written instructions before proceeding with Work in the affected area.

2.2 MANUFACTURERS

- .1 Manufacturer's printed Installation Instructions: Comply with manufacturer's printed installation instructions where proprietary Products are used:
 - .1 Obtain written directions or instructions from manufacturer.
 - .2 Do not rely on labels or directions enclosed with Products.
 - .3 Interpret recommended practices as directives.
 - .4 Failure to comply with these requirements, or those relating to initial supervision by the manufacturer's representative, shall authorize the Consultant to require any uncovering, removal and re-installation, and testing, that are considered necessary, at Subcontractor's expense.

Part 3 Execution

3.1 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to ensure structural integrity of surroundings; provide devices and methods to protect other portions of Project from damage.
- .5 Provide protection of elements, materials and surfaces previously installed or existing and adjacent to location of cutting and patching.
- .6 Review all project documents, shop drawings, samples, mock-ups and all specifications to develop a full and comprehensive understanding of the work prior to commencement of any part of the work.
- .7 Acceptance of Conditions:
 - .1 Contractor and all Sub-Contractors shall examine all existing or pre-determined conditions, prior to commencing portions of the Work in that area of Work, and report to the Consultant all conditions unacceptable for Work to proceed. Commencement of Work shall imply acceptance of conditions found.
- .8 Construction Layout: Verify layout information shown on Drawings, in relation to the existing configuration; notify Consultant promptly where discrepancies are discovered and as follows:
 - .1 Lay out the Work accurately.
 - .2 Provide sufficient string and chalk lines or monuments to preserve the main lines and levels.

- .3 Take measurements from existing elements intended to remain in place including permanent structural elements.
- .4 Verify all dimensions and report any errors or inconsistencies to the Consultant.
- .9 Existing services: The existence and location of services indicated as existing are not guaranteed or warranted; Contractor shall investigate and verify the existence and location of all services and other construction affecting the Work prior to starting site work:
- .10 Existing Conditions: Examine substrates, areas, and condition for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations and perform the following tasks:
 - .1 Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - .2 Examine roughing in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - .3 Examine walls, floors, etc., for suitable conditions where Products and systems will be installed.
 - .4 Proceed with installation only after unsatisfactory conditions have been corrected.
- .11 Proceeding with Work indicates acceptance of surfaces and conditions.

3.2 DIMENSIONS

- .1 Take site measurements in order to verify the fit of the new work within existing elements. Check measurements on multiple occasions before installing each Product and during installation. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by site measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- .2 Verify space requirements at all times and continuously. Dimensions of items are shown diagrammatically on drawings.

3.3 INSTALLATION

- .1 Locate components of the Work accurately, in correct alignment and elevation, as indicated and as follows:
 - .1 Make vertical Work plumb and make horizontal Work level.
 - .2 Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - .3 Conceal pipes, ducts, and wiring in finished areas, unless indicated specifically as being exposed as architectural features and as follows:
 - .1 In rooms or areas having no finished ceiling; pipes, conduits and ducts will generally be left exposed, except where specifically referenced to be covered or concealed on any of the Contract Documents. Refer to other Sections and Drawings for painting and finishing requirements.
 - .2 All Mechanical Division or Electrical Division devices, conductors, piping, ducts and other elements shall be as built into walls or bulkheads or concealed above finished ceilings or otherwise behind furring. Electrical conduit and fittings shall be built into walls.
 - .3 Maintain minimum headroom clearance of 2438 mm (8'-0") or the dimension noted in spaces without a suspended ceiling.
 - .4 In the event of conflicts occurring between equipment shown in concealed areas, the following order of priority shall be observed:
 - .1 Structural elements.
 - .2 Plumbing drains.
 - .3 Sprinkler piping.

- .4 Ductwork.
 - .5 Heating piping.
 - .6 Plumbing piping.
 - .7 Electrical conduit.
- .2 Underside of Structure: Underside of Structure is defined to mean the underside of a structural sheet steel deck for a roof or floor assembly, a cast concrete floor or roof structure or the underside of a pre-cast concrete floor or roof plank system.
- .3 Provide sufficient clearance around penetrating components; such as beams, joists, purlins and similar horizontal components to account for structural deflection and packing of ancillary materials required for the following:
 - .1 Fire Resistance Ratings.
 - .2 Smoke Separations.
 - .3 Acoustic Separations.
 - .4 Environmental Separations.
 - .5 Other conditions requiring separation between two adjacent spaces.
- .4 Install Products in accordance with manufacturer's printed installation instructions and recommendations. Notify Consultant of any modifications or adjustments to installation requirements where Project conditions differ from manufacturer's written instructions. Be responsible for obtaining manufacturer's literature necessary to effect correct roughing-in and hook-up of all equipment, fixtures and appliances.
- .5 Install Products at the time and under conditions that will ensure the best possible results. Maintain conditions required for Product performance until Substantial Performance of the Work.
- .6 Inform the Consultant of impending installation of fixtures, switches and attachments and confirm actual locations prior to final installation:
 - .1 Location of fixtures, apparatus or outlets devices, inlets, grilles and other features illustrated on Contract Documents (Drawings or described within Specifications) or otherwise specified or shall be considered as approximate, only. The actual location shall be as directed and required to suit conditions at the time of installation and shall be determined by Consultant.
 - .2 Locations measured on site during Contractor's verification process and for the purposes of facilitating shop drawing production and ordering of goods are considered accurate to the extent defined by the Contractor or the entity preparing the measurements.
 - .3 The entity preparing field measurements of any kind shall stipulate the accuracy of measurements and clearly indicate deviations from the intent of the Contract Documents or deviations from measurements otherwise anticipated.
 - .4 Note all furring requirements and any furring limitations shown on the drawings.
 - .5 Make allowance for the possibility that indications and locations shown on Mechanical and Electrical drawings are diagrammatic. Do not install mechanical and electrical items when their alignment with other elements such as ceiling tile grid, wall position, bulkheads, etc. are not clearly understood.
- .7 Inform the Consultant before Work is carried out where the Contractor determines that furring allowances described above cannot be obtained.
- .8 Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- .9 Inform the Consultant before proceeding with Work where the location of holes in the structure could affect the nature or strength of the structure.

- .10 Do not use tools or equipment that produce harmful noise levels unless appropriate Personal Protection Equipment and safety instructions to personnel have been provided:
 - .1 Notify adjacent Occupants, or land owners and tenants or persons using other properties in close proximity to the Place of the Work when tools or equipment having any of the following affects will be experienced:
 - .1 Noise at sufficient volume that it will be harmful to persons.
 - .2 Vibration that will be harmful to persons and property.
 - .3 Water or other liquids or semi-liquid materials that may be transported by wind or flow overland when these effects are unmitigated, whether harmful to persons or not.
 - .4 Chemical or other hazard including dust, air-borne chemical or similar affect.
 - .5 Pollution of the environment may occur regardless of the temporary nature of such effects and regardless of the type or nature of the pollution.
 - .2 Schedule use of equipment having harmful noise levels at a time that will cause the least disturbance to adjacent properties.
- .11 Lighting Fixtures at Suspended Ceilings:
 - .1 Provide secure support for lighting fixtures by suspended ceilings, or by separate hangers, or by both.
 - .2 Coordinate the ceiling system and lighting fixture installations to provide adequate support.
 - .3 Submit affidavits with acceptable design information confirming that the installation of the suspended ceiling system and/or separate fixture hangers will provide adequate support for the lighting fixtures without exceeding specified deflection tolerances for the ceiling system.

3.4 ANCHORS AND FASTENERS

- .1 Fastenings: Provide metal fastenings and accessories in same texture, colour and finish as adjacent Products, and as follows.
- .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 Specifications Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage.
- .5 Wood, or any other organic material plugs are not acceptable; coordinate design of fastenings and anchors with requirements listed below.
- .6 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .7 Fastenings that cause spalling or cracking of material to which anchorage is made are not acceptable.
- .8 Fixings to Precast Concrete Decks: Use fasteners of a length that do not pierce floor or roof slabs.
- .9 Equipment Fastenings: Use fastenings of standard commercial sizes and patterns with material and finish suitable for service, and as follows:
 - .1 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
 - .2 Bolts may not project more than one diameter beyond nuts.
 - .3 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.
- .10 Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work:
 - .1 Mount components at heights directed by Consultant where mounting heights are not indicated.
 - .2 Allow for building movement, including thermal expansion and contraction.

- .3 Anchors for systems, pipes, conduits and equipment, hangers and support systems, and connections to building structure shall be the responsibility of the installing Subcontractor; installing Subcontractor shall retain a professional engineer registered in Province of the Work to review/design anchor installation to ensure that all anchors and attachments to the structure are suitable for the purposes intended, properly installed, including those where installation deviates from design data and standards published by anchor and hanger support manufacturers:

- .1 Submit proof of load carrying capacity for standard anchors and hanger supports used in construction when requested by the Consultant or Contractor.
- .4 Do not use Powder Actuated Tools at the Place of the Work without prior written authorization from Consultant; comply with requirements of the local Occupational Health and Safety Act, General Safety Regulations when powder actuated tools are used.

3.5 SLEEVES AND OPENINGS

- .1 Sub-Contractors shall supply all required sleeves for setting or building-in to the Contractor, and all exact locations for installation.
- .2 Sub-Contractors requiring openings greater than 200 mm (8") in any dimension shall coordinate openings with the Contractor and the Sub-Contractor who will be installing required opening.
- .3 Installing Sub-Contractors shall be responsible for all openings less than 200 mm (8") in any dimension and include cost for such openings in their subcontract price.

3.6 CONDUIT ON ROOFS AND FLOORS

- .1 Electrical conduit and any other piping shall not be run on top of roof decks or within concrete toppings of floors or exterior slabs or roof assembly, except where specifically indicated on Contract Documents.
- .2 Inform Consultant before proceeding where drawings, Specifications or site conditions are at variance with this requirement.

3.7 JOINTS

- .1 Make joints of uniform width. Arrange joints for the best visual effect where joint locations in exposed Work are not indicated:
 - .1 Obtain Consultant's acceptance of joint locations prior to final installation of Products.
 - .2 Consultant retains the right to adjust location of joints to suit design criteria, provided that adjustment does not affect maximum areas recommended for Products being installed.
 - .3 Fit exposed connections together to form hairline joints.
 - .4 Do not use Products, cleaners, and installation materials that are considered hazardous.

3.8 STARTING AND ADJUSTING

- .1 Coordinate requirements for starting and adjusting equipment with requirements of Mechanical and Electrical Divisions. Implement a starting and adjusting program generally consisting of, but not limited to, the following:
 - .1 Start equipment and operating components to confirm proper operation.
 - .2 Remove malfunctioning units, replace with new units, and retest.
 - .3 Adjust operating components for proper operation without binding.
 - .4 Adjust Products and equipment for proper operation.
 - .5 Test each Product or piece of equipment to verify proper operation.
 - .6 Test and adjust controls and safeties.
 - .7 Replace damaged and malfunctioning Product controls and equipment.

- .8 Comply with qualification requirements in Section 01 45 00 – Quality Control where a factory authorized service representative is required to inspect site-assembled components and equipment installation.

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- .1 Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Performance.
- .2 Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

- .1 Repair or remove and replace defective Products or construction. Restore damaged substrates and finishes. Comply with requirements of this Section for Cutting and Patching:
 - .1 Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
 - .2 Restore permanent facilities used during construction to their specified condition.
 - .3 Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
 - .4 Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- .2 Remove and replace chipped, scratched, and broken glass or reflective surfaces

3.11 FUNDAMENTAL REQUIREMENT FOR PROTECTION OF THE WORK AND ITS CONTENTS

- .1 Protection of the Work during the complete course of the work is the sole responsibility of the Contractor in whom the Owner has vested this duty by executing the Contract.
- .2 Whenever the building is modified to the extent that its interior parts are exposed to weather, the Contractor shall take action to ensure the protection of the building interior from the effects of weather.
- .3 Protection of the building under construction where it intersects with any aspect of the Work is also the sole responsibility of the Contractor, in whom the Owner has vested this duty.
- .4 Protection of the work, the site and the previously constructed elements and products or materials contained therein, includes protection against creation of detrimental effects arising from the prosecution of the work of this Contract. The Contractor shall establish a construction sequence that permits protection of existing materials that are not intended for exposure to weather from the effects of weather throughout the full course of the Work.
- .5 Materials and assemblies illustrated and described within the Contract Documents are intended for exposure to elements and atmospheric conditions occurring when the work is established in its completed state. Various components of the Work and the existing building are not intended for exposure to weather. The Contractor shall ensure that all materials are protected against exposure to weather as the work progresses.
- .6 The nature of materials and the processes used to manipulate or assemble them including, but not limited to, wet cutting, welding, vibration, abrasion and other processes, may result in the establishment of conditions that exceed the tolerance for exposure of other materials beyond their tolerance for such activity and thereby result in conditions detrimental to the Work. The Contractor shall take care to establish conditions for all materials (previously installed or new), regardless of their individual nature and the processes necessary for their implementation, that are appropriate for the various materials encountered, exposed or utilized during the prosecution of the Work.
- .7 Materials that, by their nature and use are sufficiently robust to withstand exposure to weather may be exposed to weather within their tolerance for such exposure. Assembled elements and materials that are subsequently amended or in contact with materials or elements that are less tolerant of moisture,

weather or any other exposure, shall be protected or otherwise treated to establish and maintain their condition and environment in a manner that creates appropriate conditions for less tolerant materials.

- .8 The Contractor shall not deliberately fail to undertake work that would reasonably be considered standard construction practice including protection all parts of the work from the effects of weather, temperature, fire, theft and vandalism. Protection in this case also includes the requirement to maintain conditions appropriate for the work in progress at all times, regardless of the attendance at the site by the Contractor or persons under his control, for prosecution of the work.

3.12 ABANDONMENT OF THE WORK

- .1 The Contractor shall not abandon the work at any time during its execution.
- .2 Failure to protect the work or parts of the work during periods of time outside of the Contractor's established working hours constitutes abandonment.
- .3 Similarly, the absence of workers on the site for any single period exceeding 5 business days shall be considered abandonment.

3.13 BASIC CONDITIONS FOR SCHEDULE AND SEQUENCE OF OPERATIONS

- .1 Maintain excavations free of water.
- .2 Incorporate tasks within project planning and schedule that will deliver the work in a condition appropriate for its design and intended use:
 - .1 Plan and schedule the Work according to the fundamental requirement for protection of the work and its contents and
 - .2 Implement no sequence or procedure that could result in detrimental effects to the new or existing building as it progresses, existing domestic water supply and the existing electrical service or the Owner's equipment on the site.
- .3 No action undertaken by the Contractor or by his sub-contractors shall at any time imperil the safety of persons working on the construction or using the property or parts of the building not directly involved in the prosecution of the work.
- .4 No action or sequence of actions or omission of action shall occur that could, as a result of detrimental effects arising from the act or omission, cause damage to the new work or the parts of the building previously constructed.
- .5 The Contractor shall not deliberately fail to undertake work that would reasonably be considered standard construction practice including protection all parts of the work from the effects of weather, temperature, fire, theft and vandalism. Protection in this case also includes the requirement to maintain conditions appropriate for the work in progress at all times, regardless of the attendance at the site by the Contractor or persons under his control, for prosecution of the work.
- .6 Contractor shall schedule and sequence work to permit appropriate remedial work required by the nature of any process or implementation process in the work, including cleaning, drying of materials exposed to weather or wet processes.
- .7 Incorporate into project planning the time required for the establishment of appropriate humidity, temperature, curing and other conditions required for appropriate implementation of subsequent work.
- .8 Effect diligent removal of water, dust or other conditions or elements resulting from implementation or assembly during the course of the work, that would be detrimental to subsequent parts of the work.
- .9 Contractor shall schedule and sequence work to maintain sufficient heat within the building to prevent freezing of water within previously installed or new plumbing or the Contractor shall drain the plumbing systems entirely. Contractor is solely responsible for damage due to freezing of water within plumbing systems.
- .10 Contractor shall schedule work to maintain all areas that could be damaged in any way by exposure to precipitation through direct or indirect means or damaged due to low temperature, free of such

exposure throughout the entire course of the work. The Contractor shall be solely responsible for maintaining rooms and spaces or new work as it progresses, free of detrimental effects of temperature and weather and to prevent ingress of water into the building or its various components, and with particular diligence for those components that would be concealed by finishes.

.11 Contract shall prevent detrimental effects of temperature and weather. These detrimental effects shall include, but are not limited to, the following:

- .1 Ingress of precipitation by any means whether directly or indirectly, through the temporary weather protection established by the Contractor.
- .2 Mould and mildew growth attributable to exposure of the interior of the building, whether part of the existing or new construction, to precipitation or water from any source that arises from the work or failure to protect the work sufficiently.
- .3 Delays in the work caused by removal of potable water or electricity or other utilities supplied to the site.
- .4 Temporary heating that results in formation of condensation within the building.
- .5 Insufficient temporary heat to ensure progress of the work in accordance with material manufacturer's instructions.
- .6 Insufficient protection of materials from detrimental effects of sunlight, weather, temperature and humidity outside of the manufacturer's specified range for efficacious use of any product.

3.14 OWNER'S CONSTRUCTION REQUIREMENTS:

- .1 The Owner reserves the right not to occupy parts of the work that the Contractor might consider to be complete.
- .2 Any plan to occupy any part of the scope of the work prior to the completion of all parts of the work shall not oblige the Owner to apply the substantial performance process and closeout or commissioning or turn over process to less than the entire contract.
- .3 The Contractor shall have continuous access to all parts of the Work with the exception of occupied areas.
- .4 The Contract Price includes all temporary barricades or hoarding required to separate the areas under construction from the areas occupied. All interior barricades and infection control barriers will require erection, dismantling and reconstruction in new locations for each Phase of the work.
- .5 Exterior barricades, caution tape, and other access controls and warnings employed outside must also be amended throughout the course of the work.
- .6 Contract Price shall include all measures required to maintain Contractor's access to the floor areas under construction including, but not limited to, the relocation of temporary facilities, access controls, temporary utilities, Contractor's storage facilities, barricades, access controls, tools, materials and equipment required for the scope of the work.

3.15 EXECUTION OF CUTTING AND PATCHING

- .1 The Work includes the requirement to construct or create penetrations of load-bearing concrete elements for building services. This includes holes provided or created in concrete cast in place inside conventional or insulated concrete forms and the holes formed or created in pre-cast concrete floor and wall elements.
- .2 Services installed through assemblies designated as fire separations or noted as having fire resistance ratings shall be fire stopped or otherwise fitted with closures (including fire dampers) in every instance of penetration of an assembly noted as being part of a fire separation or as having a fire resistance rating.

- .3 Execute cutting, fitting, and patching required to complete Work indicated or implied on contract documents.
- .4 Fit the several parts of assemblies together to integrate with other Work.
- .5 Install products in conformance with requirements of the contract documents and manufacturer's published instructions in all instances.
- .6 Uncover Work to install ill-timed Work.
- .7 Remove and replace defective and non-conforming Work.
- .8 Remove samples of installed Work for testing upon request of Consultant or Owner or Field Engineer.
- .9 Schedule and co-ordinate Work to minimise cutting and patching.
- .10 Contractor shall conduct cutting and repair of previously installed materials to accommodate new work:
 - .1 Cut, patch and provide remedial work and finishing to accommodate new Work and to leave building in finished condition.
 - .2 "Cutting" or "Cut" and "Patch" shall mean the modification of any pre-existing surface, whether existing or new, regardless of the material, and that requires modification, coring, boring, cutting or other work to accommodate new or subsequent work.
- .11 Contractor shall support items remaining after cutting:
 - .1 Installation of lintels or remedial support framing is an integral part of cutting and patching operations. All cutting operations illustrated or described that affect load-bearing elements imply and require installation of remedial structural elements in the form of lintels, plates, gussets, flanges, angles, ledgers, nailing surfaces, blocking or other supports intended to support or provide fastening surfaces for the remaining materials whether these supports and lintels are illustrated or noted on drawings or not.
 - .2 The requirement to cut finishes and other existing surfaces implies and requires the installation of additional blocking, nailing elements, studs, or similar materials intended to support or provide fastening surfaces for the remaining materials whether these supports and lintels are illustrated or noted on drawings or not.
- .12 Contractor shall make cutting and patching of the exterior building envelope weather-tight:
 - .1 Cutting operations require installation of weather-tight construction following cutting operations.
 - .2 Contractor shall apply transition membranes, through-wall flashing, sealants and the associated trims and escutcheons which will comprise some of the aspects of the weather-tight construction in addition to replacement, repair and restoration exterior finishes required to complete penetrations through exterior walls.
- .13 Cutting requires, but is not limited to, the following activities or operations and any instance of cutting could require more than a single activity listed as follows:
 - .1 Modification of pre-existing surfaces by actual saw cutting: cutting with various types of blades;
 - .2 Saw cutting or coring of load-bearing floor and roof assemblies including the supply and installation of reinforcing plates, lintels, trim angles and bolted or welded reinforcements, etc.
 - .3 Removal of masonry and modification of existing masonry units together with the supply and installation of lintels, sills and trims required to create new openings;
 - .4 The coring of rigid components such as masonry, concrete or panel products (plywood, OSB or gypsum board) to allow new components to pass through or to provide new openings.
 - .5 Cutting of structural steel or other metal fabrications with torches together with the supply and installation of reinforcing plates;
 - .6 Cutting various membranes and composite assemblies or sheathings using tools special to the installation such as:
 - .1 roofing components including membranes and insulation,

- .2 site cast and plant cast concrete, floors and walls and walls framed using steel studs,
- .3 concrete floor slabs, or framed assemblies;
- .4 cutting of concrete roof and floor decks,
- .5 patching of concrete in floor assemblies,
- .6 cutting of concrete slabs, foundation walls and other concrete elements,
- .7 cutting of masonry assemblies,
- .8 the supply, installation or provision of sealers, polyurethane foams and other items that re-establish the continuity of the cut assembly for every surface or element that is cut.
- .9 All cutting in such assemblies shall include the provision of necessary remedial work such as roof curbs, roofing materials and flashing, metal trims, self-adhesive membranes, new roofing materials or new framing materials as required to complete the opening to a water-tight condition.
- .7 Cutting of existing surfaces, assemblies and materials as required to connect all parts of the new work into the existing building.
- .14 Cutting shall not mean drilling of holes to accommodate screws, setting of anchors, installation of bolts or other fasteners. Such drilling, setting or anchoring is part of Section's installation function.
- .15 Cutting and patching shall also extend to the required Work to install new roof-top equipment or devices within roof assemblies; the installation of any required new components to complete the assembly and the repair of roofing to water tight condition.
- .16 Patching includes providing and installing stiffener plates for structural and sheet steel; remedial work to reinforce new openings in existing surfaces such as concrete, masonry and the supply and installation of loose or fixed steel lintels, sheet metal liners in gypsum board assemblies and installation of lintels in load bearing wall systems.
- .17 Patching also includes provision of fire stops, fire caulking, sheet metal cowlings, flashings, trims and other finishes for penetrations of fire rated assemblies, exterior wall assemblies or the roof assembly.
- .18 Where drawings, details and schedules are not clear with respect to the provision of remedial structural elements, do not proceed with cutting until engineering consultant confirms requirements for the opening. Commencement of cutting in such circumstances leaves responsibility for the remedial work with the trade performing cutting regardless of information on the drawings.
- .19 Contractor shall fit the several parts of assemblies together to integrate with other Work.
- .20 Install products in conformance with requirements of the contract documents and manufacturer's published instructions in all instances.
- .21 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work. Restore materials around such openings to fit tight to item penetrating materials and apply appropriate fire stop or sealant to suit condition of penetration for air-tight, acoustically sealed, waterproof and fire stopped as found necessary for the penetration.
- .22 Execute Work by methods to avoid damage to other Work, and which will provide appropriate and prepared surfaces ready to receive patching and finishing. Cutting must be rectilinear or bored neatly using appropriate tools designed for the type of cutting intended.
- .23 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .24 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .25 Restore work with new products in accordance with requirements of Contract Documents.
- .26 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

- .27 For penetration of fire rated wall, ceiling, or floor construction, completely seal voids with fire stopping material in accordance with Section 07 84 00 – Firestopping for full thickness of the construction element or in accordance with fire stopping manufacturer's instructions.
- .28 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .29 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

3.16 RESPONSIBILITY FOR CUTTING AND PATCHING

- .1 Responsibility for various categories of cutting and patching shall be as follows:
- .2 Cutting and patching of architectural and structural Work required for installation of work of mechanical and electrical sections:
 - .1 Holes and openings up to 200 mm (8") in diameter and related patching by applicable Sections of the trade;
 - .2 Holes and openings larger than 200 mm (8") in diameter, chases, removal of existing bulkheads and furring (if any) and related patching by Contractor. Contractor shall be responsible for additional cost incurred as a result of creating openings larger than required by other work during cutting and patching operations and in particular when such openings need to be fire-stopped.
- .3 Cutting of openings, their sizes, tolerances and remedial support work shall be performed under the direction of a structural engineer and the trade's engineering consultant in the case of any item of the work that requires an engineering seal on shop drawings.
- .4 Cutting and patching of architectural and structural work required by Sections other than those of mechanical and electrical sections is responsibility of Section whose work is to be cut or patched.
- .5 Cutting and patching required to complete Work not covered under Section(s) of Specifications, by Contractor.
- .6 NOTE: No section shall cut any structural member without prior written consent.
- .7 Use workers qualified in work being cut and patched to ensure that it is correctly done.
- .8 Do not cut, drill or sleeve load-bearing members without obtaining written approval for each condition.
- .9 Cut holes carefully, leaving clean openings no larger than required, after Sections requiring them provide locations.
- .10 Make cuts with clean, true, smooth edges to tolerances required and in conformance with industry practice for applicable class of work. Make patches undetectable in finished work.

3.17 PENETRATIONS FOR MECHANICAL AND ELECTRICAL ITEMS OR NEW STRUCTURE:

- .1 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work. Restore materials around such openings to fit tightly to item penetrating materials and apply appropriate fire stop or sealant to suit condition of penetration for air-tight, acoustically sealed, waterproof and fire stopped as found necessary for the penetration.
- .2 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.
- .3 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .4 For penetration of all assemblies that are intended to have a fire resistance rating, completely seal voids with fire stopping material in accordance with Section 07 84 00 – Fire stopping for full thickness of the construction element or in accordance with fire stopping manufacturer's instructions or fit gypsum board tightly as the case requires.
- .5 Install fire dampers in ductwork penetrating any assembly that is intended to have a fire resistance rating.
- .6 Install fire stop system for all combustible piping penetrating any assembly that is intended to have a fire resistance rating.

- .7 For new structural items, cut sufficient area of existing assemblies to reveal all essential load-bearing conditions for the situation. Support adjacent structure and structure affected by the Work.
- .8 Install new structure in accordance with Contract Documents and advise consultant of conditions that would prohibit these actions.
- .9 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit. All parts of the work shall be finished with paint and appropriate primers throughout all rooms within the entire scope of the work.

3.18 SERVICE PENETRATIONS SOLID CONCRETE ELEMENTS - CAST IN PLACE OR PLANT PRE-CAST:

- .1 Solid concrete elements include concrete cast in the field (in situ) and solid elements cast in a plant prior to delivery to the site.
- .2 Contractor bears responsibility to coordinate the assignment of the cutting, coring and boring to appropriate, qualified Sub-Contractors.
- .3 All penetrations **exceeding 150mm in any dimension** made through solid concrete elements shall be positioned according to Shop Drawings or sketches that had been reviewed by the Consultant
- .4 All penetrations with all dimensions measured in any direction that are **smaller than 150mm** made through walls and horizontal or vertical concrete elements may be accommodated by sleeves prior to placement of concrete provided that reinforcing specified is not displaced by the sleeve. No written consent of the Consultant is required for these situations.
- .5 All penetrations that must be cored or bored or cut through existing solid concrete elements shall be created following the Contractor's receipt of consent to cut or core the concrete is issued in writing to the Contractor by the Consultant.
- .6 Limits will be placed on the spacing of grouped, multiple individual holes in cast-in-place concrete when these holes will be separated by a span of concrete less than 400mm measured in any direction. These limits will be provided by the Consultant for each instance of grouped, multiple penetrations.

3.19 SCOPE OF WORK RELATED TO PAINTING AND FINISHING

- .1 Refer to section 09 91 23.
- .2 The following items are the responsibility of the general Contractor or the trade providing the referenced material or labour.
- .3 The Contractor is responsible for ensuring that all substrates are prepared suitably for finishing.
- .4 Contractor shall ensure that the condition of substrates is appropriate for painting and that the relevant trade provides remedial work to correct defects and deficiencies in substrates, which may adversely affect painting work, except for minimal work performed by Section 09 91 23.
- .5 Abrasive blasting, shop cleaning, shop priming including site touch-ups, and shop painting when applicable, of structural steel, miscellaneous metal, ornamental metal and steel equipment as specified on drawings and under Section 05 50 00 Metal Fabrications is the responsibility of the sections providing the material.
- .6 Shop priming (and shop or pre-painting when applicable) of metal and wood doors, frames and windows including fittings is the responsibility of the relevant sections.
- .7 Painting of copper, aluminum, stainless steel, nickel, bronze or brass surfaces, baked enamel surfaces, chrome plated items or other materials intended to be exposed in their supplied state shall not be painted or otherwise finished.
- .8 Painting of materials and equipment off-site are to be completed by the relevant section.
- .9 Paint identification of equipment and services and hazards to safety are to be completed by the section supplying the equipment or that is related to the hazardous condition warning.
- .10 Painting of mechanical (heating, ventilating and plumbing services and equipment) and electrical work including color coding, stencilling and banding shall be completed by the relevant section.
- .11 Exterior caulking shall not be painted.

- .12 Do not paint exposed conduits, ductwork or piping located within service rooms, storage rooms not within residential suites and occupied by the Owner/Landlord, electrical closets and electrical rooms, boiler room and meter room.
- .13 Do not paint piping or conduits located below countertops or kitchen cabinetry or behind equipment.
- .14 All items above suspended ceilings are not considered "exposed to view".

3.20 LIMITATIONS:

- .1 Nothing in this section shall permit any cutting of steel structure, sawn lumber rafters, sawn lumber or pre-engineered wood truss members and their connecting plates or roof joists, Wood I's or Jager Industries TJI's or laminated veneer lumber framing members of any type unless such cutting is expressly shown on reviewed shop drawings.

3.21 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse or recycling in accordance with Section 01 74 19.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All Sections

1.2 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 Executed Contract
- .2 National Fire Protection Association (NFPA):
 - .1 NFPA 241-13, Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.3 PROJECT CLEANLINESS

- .1 Remove waste materials from site at daily regular scheduled times or dispose as directed by Owner at regulated landfill site. Do not burn waste materials on site.
- .2 Make arrangements with Authorities Having Jurisdiction for disposal of waste and debris and obtain permits for disposal as necessary. Cost of permits and disposal is included within the Contract Price.
- .3 Recycling and Separation of Waste:
 - .1 Provide on-site containers for collection of waste materials and debris and for each segregated material intended for recycling. As a minimum, segregate all metal, boxboard, corrugated cardboard, paper and plastic accepted at Municipal recycling centre.
 - .2 Recycle packaging materials.
 - .3 Return pallets to suppliers.
 - .4 Use Blue Box recycling for waste generated by workers at breaks and lunch periods.
 - .5 Refer to Section 01 74 19 - Construction Waste Management and Disposal.
- .4 Dispose waste materials and debris at appropriate Municipal landfill off-site.
- .5 Daily Cleaning:
 - .1 Maintain all interior work areas in broom clean condition each day.
 - .2 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.
 - .3 Maintain storage areas for equipment and supplies in tidy condition, free from accumulation of waste products, removed packaging and debris.
 - .4 Clear site of debris caused by Owner or other Contractors.
 - .5 Keep access to exits clear of debris and stored materials and tools at all times.
 - .6 Store volatile waste in covered metal containers, and remove from premises at end of each working day. Store securely.
 - .7 Vacuum clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .6 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .7 For permanent finishes, use cleaning materials recommended by manufacturer of surface to be cleaned, only. Conduct cleaning as recommended by cleaning material manufacturer.

1.4 FINAL CLEANING

- .1 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

- .2 Remove waste products and debris and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris including that caused by Owner or other Contractors.
- .5 Remove labels adhered to products.
- .6 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .7 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.
- .8 Clean lighting reflectors, lenses, and other lighting surfaces.
- .9 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .10 Seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .11 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .12 Sweep and wash clean paved areas.
- .13 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .14 Clean roofs, downspouts, and drainage systems.
- .15 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

Part 2 Products

2.1 CLEANING MATERIALS

- .1 Use cleaning materials recommended by manufacturer of materials to be cleaned, only.
- .2 Use cleaning materials on surfaces recommended by cleaning material manufacturer, only.
- .3 Use only non-toxic cleaning materials and procedures to the greatest extent possible; alternatives to more toxic commercial cleaning agents include; but or not limited to vinegar, citrus, borax, cornstarch, and baking soda

Part 3 Execution

3.1 HOUSEKEEPING

- .1 Individual Sub-Contractors will be responsible for daily housekeeping under the Contractor's cleaning program. Sub-Contractors will assign employees for general clean-up as directed by the Contractor.
- .2 Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
- .3 Remove debris from concealed spaces before enclosing the space.
- .4 Clean areas and spaces where cutting and patching are performed; completely remove paint, mortar, oils, putty, and similar materials:
 - .1 Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.
- .5 Burying or burning waste materials at the Place of the Work shall not be permitted.
- .6 Washing waste materials down sewers or into waterways shall not be permitted.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All Sections

1.2 SECTION INCLUDES:

- .1 Requirements for recycling.
- .2 Requirements for disposal of construction waste.

1.3 WASTE DIVERSION GOALS

- .1 New Construction and Renovation Waste Diversion, minimum:
 - .1 All metal waste including packaging banding, electrical conduit and conductor cut-offs, ductwork cut offs, copper pipe cut-offs, damaged metal fittings, metal flashing, roofing and trim waste, nails, bolts and other metal fasteners together with all metal containers including paint cans.
 - .2 100% wood lumber and trim cut-offs set aside for compost or chipping for mulch.
 - .3 100% wood, plastic or compressed cellulose fiber pallets returned to supplier for reuse.
 - .4 100% corrugated cardboard and card stock packaging, containers and lunch waste diverted to recycling.
 - .5 100% paper including protective wrappings, kraft paper and instruction manuals or other fine paper diverted for recycling.
 - .6 100% waste concrete diverted by crushing for use on site as backfill or delivery to alternative site for re-use.
 - .7 100% surplus paint diverted to recycling or reuse.
 - .8 100% of plastics accepted by Municipal recycling program.
- .2 Minimize amount of non-hazardous solid waste generated by project and maximize reduction, reuse and recycling of solid waste produced by construction activities.
- .3 Protect environment and prevent environmental pollution damage.
- .4 Do not dispose waste materials through any of the following means:
 - .1 Dumping, pouring or placing onto ground or by burying or
 - .2 by dumping into drainage ditches, water courses, storm drain catch basins or manholes.
- .5 Volatile materials, include, but not limited to, substances such as:
 - .1 mineral spirits, oil, gasoline or paint thinner;
 - .2 water containing paint residue or paint thinner;
 - .3 adhesives, resins and coatings including primers and paints and surface sealers;
 - .4 cleaning products and rags, sponges and other materials impregnated with cleaning products.
 - .5 into ground, waterways, or sewer systems is prohibited solvents, thinners, shall be
- .6 Burning of waste and rubbish is not permitted at the Place of the Work.

1.4 REFERENCES

- .1 Definitions:
 - .1 Approved or Authorized Recycling facility: waste recycler approved by applicable provincial authority or other users of material for recycling approved by the Owner and Consultant.
 - .2 Construction, Renovation and Demolition Waste: Class III solid, non-hazardous waste materials generated during construction, demolition, and renovation activities.
 - .3 Inert Fill: inert waste - exclusively concrete, crushed or excavated fill free of organic materials.

- .4 Waste Source Separation Program (WSSP): implementation and coordination of ongoing activities to ensure designated waste materials will be sorted into pre-defined categories and sent for recycling and reuse, maximizing diversion and potential to reduce disposal costs.
- .5 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .6 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .7 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .8 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
 - .2 Returning reusable items including pallets or unused products to vendors.
- .9 Salvage: removal of structural and non-structural materials from deconstruction projects for purpose of reuse or recycling.
- .10 Separate Condition: refers to waste sorted into individual types.
- .11 Source Separation: act of keeping different types of waste materials separate beginning from the point they became waste.
- .12 Ontario Ministry of Environment
 - .1 Ontario Environmental Protection Act (EPA)
 - .1 Regulation 102/94, Waste Audits and Waste Reduction Workplans.
 - .2 Regulation 103/94, Source Separation Programs.
 - .2 Canadian Construction Association (CCA)
 - .1 CCA 81-2001: A Best Practices Guide to Solid Waste Reduction.

1.5 DOCUMENTS

- .1 Post and maintain in visible and accessible area at job site, one copy of following documents:
 - .1 List of materials intended for separation and
 - .2 Post location of bins or similar instructions regarding temporary storage of recycled or salvaged materials on site.

1.6 WASTE SOURCE SEPARATION PROGRAM (WSSP)

- .1 Provide list and drawings of locations that will be made available for sorting, collection, handling and storage of anticipated quantities of reusable and recyclable materials. Submit to Consultant and Owner and modify according to Owner's commentary.
- .2 Provide sufficient on-site facilities and containers for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .3 Locate containers to facilitate deposit of materials without hindering daily operations.
- .4 Provide training in handling and separation of materials for reuse and recycling for contractor's forces, sub-contractors and any workers.
- .5 Locate separated materials in area which minimizes material damage and will not encumber operations on the site. Area used for temporary storage of materials shall be approved by Owner if located outside of building.

- .6 Clearly and securely label containers to identify the types and conditions of materials within and assist sub-contractors and any workers engaged in salvage and waste handling with segregation and separation materials accordingly.
- .7 Monitor on-site waste management activities by conducting periodic site inspections to verify: state of signage, contamination levels, bin locations and condition, personnel participation, use of waste tracking forms and collection of waybills, receipts and invoices.
- .8 On-site sale of salvaged materials is not permitted unless authorized in writing by Consultant and provided that contractor adheres to site safety regulations and security requirements.
- .9 Remove materials destined for reuse and recycling as Work progresses and as bins become filled.

1.7 SUBMITTALS

- .1 Prepare and submit on monthly basis, throughout project or at intervals agreeable to Owner the following:
 - .1 Receipts, scale tickets, waybills, and/or waste disposal receipts that show quantities and types of materials reused, recycled, or disposed.
- .2 Submit prior to final payment the following:
 - .1 Provide receipts, scale tickets, waybills, waste disposal receipts that confirm quantities and types of materials reused, recycled or disposed of and destination.

1.8 USE OF SITE AND FACILITIES

- .1 Execute Work with minimal interference and disturbance to normal use of premises.
- .2 Maintain security measures and ensure Owner's space is secure at the end of every work session. Ensure that sub-trades and others do not work within the space unless security of the place of work is assured, before, during and after the work.
- .3 Cover all disposal bins for transport of waste and recycling material between the Place of the Work and the temporary disposal site on the Owner's property. Transport facilities that must be covered within the building include hand carts fitted with tarps tightly to avoid release of dust into areas occupied by owner.

1.9 WASTE PROCESSING SITES

- .1 Contractor is responsible to research and locate waste diversion resources and service providers. Salvaged materials are to be transported off site to approved and/or authorized recycling facilities or to users of material for recycling.

1.10 STORAGE, HANDLING AND PROTECTION

- .1 Store materials to be reused, recycled and salvaged within bins or containers in locations found mutually agreeable to Contractor and Owner. Owner shall provide final approval of all such storage locations.
- .2 No waste material shall be stock piled directly on ground. All waste material intended for landfill shall be deposited directly into disposal bins.
- .3 Unless specified otherwise, materials removed become Contractor's property.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility. Transport salvageable and recyclables to Municipal transfer station or similar recycling facility.
- .5 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials.

- .6 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities and as follows:

- .1 On-site source separation is recommended.
- .2 Remove co-mingled materials to off-site processing facility for separation.

1.11 WASTE DISPOSAL

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose waste, volatile materials, mineral spirits and other solvents, oil, paint thinner or paint into waterways or storm water swales or in sewage system.
- .3 Remove waste to landfill as bins become filled.
- .4 Do not dispose topsoil, excess or disposed granular fill and concrete, organic material removed during site demolition or removed trees in sanitary landfills. Dispose such materials appropriately at alternative sites including Municipal composting facility.

1.12 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 Products - NOT USED

Part 3 Execution

3.1 APPLICATION

- .1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations, legislation and codes.

3.2 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11.
- .2 Leave Work area broom-clean at end of each day.
- .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.
- .4 Waste Management: separate waste materials for reuse and recycling in accordance with this section and as follows:
 - .1 Remove recycling containers and bins from site and dispose materials at appropriate facility.

3.3 DIVERSION OF MATERIALS

- .1 Separate materials from general waste stream and stockpile in separate piles on tarps or other protection for native grade or within containers and consistent with applicable fire regulations.
 - .1 Identify containers or stockpile areas according to material sorted into them.
 - .2 Provide instruction on disposal practices.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All Sections.

1.2 REFERENCE STANDARDS

- .1 The Construction Act: The Construction Act, R.S.O. 1990, c C.30; also referenced as "C.A."
- .2 Ontario Association of Architects (OAA) / Ontario General Contractor's Association (OGCA) OAA/OGCA Document Number 100 - 2018, OAA/OGCA Take-Over Procedures, for Use on Projects Under the Construction Act, R.S.O. 1990, c C.30. "Recommended Procedures Concerning Substantial Performance of Construction Contracts and Completion Take-Over of Projects". This Document may be referred to as "OAA/OGCA TAKE-OVER PROCEDURES (CA)".
- .3 The requirements of the Contract may exceed the named standards. Modify Take-Over procedures to achieve conformance to the Sections of the Specifications in the Project Manual.

1.3 INSPECTIONS RELATED TO SUBMITTALS:

- .1 Follow Stages within OAA/OGCA Document Number 100 - 2018, OAA/OGCA Take-Over Procedures, for Use on Projects Under The Construction Act, R.S.O. 1990, c C.30 and as modified by the Specifications.
- .2 Conduct or arrange to have conducted visits to the site for inspection of systems and devices, testing and other activities required to obtain all reports and certificates associated with Closeout prior to application for Substantial Performance of the Contract.
- .3 Refer to other Sections for Closeout Documents and inspections and arrange the following as a minimum prerequisite for application for Substantial Performance of the Contract:
 - .1 Final Inspection Report and sign-off by fire suppression system designer.
 - .2 Final inspection and sign-off submittals by other delegated designers.
 - .3 Complete Testing, Adjusting and Balancing of air handling systems and equipment.
 - .4 Test all installed electronic hardware.
 - .5 Conduct a Fire Alarm System Verification.
 - .6 Provide final ESA Inspection Certificate.
 - .7 Provide final TSSA reports including tags for equipment fueled by natural gas, as applicable.
 - .8 Conduct test of battery-powered exit and emergency lighting facilities and provide attestation letter.
 - .9 Provide reports containing the test results of testing for continuity of communications cables.
 - .10 Conduct and submit reporting associated with an Integrated Life Safety Study.
 - .11 As-built documents and close out submittals.

1.4 VALUE OF AS-BUILT DRAWINGS AND CLOSEOUT DOCUMENTS:

- .1 As-built drawings and closeout documents have a value of **\$25,000.00** and this amount will be withheld by the Consultant until they are submitted for review, modified as required and returned to the Consultant in their final form. The final form shall be acceptable to the Consultant in order for the withheld amount to be released for payment.

1.5 DEFINITIONS:

- .1 Refer to executed Contract, OAA/OGCA Document Number 100 - 2018, OAA/OGCA Take-Over Procedures, the CCDC Contract and Division 01 Sections.

1.6 ADMINISTRATIVE REQUIREMENTS – SUBSTANTIAL PERFORMANCE AND COMPLETION

- .1 "C. A." shall mean the Construction Act of the Province of Ontario, latest edition.

- .2 Complete Stages stipulated within OAA/OGCA Document Number 100 - 2018, OAA/OGCA Take-Over Procedures, for Use on Projects Under The Construction Act, R.S.O. 1990, c C.30, as modified by the Sections of the Specifications within the Project Manual.
- .3 The concept of "substantial performance" and "substantially performed" and "substantially completed" is set out in subsection (1) of Section 2 of the Construction Act, latest edition which is excerpted as follows:
 - .1 "(1) For the purposes of this Act, a contract is substantially performed,
 - (a) when the improvement to be made under that contract or a substantial part thereof is ready for use or is being used for the purposes intended; and
 - b) when the improvement to be made under that contract is capable of completion or, where there is a known defect, correction, at a cost of not more than,
 - (i) 3 per cent of the first \$1,000,000 of the contract price,
 - (ii) 2 per cent of the next \$1,000,000 of the contract price, and
 - (iii) 1 per cent of the balance of the contract price."
- .4 Attention is drawn to subsection (2) of Section 2 of the Construction Act, latest edition which reads as follows:

"(2) For the purposes of this Act, where the improvement or a substantial part thereof is ready for use or is being used for the purposes intended and the owner and the contractor agree not to complete the improvement expeditiously, the price of the services or materials remaining to be supplied and required to complete the improvement shall be deducted from the contract price in determining substantial performance."
- .5 The concept of "separate holdback for finishing work" is set out in Section 22(2) of the Construction Act, latest edition which reads as follows:

"22(2) Where the contract has been certified or declared to be substantially performed but services or materials remain to be supplied to complete the contract, the payer upon the contract, or a subcontract, under which a lien may arise shall retain, from the date certified or declared to be the date of substantial performance of the contract, a separate holdback equal to 10 per cent of the price of the remaining services or materials as they are actually supplied under the contract or subcontract, until all liens that may be claimed against the holdback have expired or been satisfied, discharged or otherwise provided for under this Act."
- .6 The concept of "completed" is set out in subsection (3) of Section 2 of the Construction Act, latest edition which reads as follows:

"(3) For the purposes of this Act, a contract shall be deemed to be completed and services or materials shall be deemed to be last supplied to the improvement when the price of completion, correction of a known defect or last supply is not more than the lesser of,
 - (a) 1 per cent of the contract price; and
 - (b) \$5,000."
- .7 Prior to Substantial Performance of the Contract, the Owner may elect to occupy a portion of the Work whether the entirety of the Work is completed or not, by delivering and storing the Owner's products, furnishings and by installing equipment. This occupancy may include, through commission provided to other contractors, execution of work associated with the products and equipment supplied by the Owner. Such occupancy will be associated with the Owner's fittings, fixtures, furnishings and equipment and the personnel engaged to install them and the Contractor shall oblige the Owner by permitting this occupancy when it is safe and appropriate to permit it.
- .8 In spite of occupancy of all or a part of the Work, the Owner is not obliged to issue a Certificate for Substantial Performances of the Contract for less than the entirety of the Work.
- .9 Contractor is responsible for initiating all substantial performance procedures and reviews through written notice to sub-contractors, Authorities Having Jurisdiction, Consultant and Owner.

.10 Substantial Performance Review and Procedures:

- .1 Complete Stages stipulated within OAA/OGCA Document Number 100 - 2018, OAA/OGCA Take-Over Procedures, for Use On Projects Under The Construction Act, R.S.O. 1990, c C.30, as modified by the Contract Documents.
- .2 Contractor's Inspection: Contractor shall conduct inspection of Work, identify deficiencies and defects, and complete remedial work required to conform to Contract Documents.
- .3 Notify Owner and Consultant in writing of satisfactory completion of Contractor's remedial work and submit written verification that corrections have been made.
- .4 Collect close-out documents listed in the specifications, including, but not limited to, certificates, reports, TSSA, Electrical Safety Authority, fire alarm verification, etc. and submit As-built documents together with these reports to Consultant.
- .5 Prepare and submit maintenance manual complete with warranties and lists of sub-trades, shop drawings, product data and all field reports.

.11 Following remediation of defective work found by Contractor, the Contractor shall request that Owner and Consultant perform a field review visit with the following outcome:

- .1 Owner and Consultant together with the Contractor will tour the site to review the work and to identify defects and deficiencies.
- .2 A deficiency list will be prepared by the Consultant.

.12 Following receipt of Consultant's list of deficient work, the Contractor shall correct work identified as deficient.

.13 Following correction of deficiencies, Contractor shall submit written confirmation that tasks have been performed as follows:

- .1 Work: completed and inspected for compliance with Contract Documents.
- .2 Defects: corrected and deficiencies completed.
- .3 Equipment and systems: tested, adjusted, balanced and fully operational.
- .4 Commissioning of mechanical systems: completed in accordance with 01 91 13 General Commissioning (Cx) Requirements and copies of final Commissioning Report submitted to Consultant.
- .5 Work: complete and ready for final review.
- .6 Final Review for Substantial Performance of the Contract:
 - .1 Following completion of remedial work, collection of project documentation and certificates, request final review of Work by Owner and Consultant. Contractor shall attend review.
 - .2 Complete all deficient work identified by Consultant during final review. Request re-inspection.
- .7 Declaration of Substantial Performance: when Owner and Consultant consider deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
- .8 Commencement of Construction Act periods and Warranty Periods: date of Certificate for Substantial Performance (Ontario Construction Act Form 9) shall be commencement date for commencement for warranty period.
- .9 Date of publication of notice of substantial performance shall become the commencement date for the lien period prior to release of hold back.
- .10 Payment of Holdback: refer to Construction Act.
- .11 Final Payment and Deemed Completion:
 - .1 When Owner and Consultant consider final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
 - .2 Following receipt of written notification that work is entirely completed, Consultant and Owner will attend the site to conduct final field review.

- .3 If a list of work deemed incomplete arises from final field review, Contractor shall complete outstanding items and request field review.
- .4 Provided that all deficient items are completed to the satisfaction of Owner, final Certificate for Payment will be issued following receipt of Contractor's final application for payment.

Part 2 Products

2.1 DEFICIENCY LIST

- .1 Prepare a list of incomplete items and submit to Consultant prior to making application for Substantial Performance of the Work. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed that are outside the limits of construction:
 - .1 Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 - .2 Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 - .3 Include the following information at the top of each page:
 - .1 Project name.
 - .2 Project number.
 - .3 Date.
 - .4 Name of Owner.
 - .5 Name of Consultant.
 - .6 Name of Contractor.
 - .7 Page number.
 - .8 Include value of items on the list, and reasons why the item of Work is incomplete or deficient.
 - .9 Include space for Consultant's verification check and any additional items that the Consultant may add during Preliminary Review.
 - .10 Include space for Contractor's Correction or Completion Date.

Part 3 Execution

3.1 PROCEDURES ASSOCIATED WITH SUBSTANTIAL PERFORMANCE AND DEEMED COMPLETION

- .1 Refer to Stages stipulated within OAA/OGCA Document Number 100 - 2018, OAA/OGCA Take-Over Procedures, for Use On Projects Under The Construction Act, R.S.O. 1990, c C.30.
- .2 Contractor shall apply to Consultant and Owner for review of the Contractor's application for Substantial Performance
- .3 Acceptance of Application for Substantial Performance of the Work by the Consultant will result in the issuance of:
 - .1 Certificate of Substantial Performance, showing date for Substantial Performance of the Work.
 - .2 List of deficiency items to be completed or corrected including:
 - .3 The amount of the Contract Price not certified for deficiencies will be a minimum of two- hundred percent (200%) of the estimated cost to correct the deficiencies
- .4 Rejection of Application for Substantial Performance of the Work by the Consultant will result in the issuance of the following documents:
 - .1 List of deficiency items to be completed or corrected.
 - .2 The amount of the Contract Price not certified for deficiencies will be a minimum of 200% of the estimated cost to correct the deficiencies.
 - .3 When Contractor has completed deficiencies, re-start application for Substantial Performance of the Work procedure above.

3.2 TURNOVER PROCEDURES

- .1 Prior to requesting final review, the Contractor will undertake the following items in preparation for turnover of the Work or a portion thereof to the Owner for use and occupancy.
- .2 Arrange all final inspections of the Work or portion thereof with Authorities Having Jurisdiction and obtain documentation accepting installation including but not limited to the following:
 - .1 Testing and Air Balancing Report (legible technicians' worksheets are acceptable for phased portions of the Work).
 - .2 Gas-Fired Appliances inspection.
 - .3 Final Plumbing Inspection.
 - .4 Domestic Water Quality Test Report.
 - .5 Sprinkler dry test verification letter stamped and signed by Delegated Design Professional Engineer responsible for sprinkler design, if applicable.
 - .6 Mechanical equipment start-up reports (Boilers, HVAC Units, Chillers, Water Softeners, etc.).
 - .7 Control Subcontractor verification letter confirming Building Monitoring Systems have been tested and are operational.
 - .8 Security System verification.
 - .9 Data/Voice Cabling System verification.
 - .10 Confirmation that all code-required signage (electromagnetic locks, etc.) have been installed.
 - .11 Emergency Generator & Automatic Transfer Switch test report (Number of copies as specified).
 - .12 Fire Alarm Verification Report (legible technicians' worksheets are acceptable for phased Work).
 - .13 Door Controls Verification Certificate.
 - .15 Emergency Lighting Verification.
 - .16 Electrical distribution system inspection and load balancing.
 - .17 ESA Certificate for electrical systems and devices.
 - .18 Nurse Call System verification.
- .3 Submit a written declaration to Consultant that the following have been performed:
 - .1 Work has been completed and inspected for compliance with Construction Documents.
 - .2 Start-up of equipment and systems is completed and that they are functioning within specified operating parameters.
 - .3 That known defects have been corrected and deficiencies have been completed.
 - .4 That equipment and systems have been tested, adjusted and balanced and are fully operational.
- .4 Provide Certificates required by Fire prevention officer and utility companies and all other Authorities Having Jurisdiction.
- .5 Provide completed Operation and Maintenance Data Manuals to Consultant.
- .6 Provide As-Built and Specifications and submit to Consultant.
- .7 Ensure that operation of systems have been demonstrated to Owner's personnel.
- .8 Ensure that Work or portion thereof is complete and ready for Final Review.

3.3 FINAL REVIEW AND STATEMENT OF DEEMED COMPLETED

- .1 Request final review when the Work identified in deficiency list noted as incomplete is completed or corrected. The Consultant and Contractor will make a final review of the Work.
- .2 Results of completed review will form the basis of Consultant's acceptance of application for Total Completion and issuance of final progress payment and for release of any holdbacks.
- .3 Should the Consultant determine that excessive deficiencies still exist, the final review will cease and the Contractor shall re-start the application procedure.

3.4 FINAL PAYMENT

- .1 Following completion of lien period, submit application for final payment in accordance with the supplementary conditions of the CCDC 5B.
- .2 Submit certified copy of inspection list of items to be completed or corrected, endorsed and dated by *Consultant*. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance

3.5 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11.
- .2 Remove surplus materials, excess materials, rubbish, tools and equipment.

3.6 FINAL ACCEPTANCE

- .1 Final acceptance of the *Work* will occur after completion of Performance Testing and Fine Tuning required by Section 01 75 13 – Checkout Procedures and Facility Start-Up.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All Sections

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 The Closeout Submittals including, but not limited to, all maintenance materials, maintenance instructions, shop drawings, manuals, warranties, certificates, supplier and sub-trade contract list, as-built drawings and other materials have a value of **\$3,000.00** and this sum will be withheld by the Payment Certifier until these items are received, reviewed and found acceptable to the Owner.

1.3 ACRONYMS:

- .1 Cx - Commissioning.
- .2 HVAC - Heating, Ventilation and Air Conditioning.
- .3 TAB - Testing, Adjusting and Balancing.
- .4 WHMIS - Workplace Hazardous Materials Information System.

1.4 INSPECTIONS RELATED TO SUBMITTALS:

- .1 Conduct or arrange to have conducted visits to the site for inspection of systems and devices, testing and other activities required to obtain all reports and certificates associated with Closeout prior to application for Substantial Performance of the Contract.
- .2 Refer to other Sections for Closeout documents and inspections and arrange the following as a minimum prerequisite for application for Substantial Performance of the Contract:
 - .1 Fire Alarm Verification.
 - .2 Sprinkler system designer sign-off, if applicable.
 - .3 Test results of testing for continuity of communications cables.
 - .4 ESA Inspection Certificate.
 - .5 TSSA reports applicable.
 - .6 As-built documents and close out submittals.
- .3 Collect reports and certificates and submit with closeout submittals.

1.5 PROCEDURES TO DETERMINE DOCUMENTS REQUIRED:

- .1 Contractor's Pre-Substantial Performance Meeting:
 - .1 Prior to the submitting a request for a review of the work by the Consultant to determine Substantial Performance of the Contract, convene a meeting attended by the Consultant and the Owner to review the following:
 - .1 Verify Project requirements.
 - .2 Review warranty requirements, certificates, transcripts and closeout documents.
 - .2 Owner and Consultant shall establish communication procedures for:
 - .1 Notifying Contractor of discovered construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Contractor shall:
 - .1 Establish a schedule for completion of deficient work.
 - .2 Determine reasonable response time to deficiency list.
 - .3 Organize attendance at the site by Contractor's forces and sub-contractors whose work is deficient.
 - .4 If contractor intends to utilize a third party to correct found defects considered to be under warranty, the following actions and stipulations apply:

- .1 Contractor shall provide contact information for third party firm including name, address, telephone numbers, designated contact person, and electronic communication instructions.
- .2 Firm selected must be bonded and licensed company.
- .3 Establish protocol for communication among all parties including Owner, Architect, Consultant, third party warranty contractor and Contractor.
- .5 Ensure third-party contractor is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.6 SUBMITTAL OF DOCUMENTS:

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prior to or concurrent with request for Substantial Performance review of the Work by Owner and designees, submit to the Payment Certifier, Architect and Consultant, two printed final copies of operating and maintenance manuals together with electronic copy on CD or DVD or memory stick. Organization of electronic manuals shall be identical to the printed manuals.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work. Store maintenance materials on site where directed by Architect, Payment Certifier or Consultant.

1.7 GENERAL INFORMATION

- .1 Provide consultant with the following placed within the Building Maintenance Manual:
 - .1 Complete list of names, addresses, telephone and email addresses and web sites of contractor and sub-contractors.
 - .2 Information on operation and maintenance of architectural systems and equipment installed and commissioned.
 - .3 Information on operation and maintenance of fire detection, alarm and fire protection and life safety systems and equipment installed and commissioned.
 - .4 Information on operation and maintenance of mechanical systems and equipment installed and commissioned.
 - .5 Copies of reviewed shop drawings and technical data sheets submitted.
 - .6 As-built drawings.
 - .7 Operating and maintenance manuals.
 - .8 Final commissioning plan as actually implemented.
 - .9 Completed commissioning checklists.
 - .10 Commissioning test procedures employed.
 - .11 Completed Product Information (PI) and Performance Verification (PV) report forms, approved and accepted by Owner.
 - .12 Commissioning reports.

1.8 FORMAT OF BUILDING INFORMATION MANUAL

- .1 Building Information Manual:
 - .1 Standard letter size paper 216 mm x 279 mm.
 - .2 Provide both digital and paper copies in identical format.
 - .3 3-hole punched paper shall be used to facilitate updating.
 - .4 Bind paper copies within 3-ring, D binders.
 - .5 Drawings, diagrams and schematics to be professionally developed.
 - .6 Electronic copy of data using PDF files organized identically to the printed version and approved by Consultant.
- .2 Use current technology for production of documentation. Place emphasis on ease of accessibility at all times, maintain in up-to-date state, compatibility with user's requirements.

- .3 Organize data as instructional manual for both electronic and paper copy of manuals.
- .4 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .5 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .6 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .7 Arrange content according to systems under Section numbers and sequence of Table of Contents.
- .8 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .9 Text: manufacturer's printed data, or typewritten data.
- .10 Drawings: provide all shop drawings and data sheet submissions with reinforced punched binder tab or within separate punch envelope.
 - .1 Bind in with text; fold larger drawings to size of text pages.
- .11 Provide red line as-built prints to architect.

1.9 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: 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 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.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.10 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Architect, Owner Payment Certifier and Consultant one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Post-Tender Addenda and Addenda issued during Bid Period.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 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.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.

- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Owner and Consultant.

1.11 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of printed opaque drawings provided by Owner.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by Change Orders.
 - .4 Details not on original Contract Drawings.
 - .5 References to related shop drawings and modifications.
- .5 Specifications: 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.
- .7 Provide digital photos, if requested, for site records.

1.12 EQUIPMENT AND SYSTEMS

- .1 For each item of equipment and each system include description of unit or system, and component parts.
 - .1 Give function, normal operation characteristics and limiting conditions.
 - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
 - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
 - .2 Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.

- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control 01 91 13 - General Commissioning (Cx) Requirements.
- .15 Additional requirements: as specified in individual specification sections.

1.13 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .1 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.

1.14 MAINTENANCE MATERIALS

- .1 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 and place in location selected by Owner.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Owner and Consultant.
 - .2 Include approved listings in Maintenance Manual.
 - .5 Obtain receipt for delivered products and submit prior to final payment.
- .2 Extra Stock 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 and place in location selected by Owner.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Owner and Consultant.
 - .2 Include approved listings in Maintenance Manual.
 - .5 Obtain receipt for delivered products and submit prior to final payment.
- .3 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 and place in location selected by Owner.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Owner and Consultant.
 - .2 Include approved listings in Maintenance Manual.

1.15 DELIVERY, STORAGE AND HANDLING

- .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 materials susceptible to freezing in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense. Permit Owner to view replacement products.

1.16 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranties 5 business days prior to application for Substantial Performance field review, to Consultant for review.
- .3 Submit, warranty information made available during construction phase, to Consultant in electronic form for review prior to each monthly pay estimate.
- .4 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
 - .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 following completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .5 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .6 Conduct joint 9-month warranty review, measured from date of substantial performance certificate, with Owner and Consultant.
- .7 Include information contained in warranty management plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
 - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to including sealed glass window units, roofing.
 - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location where installed.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to continue warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
 - .11 Organization, names and phone numbers of persons to call for warranty service.
 - .12 Typical response time and repair time expected for various warranted equipment.

- .4 Contractor's plans for attendance at 9 month post-construction warranty inspection.
- .5 Procedure and status of tagging of equipment covered by extended warranties.
- .6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .8 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .9 Written verification to follow oral instructions.
 - .1 Failure to respond will be cause for the Owner to proceed with action against Contractor or to commission work through alternative Contractor and claim cost against original contractor.

1.17 WARRANTY TAGS

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Consultant.
- .2 Attach tags with copper wire and spray with waterproof silicone coating.
- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
 - .1 Type of product/material.
 - .2 Model number.
 - .3 Serial number.
 - .4 Contract number.
 - .5 Warranty period.
 - .6 Inspector's signature.
 - .7 Construction Contractor.

Part 2 Products - NOT USED

Part 3 Execution - NOT USED

END OF SECTION

PART 1 General

1.1 RELATED SECTIONS

- .1 Section 02 41 19 Selective Demolition
- .2 Section 06 10 00 Rough Carpentry
- .3 Section 31 00 00 Earthwork
- .4 Section 32 12 16 Asphalt Paving
- .5 Section 32 12 18 Painted Traffic Lines and Markings
- .6 Section 32 14 13 Pre-Cast Concrete Unit Paving
- .7 Section 32 91 19 Top Soil Placement and Grading
- .8 Section 32 92 19 Hydraulic Seeding
- .9 Section 32 93 23 Sod

1.2 REFERENCES

- .1 Definitions:
 - .1 Clearing:
 - .1 General clearing: consists of cutting off trees, brush and shrub vegetative growth to within specified height above ground and disposing felled trees, live or dead plant material, previously uprooted trees and stumps, exposed visible boulders and surface debris rubbish.
 - .2 Clearing isolated trees: consists of cutting off to within specified height above ground of designated trees, and disposing of felled trees and debris.
 - .3 Underbrush clearing: consists of removal from treed areas of undergrowth, deadwood and trees smaller than specified trunk diameter and disposing of fallen timber and surface debris.
 - .2 Demolition: rapid destruction of building following removal of hazardous materials.
 - .3 Disposal of Organic Material Removed:
 - .1 brush and logs or branches removed shall be transported to location selected by the Contractor; not to sanitary landfill.
 - .2 Cost of chipping (if performed), handling, transport, unloading is included within Contract Price.
 - .4 Grubbing:
 - .1 General grubbing: consists of excavation and disposal of stumps, roots, exposed visible boulders, and rock fragments of specified size to minimum specified depth below existing ground surface.
 - .5 Hazardous Materials: Substances classified within Ontario Legislation that are hazardous to human health. Dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.
 - .6 Mycorrhiza: association between fungus and roots of plants. This symbiosis, enhances plant establishment in newly landscaped and imported soils.
 - .7 Pruning Definitions:
 - .1 Crown Cleaning: consists of selective removal of one or more of following items: dead, dying or diseased branches, weak branches and water sprouts.
 - .2 Crown Thinning: consists of selective removal of branches to increase light penetration, air movement and reduce weight.
 - .3 Crown Raising: consists of removal of lower tree branches to provide clearance.
 - .4 Crown Reduction or Crown Shaping: decreases tree height and/or spread.
 - .5 Vista Pruning: is selective thinning of framework limbs or specific crown areas to improve views.

- .6 Crown Restoration: improves structure, form and appearance of trees that have been severely headed or vandalized.
- .8 Recycling of Removed Asphalt Paving: Collection, grinding, placement and compaction to suit new site grading and drainage requirements.
- .9 Selective Demolition: Careful and methodical removal of selected materials, equipment and building components to permit installation of new Work.
- .10 Waste Audit (WA): detailed inventory of materials in building. Indicates quantities of reuse, recycling and landfill.
 - .1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project.
 - .2 Indicates quantities of reuse, recycling and landfill.
- .11 Waste Management Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .12 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.
- .2 American National Standard Institute (ANSI)
 - .1 ANSI A300 (Part 1)-2001, Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices (revision and re-designation of ANSI A300-1995) (includes supplements).
 - .2 ANSI A300 (Part 2)-1998, Tree Care Operations - Tree, Shrub, and Other Woody Plant Maintenance - Standard Practices - Part 2 - Fertilization.
 - .3 ANSI A300 (Part 3)-2000, Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance: Standard Practices - Part 3 - Tree Support Systems (a. Cabling, Bracing, and Guying) (supplement to ANSI A300-1995).
- .3 Canadian Nursery Landscape Association (CNLA)
- .4 International Society of Arboriculture (ISA)
- .5 Ontario Ministry of Agriculture, Food and Rural Affairs
 - .1 Publication 483-2004, Pruning Ornamentals.
- .6 Canadian Council of Ministers of the Environment (CCME)
 - .1 PN1326, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.
- .7 Canadian Federal Legislation
 - .1 Canadian Environmental Protection Act (CEPA), 1988.
 - .2 Canadian Environmental Assessment Act (CEAA), 1995.
 - .3 Transportation of Dangerous Goods Act (TDGA), 1992.
 - .4 Motor Vehicle Safety Act (MVSA), 1995.
- .8 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .2 Pest Management Regulatory Agency (PMRA), National Standard for Pesticide Education, Training and Certification in Canada (1995).
- .9 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.

1.3 REGULATORY REQUIREMENTS

- .1 Ensure all work is performed in compliance with all applicable Ontario regulations.

PART 2 Products

2.1 GEOTEXTILE:

- .1 Geotextile definition: woven synthetic fibre fabric, supplied in rolls.
 - .1 Width: 2m minimum.
 - .2 Composed of: minimum 85% by mass of polypropylene or polyester with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure for 60 days.
- .2 Physical properties:
 - .1 Factory seams: sewn in accordance with manufacturer's recommendations.
 - .2 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.
- .3 Hydraulic properties:
 - .1 Apparent opening size (AOS): to ASTM D4751.
 - .2 Filtration opening size (FOS): to CAN/CGSB-148.1 No.10 and OPSS 1860.
 - .3 Transmissivity: to ASTM D4716.
 - .4 Permittivity: to ASTM D4491.
- .4 Securing pins and washers: to CAN/CSA-G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to CAN/CSA G164.

2.2 SILT FENCING

- .1 Supply and install geotextile on wood stakes or wood frame held in place with weight for silt control structure arranged along entire perimeter of work area at outer limit of work.
- .2 Fix geotextile to wood frame using galvanized roofing nails and arrange geotextile to lie horizontally on ground for 300 mm minimum, and extend vertically on frame 610 mm. Silt fence is required during entire course of the site work and excavation work until exposed earth is covered by intended work. No silt shall be permitted run over areas beyond the extent of the work illustrated on drawings.

2.3 EQUIPMENT

- .1 Equipment and heavy machinery used to meet or exceed applicable emission requirements.
- .2 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.
- .3 Asphalt Removal:
 - .1 Use cold milling, planing or grinding equipment with automatic grade controls capable of operating from a string line, and capable of removing part of pavement surface to depths or grades for repairs to existing asphalt that would not require complete removal of asphalt paving.

PART 3 Execution

3.1 PREPARATION

- .1 Inspect site with Consultant and Owner to verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Items to remain: mark clearly.
- .3 Erect necessary access controls and safety fencing; post signage.
- .4 Identify stock-pile areas available for temporary storage of removed soil and organic material and mulched material awaiting transport off site. Where feasible, apply tarps over native grade where materials are stock-piled to prevent contamination of existing native materials with mulched and stored or stockpiled materials on site.
- .5 Identify location of new construction.

- .6 Outline scope of demolition using stakes, stings, spray paints and other means. Restore damaged markers as work progresses.
- .7 Locate and protect utilities:
 - .1 Preserve active utilities traversing site in operating condition.
 - .2 Notify and obtain locations for all buried utilities prior to commencing work.
 - .3 Notify utility companies and obtain approvals for temporary disconnection, relocation or other work required as prerequisite to demolition.
- .8 Protect batter boards and survey markers.
- .9 Ensure that vegetation designated for transplantation is transplanted prior to commencement of the work of this Section.
- .10 Protect existing pavement not designated for removal, light fixtures, statuary, signage and structures from damage. In event of damage, immediately replace or make repairs to approval of Consultant at no additional cost.
- .11 Protect existing items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Owner and at no cost to Owner.
- .12 Install swales, sumps and other measures intended to contain and control and direct stormwater affecting the area of demolition. Establish intent of all such measures with Field Engineer and Owner. Where such measures are intended to contain water that is potentially contaminated by hazardous materials, ensure that water is handled and managed in full accordance with EPA legislation.
- .13 Install silt fences and other measures intended to control the flow of storm water through the demolition location. In all circumstances ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
- .14 Protect trees and their roots, sod, plants and foliage on site and adjacent properties.

3.2 IDENTIFICATION AND PROTECTION OF TREES AND SHRUBS FOR PRESERVATION

- .1 Review Contract Documents for plant materials and trees noted to remain during the prosecution of the Work.
- .2 10m Limit: Consult Owner regarding all trees, shrubs, and garden bed plants within 10m of extent of site clearing and excavation works of any kind. Mark plant materials that are intended to remain in place during the prosecution of the Work.
- .3 4m Limit: Protect all trees, shrubs, and garden bed plants within 10m of extent of site clearing and excavation works of any kind:
 - .1 Establish limits of root systems to be preserved together with Owner.
 - .1 Identify limits for required construction excavation. Alert all workers to potential presence of root curtain within extent of excavation.
 - .2 Prune exposed roots cleanly at side of excavation trench nearest plants to be preserved. Pruned ends to point obliquely downwards.
 - .2 Protect plant and root systems from damage, compaction and contamination resulting from construction.
 - .3 For trees, ensure no pruning is done inside drip line. If pruning inside drip line is required consult an arborist or Canadian Certified Horticultural Technician (CCHT) for instruction.

3.3 TREE PRUNING

- .1 Scope of Pruning:
 - .1 Prune using crown thinning, reduction and raising techniques, all trees surrounding extent of work where tree roots had been cut during site clearing or during any other part of the work.
 - .2 Prune branches at tree trunk face to maintain tree foliage clear of building face and overhang.
 - .3 Prune to maintain 2000mm clear between tree foliage and face of eave.

- .2 Wound Treatment: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.
- .3 General:
 - .1 Prune in accordance with ANSI A300, and as directed by Departmental Representative. Where discrepancies occur between standard and specifications, specifications govern.
 - .2 Notify immediately Departmental Representative conditions detrimental to health of plant material or operations.
 - .3 Prune during plant dormant period or after leaves have matured. Avoid pruning during leaf formation, at time of leaf fall, or when seasonal temperature drops below minus 10 degrees C.
 - .4 Retain natural form and shape of plant species.
 - .5 Do not:
 - .1 Flush cut branches.
 - .2 Crush or tear bark.
 - .3 Cut behind branch bark ridge.
 - .4 Damage branch collars.
 - .5 Damage branches to remain.
- .4 Remove dead, dying, diseased and weak growth from plant material to permit retention of identified trees and in order to promote healthy growth.
- .5 Remove live branches that:
 - .1 Interfere with healthy development and structural strength including branches crossed or rubbing more important branches.
 - .2 Are of weak structure including narrow crotches.
 - .3 Obstruct development of more important branches.
 - .4 Are broken.
 - .5 Are within construction area for trees designated to remain.
- .6 Remove live branches to re-establish natural species form including:
 - .1 One or more developing leaders.
 - .2 Multiple growth due to previous topping.
 - .3 Branches extending outward from natural form.
 - .4 Undesirable sucker growth.
- .7 Remove loose branches, twigs and other debris lodged in tree.
- .8 Remove vines.
- .9 For branches under 50 mm in diameter:
 - .1 Locate branch bark ridge and make cuts smooth and flush with outer edge of branch collar to ensure retention of branch collar. Cut target area to bottom of branch collar at angle equal to that formed by line opposite to branch bark ridge.
 - .2 Make cuts on dead branches smooth and flush with swollen callus collar. Do not injure or remove callus collar.
 - .3 Do not cut lead branches unless directed by Departmental Representative.
- .10 For branches greater than 50 mm in diameter:
 - .1 Make first cut on lower side of branch 300 mm from trunk, one third diameter of branch.
 - .2 Make second cut on upper side of branch 500 mm from trunk until branch falls off.
 - .3 Make final cut adjacent to and outside branch collar.
- .11 Ensure that trunk bark and branch collar are not damaged or torn during limb removal.
 - .1 Repair areas which are damaged, or remove damaged area back to next branch collar.

3.4 ROOT GIRDLING

- .1 For girdling roots one-quarter size of trunk diameter or larger, V-cut girdling root one-half way through at point where root is crossing.
- .2 Remove exposed portion of girdling root as directed by after cleanly cutting root flush with grade on each side of parent root. Do not injure bark or parent root.

3.5 CARE OF WOUNDS

- .1 Shape bark around wound to oblong configuration ensuring minimal increase in wound size. Retain peninsulas of existing live bark.

3.6 GENERAL EXECUTION

- .1 Removal
 - .1 Remove items to minimum extent required to accommodate new work or to extent indicated on drawings.
 - .2 Do not disturb items designated to remain in place.
- .2 Disposal off-site:
 - .1 Remove any stockpiles of excess materials by an alternate disposal option once collection of that material is complete. Segregate materials by type and nature for re-use in other applications whenever possible.
 - .2 Dispose of specified material by selected alternative disposal for own use. Do not dispose of these materials in a landfill or a waste stream destined for landfill.
 - .3 Dispose of materials not designated for salvage or reuse off site in accordance with Section 01 74 19.
- .3 Sealing Storm Drains:
 - .1 Seal pipe ends and walls of manholes or catch basins when such sealing is indicated. Securely plug to form watertight seal.

3.7 REMOVAL OF EXISTING ASPHALT PAVING:

- .1 Protection:
 - .1 Protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Consultant at no additional cost.
- .2 Equipment:
 - .1 Use cold milling, planing or grinding equipment with automatic grade controls capable of operating from a stringline, and capable of removing part of pavement surface to depths or grades for repairs to existing asphalt that would not require complete removal of asphalt paving.
- .3 Removal:
 - .1 Remove existing asphalt pavement to lines and grades indicated and as site verified in the field. Cut asphalt using saws for extent of removed area.
 - .2 Use equipment and methods of removal and hauling, which do not damage or disturb pavement intended to remain.
 - .3 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
 - .4 Provide for suppression of dust generated by removal process.
 - .5 Dispose removed pavement materials at appropriate landfill or crushing facility.
- .4 Sweeping:
 - .1 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand-broom as required.

- .5 Finish Tolerances:
 - .1 Finished surfaces in areas where asphalt pavement has been removed to be within +/-5 mm of grade specified but not uniformly high or low.
- .6 Recycling of Removed Asphalt Paving: refer to Civil engineering drawings.

3.8 SITE CLEARING

- .1 Perform clearing to achieve cleared area sufficient to enable construction of Work described by contract documents.
- .2 Do not allow stripped organic material to contaminate native soil that is otherwise free from organic material.
- .3 Clearing isolated trees: cut trees indicated and grub out tree stump.
- .4 Trees, Stumps and Roots:
 - .1 Mark specific trees intended to remain in place. Protect these trees and their roots.
 - .2 Remove minimum number of trees required during site work demolition or structural demolition or to extent specifically indicated on drawings when trees are not individually annotated, but are rather part of a grove, tree line or large group.
 - .3 Remove trees within the confines of the Work of the Contract boundary or lot line, only, whichever is identified on drawings.
 - .4 Obtain written approval of Consultant prior to removal of any trees not designated for removal or when in doubt.
 - .5 When they occur near building construction areas, remove stumps and roots to level of native material found adequate to support the structure.
 - .6 When stumps and tree roots are beyond the influence of excavation for existing or new building foundations, but within an area that is intended to be covered by pavement, remove roots to extent achievable by backhoe machinery.
 - .7 Grub out stumps and roots to minimum depth 300 mm below native ground surface when stumps and roots are within landscaped areas not covered by pavements.
- .5 Vegetation:
 - .1 Perform rough cutting of shrubbery and tall vegetation to height 300 mm above ground.
 - .2 Remove brush, shrubs, fallen timber, rotten wood, rubbish, and other vegetation, as well as fences and incidental structures.
 - .3 Underbrush clearing: clear underbrush indicated and trees less than 50 mm trunk diameter to ground level. Grubbing:
- .6 Grubbing:
 - .1 Grub out exposed visible boulders and rock fragments greater than 300mm but less than 1m in diameter.
 - .2 Use hand digging and cutting methods for grubbing inside drip lines of trees which are to remain.
- .7 Top Soil:
 - .1 Perform stripping of topsoil to Contractor's best advantage and to extent required by new Work. Leave no organic material below future pavements, slabs on grade or building foundations.
 - .2 Stockpile stripped material for re-use.
 - .3 Stockpile in area with sufficient space to enable screening.
- .8 Finish:
 - .1 Leave ground surface in condition suitable for immediate grading and excavation operations.

3.9 REMOVAL OF ASPHALT PAVING:

- .1 Saw-cut limits of removed paving to form clean lines.

- .2 When removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving, prevent contamination with base course aggregates.
- .3 Remove existing asphalt pavement to lines and grades indicated on drawings and as verified in the field.
- .4 Use equipment and methods of removal and hauling, which do not damage or disturb underlying pavement.
- .5 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
- .6 Provide for suppression of dust generated by removal process.
- .7 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.

3.10 REMOVAL OF CONCRETE:

- .1 In removal of pavements, curbs and gutters:
 - .1 Remove existing concrete walks to nearest control or expansion joint present in existing, undamaged material.
 - .2 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Consultant.
 - .3 Protect adjacent joints and load transfer devices.
 - .4 Protect underlying and adjacent granular materials.

3.11 BURIED EXISTING SERVICES

- .1 Hand-dig near services in every case.
- .2 Do not excavate near services prior to establishment of a plan to stop active services in event of emergency when services must remain live.
- .3 When removing conduits, concrete duct banks or pipes under existing or future pavement area, excavate at least 300 mm below pipe invert.
- .4 Do not permit erosion of material within excavated areas to undermine adjacent surfaces and service piping, conduit or duct bank intended to remain.
- .5 Mechanical Services:
 - .1 Commission utility locating services prior to commencement of work.
 - .2 Natural Gas Supply Lines: remove, cap, modify or extend in accordance with gas utility company requirements following appropriate application to and contact with utility company. Perform work in accordance with Contract Documents and direction of Utility Provider under direction of Contractor and Field Engineer.
 - .3 Sewer and Water Lines:
 - .1 Services connected directly to Municipal service: Remove, cap, modify or extend in accordance with authority having jurisdiction and Contract Documents following appropriate application to and contact with Municipal representatives. Work may be undertaken by site services contractor or qualified plumber under direction of Contractor and Field Engineer.
 - .2 Services on the site and controlled by Owner: Remove, cap, modify or extend in accordance with Contract Documents following contact with Field Engineer or Consultant. Work may be undertaken by site services contractor or qualified plumber under direction of Contractor and Field Engineer.
- .6 Electrical Services:
 - .1 Commission utility locating services prior to commencement of work.
 - .2 Hand-dig near transformers and electrical service connections to structures.
 - .3 When service is under control of owner, conduct work to remove, modify, temporarily disconnect or extend under care of qualified electrician engaged by Contractor to perform work specified by Contract Documents.

- .4 When service is connected to main transformer or utility service, make appropriate applications, pay fees and contact utility provider for direction prior to removal, disconnection, extension or modification. Conduct such work under care of qualified electrician engaged by Contractor to perform work required by Utility and under direction of Utility and Contractor.
- .7 Communication Services:
 - .1 Commission utility locating services prior to commencement of work.
 - .2 Do not excavate near communications monuments and pedestals without expressed written consent or the presence of representative of communications utility company.
 - .3 Hand-dig near communication demarcation point or monument or pedestal or utility pole or where such services are known to be connected to structures.
 - .4 When service is under control of Owner, conduct work to remove, modify, temporarily disconnect or extend under care of qualified electrician or communications system technical expert engaged by Contractor to perform work specified by Contract Documents.
 - .5 When service is connected to utility provider's service, make appropriate applications, pay fees and contact utility provider for direction prior to removal, disconnection, extension or modification. Conduct such work under care of qualified electrician or communications system technical expert engaged by Contractor to perform work required by Utility and under direction of Utility and Contractor.

3.12 DISPOSAL

- .1 Salvage and Re-Use:
 - .1 The Owner intends that all materials removed that may be made useful by other means at other locations on the site shall be salvaged for re-use.
 - .2 All materials removed that are not designated for salvage, become the property of the Contractor who shall dispose them appropriately off-site.
- .2 Water and Water Courses:
 - .1 Do not dispose of waste volatile materials such as, mineral spirits, oil, petroleum-based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout the project.
 - .2 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.
 - .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.
- .3 Concrete:
 - .1 Dispose to crushing operation or crush on site for use as clean fill or aggregate.
- .4 Asphalt:
 - .1 Dispose to crushing operation or mill on site for re-use as appropriate.
- .5 Vegetation:
 - .1 Trees:
 - .1 Limb and cut trunks into manageable lengths.
 - .2 Chip branches on site or remotely.
 - .3 Grind stumps; remove roots entirely by excavation as noted herein.
 - .4 Dispose all parts of trees off site at discretion of Contractor, including excavated roots at location that is not sanitary landfill.
 - .5 Removed trees become the property of the Contractor unless otherwise noted.
 - .2 Grass and Sod: dispose to organic waste site location.
 - .3 Plantings not designated for transplantation: dispose to appropriate disposal site intended for organic matter.

.6 Topsoil:

- .1 Remove, screen on site and stock pile for re-use as necessary.
- .2 Excess topsoil shall be disposed off-site at a location determined by the Contractor.

.7 Granular Material:

- .1 Clean granular free of organic material may be retained on site and used as fill in accordance with direction of the Field Engineer.
- .2 Excess excavated granular material shall be disposed off site at a location determined by the Contractor.

3.13 RESTORATION

- .1 Restore areas and existing works outside areas of demolition to conditions that existed prior to commencement of work.
- .2 Use soil treatments and procedures, which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.14 CLEANING

- .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.
- .2 Use only cleaning solutions and procedures, which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

END OF SECTION

PART 1 General

1.1 RELATED SECTIONS

- .1 Section 02 22 70 Site work Demolition and Removal
- .2 Section 06 10 00 Rough Carpentry
- .3 Section 08 11 00 Metal Doors and Frames
- .4 Section 09 25 00 Gypsum Board Assemblies
- .5 Section 09 65 70 Sheet Vinyl Floor
- .6 Section 09 91 23 Painting
- .7 Section 10 26 00 –Wall Protection and Corner Guards
- .8 Section 21 50 01 – Mechanical Design and Build Specification
- .9 Section 26 05 00 Electrical Design and Build Specification Common Requirements

1.2 SUMMARY

- .1 Provide demolition work to facilitate new construction and renovations, connection of services or integration of new work and materials into existing building.
- .2 Limit demolition to the minimum required to facilitate efficacious installation of new materials or new work associated with new construction.
- .3 Dispose materials demolished
- .4 Remove materials intended for salvage and place in secure storage.
- .5 Refer to Section 01 73 00 Execution for cutting and patching.

1.3 REFERENCES

- .1 CSA S350-M80 - Code of Practice for Safety in Demolition of Structures

1.4 QUALITY ASSURANCE

- .1 Regulatory Requirements:
 - .1 Conform to The Occupational Health and Safety Act, and Regulation for Construction Projects.
 - .2 Conform to OBC and with special attention to Article 2.3.2.3 as applicable.
 - .3 Conform to Fire Code, Regulation under Fire Marshals Act, with special attention to Part 8.
 - .4 Convene a meeting before erection of Infection Control Barriers, following erection of barriers with Owner's Infection Control designee and receive consent to commence Work prior to starting selective demolition.

PART 2 Products

2.1 MATERIALS

- .1 Hoarding and Dust Control:
 - .1 Refer to Section 01 56 00 for access control materials.
 - .2 Refer to Section 01 15 00 Infection Control Measures for barrier components and assembly and enclosure environmental requirements.
- .2 Scaffold: use and erection in accordance with all applicable legislation.
- .3 Demolished Materials and Demolition Waste:
 - .1 Except as indicated to be relocated, salvaged or otherwise reused, materials demolished shall become property of this section. Remove from Site.
- .4 Salvaged Materials:
 - .1 Review drawings to establish materials, equipment, and devices that require removal and re-installation.

- .2 Salvaged Items noted for use and installation in new circumstances shall be stored in a secure location and maintained free of damage until ready for reinstallation. Fenced area around occupied building is not considered secure storage for debris, materials or contractor use. Use locked, weather-tight containers if storage is outside of building. Use heated space where items are subject to damage due to freezing. Maintain air circulation around stored items. Prevent mould growth on stored items.
- .3 Remove such items using care to prevent damage or distortion.

2.2 RED CONSTRUCTION TAPE:

- .1 Acceptable Materials:
 - .1 Tuck Tape – red sheathing tape to meet CMHC report No. 11955.
 - .2 3m red sheathing tape to meet CMHC report no. 11955.

2.3 POLYETHYLENE FILM:

- .1 to CAN/CGSB-51.34, 0.15 mm thick 6 mil (6/1000 of an inch) and as follows:
 - .1 Minimum weight of materials: not less than 0.0915 kg/square metre (2.7 oz./square yard).
 - .2 Vapour transmission using Method A, ASTM E96, not to exceed 23 perms.
 - .3 Abrasion and tear resistance to ASTM D1117
 - .4 Completed assembly water penetration resistance to result in zero leakage.

2.4 WOOD OR STEEL STUDS:

- .1 Stud grade, SPF or better.
- .2 Steel studs selected to suit span and exposure conditions including duration of partition.

2.5 PANEL MATERIALS

- .1 Reference Standard:
 - .1 Plywood, particleboard, OSB shall be free of added urea-formaldehyde and meet or exceed requirements of CAN/CSA-Z809 or FSC or SFI certified.
 - .2 Panel materials shall meet or exceed CSA O325.0
 - .3 Douglas Fir Plywood (DFP): to CSA O121, standard construction.
 - .4 Canadian softwood plywood (CSP): to CSA O151, standard construction.
 - .5 Poplar plywood (PP): to CSA O153, standard construction.
 - .6 Mat-formed structural panel boards (OSB): to CAN O437.

PART 3 Execution

3.1 PREPARATION

- .1 Conform to requirements of Division 01.
- .2 Protect existing adjacent work against damages which might occur from falling debris or other causes due to work of this Section.
- .3 Erect and maintain Infection Control Barriers and enclosures with negative air pressure in the Place of the Work as required to prevent spread of contaminated air, dust and fumes to other parts of building. On completion, remove partitions and make good surfaces to match adjacent surfaces of building.
- .4 Together with the Owner and the Contractor, reach mutual agreement regarding position of waste bins, use of driving aisle and parking areas throughout entire course of work.
- .5 Establish fencing and access control measures prior to commencing demolition.
- .6 Co-ordinate making safe electrical devices, capping plumbing and removal of fixtures prior to commencement of demolition.

3.2 PROTECTION:

- .1 This section shall provide, supply and install measures and means to mitigate risk of injury to persons using the building at all times during the course of the work.
- .2 This section shall protect building users from injury due to slipping on floor or ground surfaces, injury due to falling materials of any kind, injury to accidental access into the construction area.
- .3 Demolition must be completed within the confines of the work area and, in such a way that limits dust and debris produced to not adversely affect the building or its users.
- .4 Achieve protection using scaffolds, hoarding and Infection Control Barriers within the building and through use of scaffold, hoarding and fencing outside of the building and generally as follows:
 - .1 Conform to requirements of Division 01, in particular Section 01 15 00 Infection Control Measures and Section 01 73 00 Execution regarding requirement to maintain the existing building in a dry and protected state.
 - .2 Protect existing adjacent work against damage which might occur from falling debris or other causes due to work of this section.
 - .3 Erect and maintain Infection Control Barriers to isolate demolition work from other parts of the building. Install Infection Control Measures and establish negative air within the Place of the Work relative to the balance of the building prior to commencing demolition and maintain, including the relocation of such protection for the entire course of the work.
 - .4 Upon completion of the work, remove Barriers and make good surfaces to match adjacent surfaces of building.
 - .5 Fastening of building protection shall not result in a compromise to the thermal and moisture protection of the building or that could permanently disfigure or damage any exposed surface in service.
 - .6 Control access to the work site by building users with appropriate hoarding, scaffolding, netting, fencing or other means of security to maintain a safe environment for persons using the existing facility or users of other buildings on the property.
 - .7 Refer to Section 01 56 00 for access control methods.

3.3 GENERAL CONDITIONS

- .1 Demolished areas of the existing building will be reconstituted in their current use in some cases. Demolition in these areas must be kept to the minimum required to complete the work.
- .2 This section shall protect building users from injury due to slipping on floor or ground surfaces, injury due to falling materials of any kind, injury to accidental access into the construction area. Achieve protection using scaffolds, hoarding and dust tight barriers within the building and through use of scaffold, hoarding and fencing outside of the building.
- .3 Ensure that refuse bins used to transport construction waste are covered with tarps or otherwise enclosed for their full lengths and that vehicles transporting waste are similarly covered by tarps.
- .4 Coordinate making safe electrical devices, capping of plumbing services and removal of fixtures prior to commencement of demolition.
- .5 Prior to commencing selective demolition or construction work within spaces outside of the Place of the Work, institute Infection Control Measures in these areas and obtain written consent of the Owner's Infection Control designee prior to commencement of Work.
- .6 Sleeve new work associated with utilities or conductors where new holes are created. Cut or core passages for conduit, ducts and conductors that cross between existing rooms and spaces into new construction areas. Coordinate demolition, cutting and patching in order to minimize cutting associated with these services.
- .7 Cut and patch walls, floors and existing floor structure to accommodate installation of new elements. Minimize cutting.

- .8 This section shall be responsible for maintaining stability of existing building, bearing walls, columns and arches or beams throughout the course of demolition. Do not cut or core structural elements without expressed written permission of the Consultant.

3.4 PERFORMANCE

- .1 Work of this section shall closely adhere to requirements of Section 01 73 00 for cutting and patching.
- .2 This section shall cut materials using straight lines achieved with hand tools or powered tools unless work requires coring or drilling. Coring or drilling shall also be achieved with powered tools.
- .3 Sledge hammers, jack hammers and other impact tools including standard pry bars, hammers may be used within the field of demolished surfaces, however, edges or boundaries of surfaces demolished using these methods shall be square cut with power tools along lines established as parallel or perpendicular to the existing building.
- .4 Materials and debris shall not be stacked in building to extent that overloading of any part of structure will occur.
- .5 At end of each day's work leave work in safe condition ensuring that no parts of structure are in danger of collapsing.
- .6 Carry out demolition in accordance with requirements of CSA S350-M80. Demolish structure and remove materials from Site.
- .7 Demolish and remove interior partitions, walls, ceilings, flooring down to structural substrate (concrete) to expose existing sub-floor. Mechanically scrape and remove adhesive residue.
- .8 Demolish masonry walls in small sections. Remove and lower structural members and other heavy objects with safe and suitable equipment.
- .9 Firestopping and Smoke Seal: In event that work of this section impacts on integrity of fire separations, ensure that trade performing firestopping is notified.
- .10 Demolish windows, doors and trim and associated elements and remove materials from Site, except for materials being re-claimed or re-installed. Store these items in secure locations as instructed by Owner.

3.5 DISPOSAL OF WASTE MATERIALS

- .1 Selling or burning of materials on Site is not permitted.
- .2 Conform to requirements of Municipality regarding disposal of waste materials.
- .3 Materials prohibited from municipality waste management facilities shall be removed from Site and dispose of at recycling companies specializing in recyclable materials.
- .4 This section is solely responsible for disposal of all removed elements including bituminous products such as existing roofing materials. This material shall be disposed in appropriate landfill.

3.6 COMPLETION

- .1 Upon completion, remove protective elements and scaffolding. Perform required remedial work to restore surfaces affected by installation of protective measures to conditions equal to conditions found at commencement of the work.

END OF SECTION

Part 1 General

1.1 SUMMARY – CONCRETE WORK WITHIN PROJECT SCOPE:

- .1 Lean concrete fill – not illustrated or defined in scope; utilized locally as determined by site conditions for circumstances approved by Field Engineer.
- .2 Footings for walls, piers, columns.
- .3 Site-Cast Walls to position matching finished floor elevation.
- .4 Site-Cast curbs and up-stands associated with grade level wall conditions and varying exterior ground level relative to floor level.
- .5 Formed and site-cast engaged pilasters, and piers.
- .6 Formed beam pockets, column pockets, up-stands and casting-in of anchor bolts, bearing plates.
- .7 Casting of interior concrete slab placed inside the building.
- .8 Grout: non-shrink, applied dry pack and poured for various purposes during installation of structural steel, structural cast-in-place concrete and plant-cast concrete products.
- .9 Interior flatwork:
 - .1 Ground level floor slab placed over new insulation, existing concrete, service trenches created and miscellaneous patching of existing concrete cut to accommodate new or remedial work.
 - .2 Concrete placed to fill voids and gaps between the new finished floor or in new concrete walls and up-stands created to support new stone masonry and other adjacent elements such as existing and new steel columns or pre-engineered steel frames, masonry or cast-in-place wall elements, etc.
 - .3 Interior housekeeping pads placed below mechanical and electrical equipment and devices. Refer to mechanical and electrical drawings for the scope of this work.
 - .4 Interior service trenches, pits and sumps complete with cast-in-place elements designed to support steel edging, grilles and covers and cover plates.
 - .5 Refer to Interior Design Drawings for rooms and spaces that is exposed to view in service - noted as "SC" or "Sealed Concrete" on drawings.
- .10 Exterior flatwork and features:
 - .1 Reinforced concrete sidewalks, cast-in-place concrete curbs and cast-in-place slabs-on-grade including those associated with landscaping work and concrete cast-in-place as a base for concrete unit paving.
 - .2 New cast slabs for patios complete with foundation walls.
 - .3 Replacement of existing damaged concrete slabs on grade and walks within Municipal right-of-way.
 - .4 Installation of reinforced concrete walks crossing the vehicle entrances to the site
- .11 New hot-dipped Galvanized hollow structural steel bollards: filling with concrete.
- .12 New concrete fill within new steel stair tread pans fabricated of sheet steel.

1.2 RELATED SECTIONS

- .1 Section 00 31 00 Designated Substance Study Report and Phase 2 Environmental Assessment Report.
- .2 Section 02 41 13 Site Clearing, Grubbing, Protection of Landscape and Site Work Demolition.
- .3 Section 02 41 19 Selective Demolition.
- .4 Section 03 48 00 Plant Precast Architectural Concrete Specialties.
- .5 Section 04 05 10 Masonry Procedures.
- .6 Section 04 08 00 Masonry Reinforcing and Connectors
- .7 Section 04 09 00 Masonry Accessories
- .8 Section 04 22 00 Concrete Unit Masonry.
- .9 Section 04 43 23 Quarried Stone Veneer Cladding.

- .10 Section 05 12 10 Structural Steel for Buildings.
- .11 Section 05 00 00 Metal Fabrications.
- .12 Section 05 51 00 Metal Stairs and Ladders
- .13 Section 06 10 00 Rough Carpentry.
- .14 Section 07 13 26 Self-Adhered Waterproofing Membrane.
- .15 Section 07 21 13 Board Insulation
- .16 Section 07 27 10 Water Resistive Barrier, Air Barrier and Transition Membranes
- .17 Section 07 92 00 Joint Sealants
- .18 Section 31 00 00 Earthwork
- .19 Mechanical and electrical divisions for exterior concrete slabs placed on ground (grade), concrete placed to support natural gas meter and housekeeping slabs.

1.3 REFERENCES

- .1 General – Cast-In-Place Concrete:
 - .1 All concrete materials, formwork, tolerances and construction shall conform to all applicable requirements of CAN/CSA A23.1-09/A23.2-09. This document is referenced as the “standard”.
 - .2 Standard is available for temporary viewing on request.
 - .3 All formwork and finishing associated with architectural concrete shall conform to the design and construction standards stipulated within CAN/CSA-S269.3 with specific attention to the requirements for deflection, freedom from defects in the form facing material that will reflect into the finished surface, sealing of vertical joints and methods of tightening formwork at horizontal joints to prevent leakage. Deflection of all facing material spanning between supports and the deflection of supporting materials is hereby limited to 0.0025 times the span between supports.
- .4 Architectural Concrete:
 - .1 Refer to list of architectural concrete elements below.
 - .2 All concrete slabs exposed to view in service or covered with specified floor coverings are hereby classified as architectural concrete.
 - .3 Refer to Section 8.3 of the standard for particular requirements.
 - .4 Architectural concrete mix shall not be contaminated by other mixes.
- .5 Specific references to the requirements for the concrete work shall be construed within the context of and read together with the entirety of CAN/CSA A23.1-09/A23.2-09 and closely adhere to the following aspects of this standard as follows:
 - .1 Section 4 – Materials and Concrete Properties.
 - .2 Section 5 - Production and Delivery.
 - .3 Section 6 – Formwork, Reinforcement and Pre-stressing.
 - .4 Section 7 – Placing, Finishing and Curing Concrete.
 - .5 Section 8 – Concrete with Special Performance or Materials Requirements.
 - .6 Sub-Sections to Section 8 as follows:
 - .1 8.1 General Requirements.
 - .2 8.3 Architectural Concrete.
 - .3 8.3.4 Formwork for Special Architectural Finishes.
 - .4 8.3.5 Placing of Architectural Cast-in-Place Concrete
 - .5 8.7.3 Requirements for C, F, N, A and S class exposure.
 - .6 8.7.6 Curing Requirements for C-1 architectural concrete and Table 20, Curing Type 3 – Extended Wet Curing.
- .6 Contractor shall arrange inspection of founding conditions, concrete forms, reinforcing arrangement, concrete mix and placement with field engineer and Authorities Having Jurisdiction.
- .7 Extended wet curing shall be used for 7 days following casting and finishing of all architectural concrete through means of a curing blanket specified herein.

- .2 Abbreviations and Acronyms:
 - .1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement.
 - .2 Type GU, GUb and GUL - General use cement.
 - .3 Fly ash:
 - .1 Type F - with CaO content less than 15%.
 - .2 Type CI - with CaO content ranging from 15 to 20%.
 - .3 Type CH - with CaO greater than 20%.
 - .4 GGBFS - Ground, granulated blast-furnace slag.
- .3 American Concrete Institute (ACI)
 - .1 American Concrete Institute (ACI), SP-66-04, ACI Detailing Manual.
 - .2 ACI 303R Guide to Cast-in-Place Architectural Concrete Practice
 - .3 ACI 309.2R Guide to Identification and Control of Visible Surface Effects of Consolidation on Formed Concrete Surfaces.
- .4 American Society for Testing Materials:
 - .1 ASTM A82/A82M, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - .2 ASTM A143/A143M, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .3 ASTM A185/A185M, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - .4 ASTM A775/A775M-07b, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
 - .5 ASTM C1017/C1017M-07, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - .6 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .7 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .8 ASTM C309-07, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .9 ASTM C494/C494M-10a, Standard Specification for Chemical Admixtures for Concrete.
 - .10 ASTM D1751-04(2008), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - .11 ASTM D1751e1, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - .12 ASTM D1752-04a(2008), Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
 - .13 ASTM D260-86(2001), Standard Specification for Boiled Linseed Oil.
 - .14 ASTM D1751-04, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non extruding and Resilient Bituminous Types).
 - .15 ASTM E96/E96M, Standard Test Methods for Water Vapor Transmission of Materials.
- .5 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-19.24-M, Multicomponent, Chemical-Curing Sealing Compound.
 - .3 CAN/CGSB-25.20-95, Surface Sealer for Floors.
 - .4 CAN/CGSB-37.2-M, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
 - .5 CGSB 51-GP-51M, Polyethylene Sheet for Use in Building Construction.
- .6 Canadian Standards Association:
 - .1 CAN/CSA-A23.3, Design of Concrete Structures.
 - .2 CAN/CSA-G164-M, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA-A23.1-09/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

- .4 CSA A283-06, Qualification Code for Concrete Testing Laboratories.
- .5 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .6 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
- .7 CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .8 CSA W186-M, Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .9 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .10 CSA-O86S1-05, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
- .11 CSA O121-M1978(R2003), Douglas Fir Plywood.
- .12 CSA O151-04, Canadian Softwood Plywood.
- .13 CSA O153-M1980(R2003), Poplar Plywood.
- .14 CAN/CSA-O325.0-2(R2003), Construction Sheathing.
- .15 CSA O437 Series-93(R2006), Standards for OSB and Waferboard.
- .16 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
- .17 CAN/CSA-S269.3-M92(R2003), Concrete Formwork, National Standard of Canada
- .18 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .19 CSA W59, Welded Steel Construction (Metal Arc Welding).
- .7 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.
- .8 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.4 ELEMENTS CLASSIFIED AS ARCHITECTURAL CONCRETE:

- .1 Concrete up-stands and foundation walls and piers cast in place and exposed to view in service whether these are interior or exterior to the building.
- .2 Cast-in-place exterior sidewalks, patios and curbs, and exterior concrete slabs placed on grade in all cases.
- .3 All interior concrete slabs placed on grade (ground or rigid insulation) and exposed to view in service or covered with specified floor coverings are hereby classified as architectural concrete. Refer to Section 8.3 of the standard for particular requirements.
- .4 Concrete placed in stair tread pans.

1.5 SEALER FOR INTERIOR CONCRETE EXPOSED TO VIEW IN SERVICE:

- .1 Standards:
 - .1 ASTM C309, Type 1, Class B
 - .2 ASTM C1315, Type 1, Class A
 - .3 Agriculture & Agri-Food Canada accepted
 - .4 Canada VOC Concentration Limits for Architectural Coatings Regulations.

1.6 SUBMITTALS

- .1 Provide documents and items listed below in accordance with Section 01 33 00.
- .2 Concrete Mixes:
 - .1 Foundation walls and up-stands supporting masonry.
 - .2 Interior concrete slabs placed on grade (ground or rigid foam insulation).
 - .3 Exterior concrete curbs, walks and flatwork (slabs placed on ground).
- .3 Shop Drawings – Reinforcing Steel:
 - .1 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.
 - .2 Submit drawings for review by Consultant prior to fabricating reinforcing steel assemblies or cutting lengths.

- .3 Indicate placing of reinforcement and:
 - .1 Bar bending details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 Sizes, spacing, locations of reinforcement and mechanical splices if approved by Owner or Consultant, with identifying code marks to permit correct placement without reference to structural drawings.
 - .5 Indicate sizes, spacing and locations of chairs, spacers and hangers.
- .4 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.
 - .1 Provide type 'B' unless otherwise indicated.
- .5 When Chromate solution is used as replacement for galvanizing non-prestressed reinforcement, provide product description for review by Owner and Consultant prior to its use.
- .4 Product Data Sheet:
 - .1 Concrete Sealer for concrete exposed to view in service.
- .5 Quality assurance items.

1.7 QUALITY ASSURANCE

- .1 Execute Quality Control Plan developed in accordance with CAN/CSA A23.1-09 Alternative 1.
- .2 Ensure that Field Engineer attends site to review reinforcing steel prior to placement of concrete, review founding conditions prior to placement of footing and review concrete placement in progress while also obtaining samples and testing in field.
- .3 Submit in accordance with Section 01 45 00 and Section 01 33 30 Submittals and as described within Part 2 of this Section and items listed below:
 - .1 Mill Test Report: upon request, provide Owner, Architect and Consultant with certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.
 - .2 Upon request submit in writing to Owner, Architect and Consultant proposed source of reinforcement material to be supplied.
 - .3 Provide mix and curing plan together with quality control plan associated with finishing of flat slabs on grade.

1.8 ADMINISTRATIVE REQUIREMENTS - FLATWORK

- .1 Prior to placing rigid board insulation on prepared existing concrete slabs or prepared granular sub-grade, Contractor shall ensure the following are in place or prepared:
 - .1 Hazardous materials and excavated materials that must leave the site are removed.
 - .2 Recommendations present in geotechnical investigation are implemented.
 - .3 Waterproofing and vapour retarding materials.
 - .4 Underslab interior and exterior drainage for sanitary sewer piping, storm water piping and connections to sumps and perimeter drains affecting the slab on grade.
 - .5 Connections to buried services including, but not limited to, natural gas and electricity.
 - .6 Floor drains are appropriately set.
 - .7 Granular substrate is compacted, level or otherwise appropriately graded; ensure that the substrate is appropriately dry, and free of snow, ice or frost and clean of dust and debris.
 - .8 Finishing expectations and tolerances are understood.
 - .9 Methods to verify flatness and to control texture; edge tooling for exterior slab and finishing for a flat, smooth floor slab for interior spaces.
 - .10 Curing compound expectations and uses clarified with project design team.
 - .11 Hot weather or cold weather concrete measures.
 - .12 Curing method established.
 - .13 Finish result understood.

1.9 ENVIRONMENTAL REQUIREMENTS - FLATWORK

- .1 Temporary lighting:
 - .1 Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 sq m of floor being treated.
- .2 Electrical power:
 - .1 Provide sufficient electrical power to operate equipment normally used during construction.
- .3 Work area:
 - .1 Make work area water tight protected against rain and detrimental weather conditions.
- .4 Temperature:
 - .1 Maintain ambient temperature of not less than 10 degrees C from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.
- .5 Moisture:
 - .1 Ensure concrete substrate is within moisture limits prescribed by flooring manufacturer.
- .6 Safety:
 - .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.
- .7 Ventilation:
 - .1 Ventilate enclosed spaces in accordance with applicable legislation.
 - .2 Provide continuous ventilation during and after coating application.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 General:
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00.
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address and check for damage for concrete reinforcing.
 - .1 Replace defective or damaged materials with new.
 - .3 Store materials off ground or indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Reinforcing Steel:
 - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Concrete Delivery and Acceptance:
 - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .2 Do not modify maximum time limit without receipt of prior written agreement from field engineer and concrete producer as described in CSA A23.1-09/A23.2-09.
 - .3 Deviations in delivery time, no matter how caused, shall be documented and reports submitted for review by the field engineer.
 - .4 Ensure continuous concrete delivery from plant meets CSA A23.1-09/A23.2-09.
- .4 Bagged Cementitious Products:
 - .1 Store materials off ground or indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .5 Formwork:
 - .1 Place materials defined as hazardous or toxic in designated containers.
 - .2 Divert wood materials from landfill to a recycling or composting facility as approved by field engineer.

- .3 Divert plastic materials from landfill to a recycling facility approved by field engineer.
- .4 Divert unused form release material from landfill to an official hazardous material collections site approved by the field engineer.

1.11 WASTE MANAGEMENT AND DISPOSAL:

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Construction Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS – REINFORCING STEEL AND WIRE FABRIC

- .1 Substitute different size bars if permitted in writing by Owner and Consultant, only.
- .2 Reinforcing steel: billet steel, grade 350, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
- .4 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.
- .5 Deformed steel wire for concrete reinforcement: to ASTM A82/A82M.
- .6 Welded steel wire fabric: to ASTM A185/A185M.
 - .1 Provide in flat sheets only.
- .7 Welded deformed steel wire fabric: to ASTM A82/A82M.
 - .1 Provide in flat sheets only.
- .8 Epoxy Coating of non-prestressed reinforcement: to ASTM A775/A775M.
- .9 Galvanizing of non-prestressed reinforcement: to CAN/CSA-G164, minimum zinc coating 610 g/m².
 - .1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.
 - .2 If chromate treatment is carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.
 - .1 Temperature of solution equal to or greater than 32 degrees and galvanized steels immersed for minimum 20 seconds.
 - .3 If galvanized steels are at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.
 - .1 In this case, no restriction applies to temperature of solution.
 - .4 Chromate solution sold for this purpose may replace solution described above, provided it is of equivalent effectiveness.
- .10 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .11 Mechanical splices: subject to approval of Owner and Consultant.
- .12 Plain round bars: to CSA-G40.20/G40.21.

2.2 FABRICATION – REINFORCING STEEL

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1-09/A23.2-09, SP-66 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Owner's and Consultant's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Owner and Consultant, weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
 - .1 Ship epoxy coated bars in accordance with ASTM A775A/A775M.

2.3 FORMWORK MATERIALS

- .1 Formwork materials:
 - .1 Insulated concrete forms are specified within Section 03 11 19.

- .2 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121, CAN/CSA-O86, CSA O437 Series, CSA-O153.
- .3 Plywood: Canadian Softwood Plywood to CSA O151, Poplar to CSA O153, Face A Grade; inner veneer plies – C; face C– grade, Good One Side, spruce plywood, square, edge, 20 mm thick, meeting or exceeding CSA O121.
- .4 Rigid insulation board: to CAN/ULC-S701.
- .5 Architectural concrete shall be formed using new form panel materials consisting of coated or overlaid Douglas Fir plywood. Face of form panels shall be overlaid with resin impregnated surface applied under high heat and pressure in accordance with CSA O121-M1978 (R2003) and designed to minimize plywood grain transference to formed surfaces, and produce uniform semi-gloss appearance to exposed concrete.
- .6 Tubular column forms: round, spirally wound laminated fibre forms, internally treated with release material.
- .7 Form ties: For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
- .8 Form release agent: non-toxic, biodegradable.
- .9 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, free of kerosene, with viscosity between 70 and 110s Saybolt Universal] 15 to 24 mm²/s at 40 degrees C, flashpoint minimum 150 degrees C, open cup.
- .10 Falsework materials: to CSA-S269.1.
- .11 Sealant: to Section 07 92 00 - Joint Sealants.

2.4 CONCRETE MATERIALS

- .1 Cement: to CSA A3001, Type GU.
 - .1 Blended hydraulic cement: Type GUb to CSA A3001.
 - .2 Portland-limestone cement: Type GUL to CSA A23.1-09.
- .2 Water: to CSA A23.1-09/A23.2-09.
- .3 Aggregates: to CSA A23.1-09/A23.2-09.
 - .1 For aggregate size associated with Insulated Concrete Forms, refer to Section 03 11 19 for concrete placed within insulating concrete forms.
- .4 Admixtures:
 - .1 Air entraining admixture: to ASTM C260.
 - .2 Chemical admixture: to ASTM C494 field engineer to approve accelerating or set retarding admixtures during cold and hot weather placing.
 - .3 For admixtures used in concrete placed in insulated concrete forms, refer to Section 03 11 19 for concrete placed within insulating concrete forms: super plasticizers, mid-range, and air entrainment.
- .5 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA A23.1/A23.2.
- .6 Compressive strength:
 - .1 Footings: 25 MPa at 28 days.
 - .2 Foundation walls: 25 MPa at 28 days.
 - .3 Placed in hot-dipped galvanized hollow structural steel bollards: 32 MPa at 28 days.
 - .4 Interior slab on grade: 25MPa at 28 days.
 - .5 Interior housekeeping slabs placed on interior slabs on grade: 25MPa at 28 days.
 - .6 Concrete placed within interior metal stair tread pans and landings constructed with structural steel decking: 25MPa at 28 days.
 - .7 Exterior Concrete – curbs, walks and slabs placed on engineered fill: 35MPa at 28 days.

2.5 ACCESSORIES AND RELATED MATERIALS:

- .1 Non-premixed dry pack grout: composition of non-metallic aggregate Portland cement with sufficient water for mixture to retain its shape when made into ball by hand and capable of developing compressive strength of 35MPa at 28 days.
- .2 Curing compound: to CSA A23.1-09/A23.2-09 white.
- .3 Pre-moulded joint fillers:
 - .1 Bituminous impregnated fiber board: to ASTM D1751.
 - .2 Sponge rubber: to ASTM D1752, Type I, firm grade.
 - .3 Pre-moulded joint filler: Bituminous impregnated fibreboard: to ASTM D1751.
 - .4 Joint sealer/filler: grey, to CAN/CGSB-19.24, Type 1, Class B.
- .4 Dampproofing:
 - .1 Emulsified asphalt, mineral colloid type, unfilled.
- .5 Polyethylene film: 6 mil thickness to CAN/CGSB-51.34.
- .6 Sealer: proprietary poly-siloxane resin blend or boiled linseed oil to ASTM D260, mixed with mineral spirits 1:1.
- .7 Other concrete materials: to CSA A23.1-09/A23.2-09.
- .8 Waterproofing membrane specified within Section 07 13 26.

2.6 CONCRETE MIXES

- .1 Alternative 1 - Performance Method for specifying concrete: to meet CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 - VERIFICATION.
 - .2 Provide concrete mix to meet following plastic state requirements:
 - .1 Uniformity: +/-0.2 from initially approved value.
 - .2 Workability: free of surface blemishes and segregation.
 - .3 Slump: 80mm +/- 20mm.
 - .2 Provide concrete supplier's certification.
 - .3 Provide quality management plan to ensure verification of concrete quality to specified performance.

Component	Class of Exposure	Min. 28 Day Strength Mpa (PSI)	Max. Water/Cement Ratio	Air Content (%)	Cold Weather Curing Type
Footing	N	20 (2,900)	0.55	None	1
Foundation Walls, Piers & Columns or Beams:					
Interior piers and foundation below heated space; concrete in structural steel, stair tread pans, placed on structural metal floor deck, interior	N	25 (3,600)	0.55	None	1
Exterior Foundation Perimeter Wall & Insulated Concrete Forms	F-2	25 (3,600)	0.55	4-7	1
Slabs Placed on Grade					
Interior floor slab within heated space	N	25 (3,600)	0.55	None	1
Exterior Slabs Placed on Grade, Curbs, and all Concrete Exposed to Freezing and Thawing					
Interior, Unheated Area	C-1	35 (5,100)	0.40	5-8	1

Exterior Walks and Curbs and Slabs	C-1	35 (5,100)	0.40	5-8	2
Note: Heated space refers to insulated, enclosed areas maintained at 12 degrees C or higher.					
Exposure Class Definitions:					
Class	Definition				
N	Concrete not exposed to chlorides or freezing and thawing				
F-2	Concrete exposed to freezing and thawing but not chlorides.				
C-1	Reinforced concrete exposed to chlorides with or without freezing and thawing				

2.7 CURING BLANKET:

- .1 Acceptable curing blanket: Sika Ultracure NCF single use curing blanket composed of natural cellulose fabric and designed to maintain 100% humidity on the concrete for 7 days. Material must not alter the colour of the concrete.

2.8 VAPOUR RETARDER MEMBRANE

- .1 15 mil (0.381mm) sheet. Refer to Section 07 26 00 Vapour Retarders.
 - .1 Install vapour retarder membrane laid under rigid insulation that is placed on the existing, interior, concrete slab-on-grade.
 - .2 No vapour barrier required below ground level slab on grade.

2.9 PERIMETER AND UNDERSLAB INSULATION:

- .1 Thickness shown on drawings.
- .2 Refer to Section 07 21 13 Board Insulation.
 - .1 Underslab Insulation: closed cell, extruded polystyrene rigid boards to CAN/ULC-S701, Type 4, RSI 0.87 per 25 mm of thickness, 30 psi minimum compressive strength.
 - .2 Foundation wall rigid insulation boards that meet or exceed requirements of CAN/ULC-S701, Type 4, Closed Cell, Extruded Polystyrene (XPS) with compressive strength 30 psi, min. R5/25mm.

2.10 PERFORMANCE REQUIREMENTS - GENERAL

- .1 Do not apply curing and sealing compounds or chemical hardeners where flooring is installed on concrete.
- .2 Submit written declaration that components used are compatible and will not adversely affect finished flooring products and their installation adhesives.
- .3 Strength and exposure class listed in this Section for various parts of concrete work.
- .4 Mix, deliver, place and vibrate concrete in accordance with the Standard and requirements of insulated concrete form installation as appropriate.
- .5 Contractor responsible for Quality Assurance Program and verification of mix, strength, placement, vibration and all aspects associated with CAN/CSA A23.1-09 Alternate 1.

2.11 PERFORMANCE REQUIREMENTS AND MATERIALS – SLAB-ON-GRADE

- .1 Design Slabs on Grade to meet or exceed requirements of CAN/CSA-A23.3, and to:
 - .1 Accommodate environmental and climatic conditions.
 - .2 Accommodate varied building uses and occupancies.
 - .3 Provide slab depressions and slopes to drains.
 - .4 Provide housekeeping pads for mechanical and electrical equipment.
- .2 Alternative 1 - Performance: to CSA A23.1-09, and as described in CONCRETE MIXES of PART 2 - PRODUCTS.
- .3 Acceptable slump in field testing: 70mm +/-20mm.

- .4 Load Criteria:
 - .1 Live load not less than 12.0 kPa.
 - .2 Interior slabs on ground live load due to use and occupancy not less than 6.0 kPa.
 - .3 Concrete exposure conditions inside all entrance vestibules is C1 (exposed to chlorides and freezing and thawing).
 - .4 Minimum concentrated live load: 9.0 kN acting over an area of 750 x 750 mm.
 - .5 Live load for heavy usage, exposure to de-icing agents and freeze-thaw conditions for exterior concrete substrate below concrete unit pavers and for concrete walks crossing sidewalks: minimum 12 kPa.
- .5 Surface tolerances:
 - .1 to CSA A23.1-09/A23.2-09, Clause 22, straight edge method: flat; and as follows:
 - .2 Deviation from a 3.0 m long straight edge placed on the slab shall not exceed 3 mm.
- .6 Control Joint:
 - .1 Provide control joints spaced to eliminate uncontrolled shrinkage cracking.
 - .2 Saw-cut control joints. Maximum spacing 5.0 m on centre, each way.
 - .3 Fill with joint sealant.
- .7 Expansion Joint:
 - .1 Install pre-moulded joint filler in expansion and isolation joints to full depth of slab and flush with finished surface.

2.12 CHEMICAL HARDENERS

- .1 Type 1 - Sodium silicate
- .2 Type 2 - Magnesium fluosilicate or Zinc fluosilicate blend].

2.13 SEALING COMPOUNDS FOR INTERIOR CONCRETE EXPOSED TO VIEW IN SERVICE

- .1 Surface sealers are not manufactured or formulated with aromatic solvents, formaldehyde halogenated solvents, mercury, lead, cadmium or hexavalent chromium and their compounds.
- .2 Sealers shall conform to Canadian VOC limits (refer to Standards, above).
- .3 Acrylic Solids, Minimum: 30% by volume.
- .4 Coverage: Trowelled Surface – Approximately 12.26 m²/L (500 ft.²/gal.)
- .5 Water: potable.
- .6 Acceptable Products:
 - .1 WR Meadows VOCOMP-30 Concrete Curing & Sealing Compound.

Part 3 Execution

3.1 INSTALLATION/APPLICATION - GENERAL

- .1 Do cast-in-place concrete work in accordance with CSA A23.1-09/A23.2-09.
- .2 Slab on grade interior and exterior to building are considered architectural concrete, including their edges where exposed to view.

3.2 PREPARATION:

- .1 Ensure that Field Engineer had accepted bearing surfaces and conditions for placement of forms.
- .2 Prepare founding surfaces of sub-soil by removing loose or frozen material under direction of field engineer.
- .3 Obtain or mark foundation and footing locations in field. Verify layout with Contractor.
- .4 Temporary Erosion and Sedimentation Control:

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust beyond region of construction area and established in accordance with EPA 832/R-92-005.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal following completion of all concrete and site work.

3.3 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Field Engineer designated by Owner. Testing protocol will be in accordance with CSA A23.2-90 and Section 01 45 00 - Quality Control.
- .2 Cost for testing services will be paid out of cash allowance.
- .3 Concrete testing: to CAN/CSA A23.2-09 by testing laboratory designated and paid out of cash allowance.
- .4 Field engineer will commission additional test cylinders during cold weather concrete work. Cylinders will be cured on job site under same conditions as concrete associated with the test.
- .5 When concrete is exposed to temperatures below 5 degrees C, during placement or curing, carry out non-destructive testing to CSA A23.1-09/A23.2-09, Appendix A and related ASTM Standards to determine concrete strength prior to stripping formwork.
 - .1 Report results to Owner.
- .6 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.
- .7 Inspection or testing by Consultant will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.
- .8 Site tests: Field Engineer shall conduct tests in accordance with Section 01 45 00 - Quality Control, as follows:
 - .1 Concrete Tests:
 - .1 Notify testing agency of schedule for concrete work. Ensure supervisory personnel are on hand when concrete is being cast to observe placing and curing procedures.
 - .2 Use non-destructive methods to CSA A23.1-09/A23.2-09 for testing concrete placed and cured or partially cured.
 - .3 One standard strength is required for each 50 m³ of concrete placed, but not less than one test for each mix design of concrete placed each day.
 - .4 One standard air entrainment test is required for each 100 m³ of air-entrained concrete or portion thereof placed each day.
 - .5 Make slump tests in accordance with CSA standard CSA A23.1-09/A23.2-09, Test Method CSA A23.2-5C, with each standard strength test.
 - .2 Slump.
 - .3 Air content.
 - .4 Compressive strength at 7 and 28 days.
 - .5 Air and concrete temperature at time of casting in field.
- .9 Field Engineer will submit written report.

3.4 PLACING REINFORCEMENT

- .1 Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.
- .2 Verify dimensions, tolerances, deflection, expansion and control joints and method of attachment with other work on-site.

- .3 Place reinforcing steel as indicated on placing drawings and create reinforcing splices, assembly and restraint designed, selected, installed and restrained in accordance within ReRSIC-2004, Reinforcing Steel Manual of Standard Practice.
- .4 Use plain round bars as slip dowels in concrete.
 - .1 Paint portion of dowel intended to move within hardened concrete using one coat of asphalt paint.
 - .2 When paint is dry, apply thick even film of mineral lubricating grease.
- .5 Prior to placing concrete, obtain field engineer's and Consultant's approval of reinforcing material and placement.
- .6 Ensure cover to reinforcement is maintained during concrete pour.
- .7 Protect epoxy coated portions of bars with covering during transportation and handling.
- .8 Concrete cover (distance from any face of reinforcement to outside face of formed concrete when completed) over reinforcement shall be as follows:
 - .1 All concrete cast against and permanently exposed to earth: 3" (75mm).
 - .2 All concrete cast in forms and exposed to freezing: 2" (50mm).
 - .3 All concrete exposed to chlorides: 2.5" (60mm).
 - .4 Interior concrete slabs not exposed to earth or weather: 0.75" (20mm).
- .9 Do not place concrete over installed reinforcement unless concrete placement is approved by field engineer.
- .10 Reinforcing FIELD BENDING
 - .1 Do not field bend or field weld reinforcement except where indicated or authorized by field engineer or consultant.
 - .2 When field bending is authorized, bend without heat, applying slow and steady pressure.
 - .3 Replace bars, which develop cracks or splits.
- .11 Adjust reinforcement immediately before concrete placed to ensure that all bars are secured in their correct positions. Arrange to have a crew of reinforcing setters on hand as concrete is placed.

3.5 ENVIRONMENTAL CONDITIONS AT JOB SITE:

- .1 Refer to the Standard and in particular, temperature limits stipulated in Table 14 of the standard.
- .2 Minimum ambient temperature in degrees C: 10 for casting without cold weather measures.
- .3 Maximum ambient temperature in degrees C: 27 for casting without hot weather measures. For ambient temperatures exceeding 35 degrees C, delay casting of concrete until temperature drops below 35 degrees C.
- .4 Neither of these temperature ranges obviate the requirement for 7 days continuous wet curing using a curing blanket.

3.6 FOOTINGS - FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork and ensure dimensions agree with drawings.
- .2 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .3 Obtain field engineer's approval for use of earth forms framing openings not indicated on drawings.
- .4 Do not place shores and mud sills on frozen ground.
- .5 Footings set in rock need not be formed; however, no additional cost will be paid to contractor for concrete exceeding quantity shown on drawings. Thickness of footing shall be as shown on drawings and reinforcing centred below foundation wall.
- .6 Ensure granular material base is placed in bottom of stone trench prior to erecting forms or placing footing concrete.

- .7 Hand trim sides and bottoms and remove loose rock and earth from granular base before placing concrete.
- .8 Footing and foundations are not considered architectural concrete.
- .9 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2. Form keyway in footing. Set top of form level for entire extent of footing or step in level increments.
- .10 Place reinforcing steel and vertical dowels intended to connect foundation wall to footing. Reinforcing splices, assembly and restraint shall be designed, selected, installed and restrained in accordance within ReiRSIC-2004, Reinforcing Steel Manual of Standard Practice.
- .11 Place waterstop continuously using formed, purpose-made waterproof corner connectors. Tie to footing forms and reinforcement to maintain alignment.
- .12 Place concrete to form level top surface suitable for erection of foundation walls.

3.7 FOUNDATION WALLS – FABRICATION AND ERECTION:

- .1 Verify lines, levels and centres before proceeding with formwork and ensure dimensions agree with drawings. Mark exterior, interior and centre line of foundation walls on footing. Verify corners using survey equipment.
- .2 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2. Establish level top surface of concrete and mark same on formwork.
- .3 Establish control joints at each exterior corner 600mm each side of corner. Use these joints as stopping place for daily placement of concrete, if applicable.
- .4 Align form joints and make watertight. Keep form joints to minimum.
- .5 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
- .6 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .7 Foundation walls incorporate steps, up-stands, changes in thickness and other details shown on drawings. Erect formwork to create these features.
- .8 Place reinforcing steel and vertical foundation wall bars spliced to dowels for connection of foundation wall to footing. Reinforcing splices, assembly and restraint shall be designed, selected, installed and restrained in accordance within ReiRSIC-2004, Reinforcing Steel Manual of Standard Practice.
- .9 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
 - .2 Application of form release agents on formwork surface is prohibited where drainage lining is used.
 - .3 If concrete surfaces require cleaning after form removal, use only pressurized water stream so as not to alter concrete's smooth finish.
- .10 Anchor bolts:
 - .1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.
 - .2 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
 - .3 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from Consultant.
 - .4 Formed holes: 25 mm minimum diameter.
 - .5 Drilled holes:
 - .1 25 mm maximum diameter and to suit expansion or epoxy anchor proposed.
 - .2 Protect anchor bolt holes from water accumulations, snow and ice build-ups.

- .3 Set bolts and fill holes with epoxy grout.
- .11 Sleeves and inserts:
 - .1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required to be built-in.
 - .2 Sleeves and openings greater than 100 mm x 100 mm not illustrated on drawings, must be reviewed by Consultant prior to construction.
- .12 Floor Drains:
 - .1 Locate floor drains and below grade plumbing prior to placing concrete walls and floors.
- .13 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

3.8 CONCRETE PREPARATION

- .1 Provide field engineer 48-hours' notice before each concrete placement.
- .2 Review temperature and weather data forecasted for days during which concrete placement would occur. Considering temperature expected, elect hot or cold measures for concrete placement if applicable and ensure that all appropriate materials for the selected measures are delivered to site and ready for placement or use prior to delivery of concrete.
- .3 Maintain temperature between 10 and 20 degrees C at all times during concrete placement and immediately following placement for the following periods of time:
 - .1 Curing Type 1: 10 degrees C for 3 days or until 40% of stipulated 28-day compressive strength is attained;
 - .2 Curing Type 2: 10 degrees C for 10 days or until 70% of stipulated 28-day compressive strength is attained.
- .4 All materials, labour and construction associated with achieving protection of the concrete and the concrete forming process shall be present on the job site prior to commencing concrete forming.

3.9 COLD WEATHER REQUIREMENTS:

- .1 Refer to 7.4.1.5 Cold Weather Concreting of the standard and notes on drawings.
- .2 Use cold weather concrete placement procedures whenever the air temperature is at or below 5 degrees Celsius (C) or when the temperature at the place of the work is likely to fall below 5 degrees C within the 24 hours next following concrete placement.
- .3 Remove all frozen materials, snow and ice occurring where structural foundations or slabs-on-grade will be placed prior to placing concrete. Prevent freezing from occurring within all engineered fill or within compacted native soil as the case might be, upon which concrete foundations or concrete slabs will be placed.
- .4 All cold weather concrete placements shall be executed to conform to CAN/CSA A23.1-09. The primary means of protection shall be a heated enclosure, covering, insulation or a suitable combination of these. All water, cement and aggregate shall be heated in accordance with the standard prior to mixing and the mixed concrete shall be maintained within the temperature range specified within the standard. All formwork and the surfaces, including earth or prepared granular fill shall not be frozen. Heat surfaces against which concrete will be cast sufficient to ensure that no part of the concrete material is frozen during curing. Heat forms to ensure that ice does not exist on formwork surfaces and that formwork is not frozen for any part of its depth and assembly. Steel reinforcement and aggregate shall be protected to prevent formation of an ice film on these surfaces.
- .5 Erect protection measures sufficiently clear of the work to permit free circulation of air around all formed elements that are not in contact with grade.
- .6 Protect all footings and foundation walls placed until permanent frost protection is provided for the work (building envelope completed and temporarily heated) or until backfill and compaction is complete.

- .7 Protect all engineered backfill from freezing prior to placement of insulation boards and concrete slabs-on-grade.

3.10 HOT WEATHER CONCRETE MEASURES:

- .1 Utilize hot weather concrete methods described in 7.4.1.4 of the Standard when ambient air temperature is at or above 27 degrees C or when there is a probability of reaching or exceeding this temperature during the concrete placement period.
- .2 If severe drying conditions are experienced or the probability of these conditions occurring is that these conditions will be experienced during the period of the concrete placement (severe drying conditions are described within 7.4.1.2 of the standard), the formwork, reinforcement and concrete equipment shall be protected from direct rays of the sun or cooled by fogging and evaporation.
- .3 Apply curing blanket to architectural concrete.

3.11 PRIMARY SERVICE ENTRANCES SHALL BE INSTALLED THROUGH FOUNDATION WALLS:

- .1 Bridge footings may NOT be utilized for installation of:
 - .1 new primary buried communications (telephone and internet) service entrance;
 - .2 new primary electrical duct bank entrance routed from transformer to building;
 - .3 primary sanitary sewer exiting building or
 - .4 primary domestic water and fire suppression water supply service that crosses the line of foundation walls.
- .2 Review drawings to determine actual number of instances.
- .3 Sanitary sewer shall not be routed in same trench as water service.

3.12 BRIDGED FOOTINGS FOR SECONDARY SERVICES

- .1 Bridged footings consist of a minimum of 6-15M reinforcing bars and no fewer than the number required to space bars maximum 100 mm on centre across width footing, installed in bottom 1/3 of footing and extending minimum 1200 mm beyond each side of trench excavation containing the site service. Each reinforcing bar required for each bridged footing situation is estimated to be 3000 mm long for Bid Pricing purposes and a minimum of 6 lengths of bars each 3000 mm long per occurrence.
- .2 The Contractor must request clarification for design of bridging of footings if condition exceeds situation described in this Section. Provide bridged footings to span trenches excavated for the purposes of installing secondary electrical conductors serving site lighting or accessory buildings.

3.13 EXTERIOR CONCRETE SLABS-ON-GRADE:

- .1 Refer to notes on drawings for expansion joint requirements.
- .2 Refer to plans for new exterior walk locations.
- .3 Slope all exterior slabs away from building at 2% or as indicated.
- .4 Install slabs on minimum 300mm compacted Granular "B" to 100% SMPDD placed over proof-rolled native material free of organic material or provide additional engineered fill material required to raise new sub-grade to finished elevations below 150mm Granular "A" compacted 100% SMPDD.
- .5 Excavate areas below slabs to depths shown on drawings or to depth required to completely remove all soil containing organic material. Remove rocks or boulders exceeding 75mm in any direction. Granular "B" fill shall be placed in depth required to achieve finished elevations, compacted in 200mm lifts, with a sufficient number of lifts to achieve sub-grade noted above. 150mm Granular "A" compacted to 100% SPMDD shall be placed over compacted granular "B" and made level.

3.14 INTERIOR SLAB-ON-GRADE - ENVIRONMENTAL REQUIREMENTS

- .1 Temporary lighting: Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40sq m of floor being treated.

- .2 Electrical power: Provide sufficient electrical power to operate equipment normally used during construction.
- .3 Work area: Make work area water tight protected against rain and detrimental weather conditions.
 - .1 Temperature: Maintain ambient temperature of not less than 10 degrees C from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.
 - .2 Moisture: Ensure concrete substrate is within moisture limits prescribed by flooring manufacturer.
 - .3 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.
 - .4 Ventilation: Provide ventilation system and operate during installation of concrete floor and finishing operations when work is enclosed by new construction. Use portable supply and exhaust fans. Provide continuous ventilation during and after any coating application.

3.15 INTERIOR SLAB-ON-GRADE EXAMINATION

- .1 Vapour retarder: Ensure that vapour retarder is installed and all penetrations appropriately sealed.
- .2 Underslab Insulation: Ensure that boards are laid and level, and no hollow spots or rocking boards are evident.
- .3 Report defects found to Contractor and do not proceed with slab installation until defects are corrected.
- .4 Commencement of placement of concrete signifies acceptance of conditions in the field.

3.16 INTERIOR SLAB-ON-GRADE - SITE TOLERANCES

- .1 Concrete floor slab finishing tolerance to CSA A23.1-09- 7.5.1.2.
- .2 Straight edge method CAN/CSA A23.1-09-7.5.1.4, measured no longer than 72 hours next following floor placement and with frequency of each 10m².
- .3 Class A, Table 22, straight edge value +/-3 mm.
- .4 Floor Drains:
 - .1 Locate floor drains and below grade plumbing prior to placing concrete walls and floors.

3.17 FINISHES

- .1 Foundation wall formed surfaces exposed to view: finish as found after forming, free of honey combing and voids, in accordance with CSA A23.1-09/A23.2-09.
- .2 Interior floor slabs are considered architectural concrete whether to be left exposed or to receive floor covering. These slabs shall have a smooth, consistent surface created by initial finishing operations followed by final finishing using mechanical floating and steel trowelling as specified in CSA A23.1-09/A23.2-09 to produce hard, smooth, dense trowelled surface free from blemishes, low areas and deviations from flat using straight edge method. Finish concrete floor to CSA A23.1-09/A23.2-09, Class A.
- .3 Equipment pads: provide smooth trowelled surface.
- .4 Exterior architectural concrete - slabs on grade, entrance walk foundations, pavements, walks, curbs are considered architectural concrete when exposed to view:
 - .1 Screed to plane surfaces and use aluminum, magnesium or wood floats.
 - .2 Provide round edges and joint spacing using standard tools.
 - .3 Trowel smooth and provide lightly brushed non-slip finish.
 - .4 Rub exposed sharp edges of concrete with carborundum to produce 3 mm minimum radius edges unless otherwise indicated.

3.18 CURING TIMES AND TEMPERATURES:

- .1 Maintain temperature between 10 degrees C and 25 degrees C at all times during concrete placement and immediately following placement for the following periods of time:

- .2 Architectural Concrete - Curing Type 3 – Extended Wet Curing: temperature greater than 10 degrees C and maintained lower than 25 degrees C for 7 days. Apply curing blanket continuously for this period and apply water and fogging to reduce temperature as required.
- .3 All materials, labour and construction associated with achieving protection of the concrete and the concrete forming process shall be present on the job site prior to commencing concrete placement.

3.19 CONTROL JOINTS

- .1 Cut control joints in slabs on grade at locations indicated, to CSA A23.1-09/A23.2-09 and install specified joint sealer/filler.

3.20 EXPANSION AND ISOLATION JOINTS

- .1 Install pre-moulded joint filler in expansion and isolation joints full depth of slab flush with finished surface to CSA A23.1-09/A23.2-09.
- .2 Furnish filler for each joint in single piece for depth and width required for joint.
- .3 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
- .4 Locate and form expansion joints shown on drawings.
- .5 Install joint filler. Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12mm of finished slab surface unless indicated otherwise.

3.21 SEALING APPLICATION - EXTERIOR

- .1 Use sealer on exterior slabs on grade, only. After curing is complete, apply two even coats of linseed oil mixture to clean dry exterior surfaces, each at 8 m²/L. Allow first coat to dry before applying second coat or use poly-siloxane resin blend sealer at 4 m²/L.

3.22 SEALING APPLICATION - INTERIOR

- .1 For Interior Concrete exposed to view in service, apply specified interior concrete sealer to rooms and spaces where sealed concrete is specified as soon as practical following appropriate curing.
- .2 Apply additional sealer following cleaning of concrete when flooring product installation is completed in the areas near the rooms which are to have a sealed concrete flooring finish.
- .3 Surface Preparation:
 - .1 New Concrete: Apply VOCOMP-30 when the surface water has disappeared and the concrete surface will not be marred by walking workmen.
- .4 Mixing:
 - .1 For optimum performance, gentle mixing or agitation is recommended.
 - .2 CAUTION: DO NOT MIX EXCESSIVELY.
- .5 Application Method:
 - .1 A typical industrial sprayer, such as a Chapin 1949, provides an easy, economical method of application. Note: Use of improper spray tip or application method may result in a spotty appearance.
 - .2 Sealer may be applied using a lint-free roller or lamb's wool applicator.
 - .3 Exercise care to maintain a wet-edge during roller application to prevent roller marks in dried film.
 - .4 Sealer shall be sprayed on with a tip that produces a flow 0.5 GPM (1.9 LPM). Spray on in a fine, fog pattern without spurts and dribbles to form a thin, continuous film.
 - .5 AVOID PUDDLING in low areas.
 - .6 If puddles occur brush or roll them out immediately.
 - .7 Apply two (2) coats of sealer on two occasions:
 - .1 Two coats for each occasion shall be applied with each coat applied using an application direction which is at right angles to prior coat.

- .2 Additional coats of sealer may be applied after the first coat has thoroughly dried.
- .3 First Occasion: Apply two coats of sealer as soon as is practical following appropriate curing time for concrete and before gypsum wall board work commences on the job site.
- .4 Second Occasion: Apply two coats of sealer when finished painting work is completed within rooms and spaces that have sealed concrete floor finish.
- .6 Drying Time:
 - .1 Sealer dries quickly.
 - .2 Drying times may be extended depending on application rate, temperature, humidity and project conditions.
 - .3 Restrict foot traffic for at least 12-hours.
- .7 Clean Up:
 - .1 While sealer remains wet, equipment may be cleaned with soap and water.
 - .2 Once cured, the material may be removed with a solvent, such as xylene or toluene.
- .8 Precautions:
 - .1 KEEP FROM FREEZING.
 - .2 Do not dilute.
 - .3 Do not apply sealer when air, material and surface temperatures are expected to fall below 4° C within four hours of completed application.
 - .4 DO NOT MIX WATER-BASED COMPOUNDS WITH ANY COMPOUND CONTAINING SOLVENT.
 - .5 Do not use on non-porous surfaces or surfaces which are not uniform in porosity, i.e., brick, stone, masonry, etc.
 - .6 Concrete floors properly cured with specified sealer meet section 8.9 "Adhesion of Tile Cements" of ASTM C 1315.
 - .7 For other specifications, secure the approval of the paint or resilient flooring manufacturer before applying sealer. The applicator shall determine the suitability of the sealer for any area where the concrete sealed must be finished with flooring or paint.

3.23 GROUT BELOW BASE PLATES:

- .1 Grout under base plates using procedures in accordance with manufacturer's recommendations which result in 100% contact over grouted area.

3.24 FORMWORK REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
 - .1 Do not backfill against foundation walls until concrete has reached specified compressive 15-day strength or approved by Consultant.
 - .2 Remove formwork when concrete has reached 70% of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.
 - .3 Backfill both sides of foundation walls concurrently maintaining a depth of the backfill on both sides of the walls and never exceeding a 500mm (18") difference from one side to the other.
 - .4 Saw cut crack control joints within foundation walls and concrete slabs according to patterns shown on drawings.
 - .5 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
 - .6 Space reshoring in each principal direction at not more than 3000mm apart.
 - .7 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

3.25 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Use trigger operated spray nozzles for water hoses.
- .3 Designate cleaning area for tools to limit water use and runoff.

- .4 Cleaning of concrete equipment to be done in accordance with Section 01 35 43 Environmental Procedures.
- .5 Waste Management: separate waste materials for crushing, reuse, recycling in accordance with Section 01 74 21 – Construction Waste Management and Disposal.
 - .1 Divert unused concrete materials from landfill to local facility off site.
 - .2 Provide appropriate area on job site where concrete trucks can be safely washed.
 - .3 Divert admixtures and additive materials from landfill to approved official hazardous material collection site.
 - .4 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose a health or environmental hazard.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 03 00 00 Cast-In-Place Concrete.
- .2 Section 04 05 01 Masonry Procedures.
- .3 Section 04 05 16 Mortar and Masonry Grout.
- .4 Section 04 05 19 Masonry Reinforcing and Connectors.
- .5 Section 04 05 23 Masonry Accessories
- .6 Section 04 43 23 Quarried Stone Veneer Cladding
- .7 Section 07 92 00 Joint Sealants

1.2 SUMMARY

- .1 Supply of the following plant-precast concrete specialty items using coloured concrete including the following elements:
 - .1 wall coping – a concrete coping formed to drain and intended as the top finish for landscaping walls that are faced with veneer masonry units;
 - .2 window sills with a single length for each opening that is continuous below single window openings with masonry openings up to 2350 mm in length, free of joints and joined for longer using sill units of 2350 mm long, as detailed on drawings.
 - .3 A pre-cast concrete continuous masonry unit band with a smooth face.
- .2 Pre-cast window sills and pilaster caps are “sill and banding” products. The Wall Coping is intended as a finish for the top of free-standing exterior walls surrounding loading area and refuse bin areas (located as illustrated on architectural site plans).
- .3 Deliver materials to Division 04 for installation.

1.3 BASIS OF DESIGN

- .1 Plant-Precast Architectural Concrete Specialties as follows:
 - .1 Window sill units shall be equal profile SL-29 manufactured by Ed's Concrete Products Ltd. and these shall be a single piece sill unit for all windows when the sill will have a length of 2440 mm or less.
 - .2 Continuous curtain wall windows shall have multiple 2440 mm lengths of the SL-29 profile as the sill.
 - .3 Ed's Concrete Products Ltd., Stratford Head Office,
 - .1 1266 Erie Street, Stratford, Ontario, Canada N4Z 0A1
 - .4 Email: info@edsconcrete.com;
 - .5 telephone: 519-271-6590
 - .6 telephone toll free: 1-877-265-6590.

1.4 REFERENCES

- .1 American Society for Testing Materials:
 - .1 ASTM A108-18 Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
 - .2 ASTM A123/A123M-17 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - .3 ASTM /A153M-16a Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - .4 ASTM A307-14e1 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
 - .5 ASTM A416/A416M-18-Steel Strand, Uncoated Seven-Wire for Prestressed Concrete
 - .6 ASTM A421/A421M-15—Stress-Relieved Steel Wire for Pre-stressed Concrete
 - .7 ASTM A555/A555M-16-General Requirements for Stainless Steel and Wire Rods.
 - .8 ASTM A666-15-Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, & Flat Bar.
 - .9 ASTM A775/A775M-19 - Epoxy-Coated Reinforcing Steel Bars.
 - .10 ASTM A1064/A1064M-18a - Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - .11 ASTM C260/C260M-10a (2016) - Air-Entraining Admixtures for Concrete

- .12 ASTM C494/C494M-17 - Chemical Admixtures for Concrete.
- .13 ASTM C881/C881M-15 - Epoxy-Resin-Base Bonding Systems for Concrete.
- .14 ASTM D2240 – 15e1 - Test Method for Rubber Property - Durometer Hardness.
- .15 ASTM F3125/F3125M-15a - High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.
- .16 ASTM F3125/F3125M-18 - High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.
- .2 CISC/CPMA Standard 2-75 - Quick-drying Primer for Use on Structural Steel
- .3 Canadian Institute of Steel Construction:
 - .1 CISC/CPMA Standard 2-75 - Quick-drying Primer for Use on Structural Steel
- .4 Canadian Standards Association:
 - .1 CSA-A23.1-19/A23.2-19 - Concrete Materials and Methods of Concrete Construction / Methods of Test for Concrete.
 - .2 CSA-A3000-18 - Cementitious Materials Compendium.
 - .3 CSA-G30.18-09 (R2019) – Carbon steel bars for concrete reinforcement
 - .4 CSA-G40.20-13/G40.21-13 (R2018) - General Requirements for Rolled or Welded Structural Quality Steel /Structural Quality Steel.
 - .5 CSA-A23.3-19 - Design of Concrete Structures.
 - .6 CSA-A23.4-16 - Precast Concrete - Materials and Construction.
 - .7 CSA-W47.1-19 - Certification of Companies for Fusion Welding of Steel.
 - .8 CSA W48-2018 - Filler metals and allied materials for metal arc welding
 - .9 CSA-W59-18 - Welded Steel Construction (Metal Arc Welding).
 - .10 CSA-W186-M1990 (R2016) - Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .5 Canadian Precast/Prestressed Concrete Institute (CPCI):
 - .1 CPCI - Architectural Precast Concrete Colour and Texture - Selection Guide.
 - .2 CPCI - Architectural Precast Concrete Technical Guide.
 - .3 CPCI Design Manual – 5th Edition.
 - .4 CPCI – Architectural Precast Concrete Walls: Best Practice Guide
 - .5 CPCI– Precast Concrete Insulated Wall Technical Guide.
 - .6 CPCI Design Manual – 5th Edition.
 - .7 CPCI - Infrastructure Solutions Technical Guide.
 - .8 CPCI - Structural Solutions Technical Guide.
 - .9 CPCI - Structural Floor and Roof Technical Guide.
 - .10 CPCI - Colour and Texture Selection Guide.
 - .11 PCI - MNL 116 Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products.

1.5 QUALIFICATIONS

- .1 Plant-Precast Architectural Concrete Specialties shall be fabricated by the manufacturer of the Basis of Design Product or,
 - .1 in the case of an alternative manufacturing plant certified by Canadian Standards Association in appropriate category according to CSA A251.
 - .2 Precast concrete manufacturer to be certified in accordance with CSA's certification procedures for precast concrete plants prior to submitting tender and to specifically verify as part of tender that plant is currently certified in appropriate category of Architectural Concrete.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for concrete window sills and concrete and include product characteristics, performance criteria, physical size, mix design, finish and limitations.
 - .1 Indicate finish of materials and colour.
- .3 Shop Drawings:
 - .1 Submit shop drawings illustrating component dimension and features. Show products in plan, section and elevation. Indicate slopes and finish.
 - .2 Indicate location of component: either window sill or pilaster cap.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and in full accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
 - .1 deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .2 Review materials immediately upon receipt and return broken or defective products and replace with new, undamaged components.
 - .3 Patching or repair of products on site is not permitted
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and indoors in a dry location that is well-ventilated.
 - .2 Store and protect concrete elements from damage and in an area acceptable to the installer.
 - .3 Replace defective or damaged materials with new should any products be broken while handling for installation.
- .4 Construction Waste Management:
 - .1 Place packaging in recycling system at location of the Work or other location to best advantage of supplier or Sub-Contractor.
 - .2 Return pallets to supplier for re-use.
 - .3 Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.8 WARRANTY

- .1 This Section hereby warrants that the precast architectural elements will not spall or show visible evidence of cracking, except for normal hairline shrinkage cracks, in accordance with the Contract and an additional extended period of 5-years next following the date of the expiration of the Contractor's warranty for the Project under the Contract.

Part 2 Products

2.1 DESIGN REQUIREMENTS

- .1 The design of the Plant-Precast Architectural Concrete Specialties (wall coping, window sills, etc.) is hereby delegated to the manufacturer of the products.
- .2 Design precast elements to CAN3-A23.3 and CAN3-A23.4 and to resist handling, stockpiling, shipping and erection stresses.
- .3 Tolerance of precast elements to CAN3-A23.4, Section 10 and as follows:
 - .1 Length of precast elements not to vary from design length by more than plus or minus ¼ inches.
 - .2 Cross sectional dimensions of precast elements not to vary from design dimensions by more than plus or minus 1/8 inches.
 - .3 Deviations from straight lines not to exceed 1/4 inch in 10 feet.
 - .4 Precast elements not to vary by more than plus or minus 1/4 inch from true overall cross-sectional shape as measured by difference in diagonal dimensions.
- .4 Design of elements shall include features, reinforcements, aggregate and cement mixtures selected to resist creep, shrinkage and temperature effects, as well as water penetration and distortion during shipping and handling.

- .5 Select reinforcing and concrete mixes to suit exposure conditions and local climate.
- .6 Provide a sloped top and profile illustrated on drawings. Provide a recessed drip line (cut or formed).
- .7 Face and top of units shall be smooth surfaces free of pits and variations from level, plumb and flat surfaces.
- .8 Select lengths for window to match masonry opening width plus 152 mm on each side or an additional 304 mm when compared to the width of the windows to correspond to appearance of the drawings. Sills shall be full width of openings up to 2440 mm wide.

2.2 MATERIALS

- .1 Portland cement to CSA A3000, Type 10.
- .2 Water: to CSA A23.1/A23.2.
- .3 Aggregates: selected to maximize smooth, consistent finish in the final product and to meet or exceed the requires of CSA A23.1/A23.2.
- .4 Provide Air entraining admixture that meets for exceeds requirements of ASTM C260.
- .5 Chemical admixtures: shall meet or exceed ASTM C494/C494M and shall be selected to maximize the performance of the unit in service.
- .6 Supplementary cementing materials shall meet or exceed requirements within CSA A3000.
- .7 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents.
 - .1 Minimum Compressive strength: 35 MPa at 28-days.
 - .2 Consistency:
 - .1 Fluid: to meet or exceed requirements of ASTM C827. Time of efflux through flow cone ASTM C939, under 30 seconds.
 - .2 Flowable: to meet or exceed requirements of ASTM C827. Flow table, 5 drops in 3 seconds, ASTM C109/C109M, applicable portion] 125 to 145%.
 - .3 Plastic: to ASTM C827. Flow table, 5 drops in 3 seconds, ASTM C109/C109M, applicable portions 100 to 125%.
 - .4 Dry pack: to manufacturer's requirements.
 - .3 Net shrinkage at 28-days: maximum 0.5%.

2.3 CONCRETE MIXES

- .1 Proportion concrete in accordance with CSA A23.1/A23.2, Alternative 1, to following requirements:
 - .1 Type N cement or as recommended by manufacturer.
 - .2 Minimum compressive strength at 28 days: 35 MPa.
 - .3 Class of exposure: F2.
 - .4 Nominal size of coarse aggregate: 12.7 mm or as recommended by manufacturer.
 - .5 Slump at time and point of discharge: 12.7mm to 20mm or as recommended by manufacturer.
 - .6 Air content: 6% to 8% or as recommended by manufacturer.
 - .7 Chemical admixtures: in accordance with ASTM C494/C494M, type recommended by manufacturer.
 - .8 Supplementary cementing materials: type in accordance with CSA A3000 and as recommended by manufacturer.

2.4 FABRICATION

- .1 Fabricate: to CSA A23.4, with profile illustrated on drawings.
- .2 Finish: commercial grade; smooth, level and exhibiting no pitting or variations from flatness, plumb, level and square.
- .3 Fabricate at least 4 holes per 2440 mm length of unit (approximately 1 hole per 610mm of length or as recommended by manufacturer) to permit securing with anchors into masonry veneer units or concrete. Locate holes no nearer to outside ends of units than 150 mm.
- .4 Fabricate to resist loads listed within this Section including effects of weather and temperature.
- .5 Plant-Precast Architectural Concrete Specialties as follows:

- .6 Window sill units shall be equal profile SL-29 manufactured by Ed's Concrete Products Ltd. and these shall be a single piece sill unit for all windows when the sill will have a length of 2440 mm or less.
 - .1 Continuous curtain wall windows shall have multiple 2440 mm lengths of the SL-29 profile as the sill.
 - .2 Ed's Concrete Products Ltd., Stratford Head Office,
 - .1 1266 Erie Street, Stratford, Ontario, Canada N4Z 0A1
 - .3 Email: info@edsconcrete.com;
 - .4 telephone: 519-271-6590
 - .5 telephone toll free: 1-877-265-6590.

2.5 PROTECTION

- .1 Protect products for shipping and support products appropriately secured to pallets.

Part 3 Execution

3.1 INSTALLATION

- .1 Turn products over to Division 04, Masonry for installation.

END OF SECTION

PART 1 General

1.1 RELATED SECTIONS

- .1 Section 03 00 00 Cast-in-Place Concrete
- .2 Section 03 48 00 Plant-Pre-Cast Concrete Specialities.
- .3 Section 04 06 00 Mortar and Masonry Grout
- .4 Section 04 08 00 Masonry Reinforcing and Connectors
- .5 Section 04 09 00 Masonry Accessories
- .6 Section 04 22 00 Concrete Masonry Units
- .7 Section 04 43 23 Quarried Stone Veneer Cladding
- .8 Section 05 12 10 Structural Steel for Buildings
- .9 Section 05 50 00 Metal Fabrications
- .10 Section 06 10 00 Rough Carpentry
- .11 Section 07 21 13 Rigid Board Insulation
- .12 Section 07 62 00 Sheet Metal Flashing
- .13 Section 07 27 10 Weather Barrier, Air Barrier and Transition Membrane
- .14 Section 07 92 00 Joint Sealers.
- .15 Section 08 11 00 Steel Doors and Frames
- .16 Section 08 11 16 Aluminum Doors and Frames
- .17 Section 08 50 00 Aluminum Windows

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA A179-94, Mortar and Grout for Unit Masonry.
 - .2 CSA-A371-94, Masonry Construction for Buildings.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit samples:
 - .1 Provide a sample of masonry sand for testing purposes.
 - .2 One of each type of stone veneer unit.
 - .3 One of each type of masonry accessory specified.
 - .4 One of each type of masonry reinforcement, tie and connector proposed for use.

1.4 TEST REPORTS

- .1 Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 Common Product Requirements.
- .2 Deliver materials to job site in dry condition.
- .3 Keep materials dry until use.
- .4 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 Construction Waste Management and Disposal.
- .2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Cold weather requirements
 - .1 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 and forms for masonry work during and after erection until permanent lateral support is in place.

PART 2 Products

2.1 MATERIALS

- .1 All tie and reinforcement materials shall be hot-dipped galvanized after fabrication. No ties or reinforcements shall be welded in field.
- .2 All loose steel lintels shall be hot dipped galvanized after fabrication. No welding of loose steel lintels is permitted in field. Hot-dip galvanize masonry lintels fabricated of multiple components after fabrication.
- .3 Receive and install elements required for work of other Sections including structural steel for buildings and metal fabrications.
- .4 Receive loose steel and special veneer support lintels for all openings and build-in as work progresses.
- .5 Provide continuous waterproof, self-adhesive flashing wherever through wall flashings are indicated or specified.
- .6 Review through wall flashing assembly details shown on drawings and co-ordinate with section 04 09 00 Masonry Accessories in all cases.
- .7 Provide flexible control joint fillers for all masonry expansion joints.
- .8 Masonry materials are specified in related sections indicated in 1.1.

PART 3 Execution

3.1 INSTALLATION

- .1 The wall assemblies are designed as pressure equalized rain screen assemblies with the following characteristics:
 - .1 Through-wall flashings shall be installed over all horizontal supports for masonry veneer and to seal air cavity locally.
 - .2 Air cavity shall be separated from soffit ventilation in all cases and divided at each vertical corner or as shown on drawings coincident with a vertical control joint.
 - .3 Weep hole ventilators shall be installed above all through-wall flashings to permit ingress of air and to release moisture in the wall cavity.
 - .4 No weep hole flashings shall be provided at the top of the air space cavity below through wall flashings.
 - .5 Air space shall be sub-divided with vertical cavity seals formed from wipe coated galvanized sheet metal bent to form 90-degree angle for fastening to sheathing behind rigid insulation and extended into a prepared control or expansion joint.
- .2 Install continuous control/expansion joint fillers in control joints at locations indicated and as referenced herein.
- .3 Install weep hole vents in vertical joints immediately over all through wall flashings, in exterior wythes of masonry veneer wall construction, at maximum horizontal spacing of 400 mm (16") on centre, continuously. Install weep hole vents symmetrically over window and door openings such that each opening has at least three weep hole vents spaced with one near each left and right end of the opening and one at the centre of the opening.
- .4 No weep hole vents are required at top of wall locations.

- .5 Install mortar net continuously at top of foundation wall. Mortar net product to rest directly on through-wall flashing.
- .6 Do masonry work in accordance with CSA-A371 except where specified otherwise.
- .7 Build masonry plumb, level, and true to line, with vertical joints in alignment.
- .8 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.
- .9 Verify that bed depth available on foundation wall is suitable for installation of masonry and do not proceed if foundation is not acceptable for appropriate installation of masonry.
- .10 Verify that self-adhesive air barrier continuity strips are installed as indicated prior to commencing masonry.
- .11 Verify that there are no deviations from the drawings in terms of the position of walls, bows, bends, cracks, position of control joints, etc. prior to commencing work.
- .12 Co-ordinate installation of mechanical, electrical, structural, architectural and others with masonry as installation progresses. Do not proceed with work if items requiring building-in are not available.
- .13 Review structural drawings carefully for locations of reinforcing steel, anchor bolts, sleeves, reinforcement and other items. Build all such items in as the work progresses.
- .14 Refer to structural drawings for steel or block lintel installation notes. Install loose steel lintels for all openings in masonry veneer walls whether noted specifically or not. Verify reinforcing sizes with consultant.
- .15 Use solid units or units filled with grout where indicated on drawings.
- .16 Fill hollow structural units with grout wherever reinforcing steel is specified.
- .17 All load-bearing masonry shall use type S mortar.
- .18 Install control and expansion joints as indicated or as required by site conditions. Provide control joints each run of wall construction 6m in length and at top of door frame locations aligned with outer edge of lintel each side of each door opening.
- .19 Tool all mortar joints slightly concave, nominal 10mm (3/8") height.
- .20 Use cold weather protection measures in accordance with CSA standards when weather conditions warrant.
- .21 Protect top of work each day for each section of the work until masonry is complete.
- .22 Use only dry and unfrozen materials. Do not use frozen mortar.
- .23 Remove any section of masonry that may be frozen before continuing to lay masonry in that section.
- .24 Lay all concrete unit masonry in a running bond pattern except for details indicated.
- .25 Install through wall flashings as indicated and use end dam flashings for all masonry or concrete sills without exception.
- .26 Rake out masonry joints to provide control joint backer and caulking –
 - .1 at junctures of doors, windows and other openings;
 - .2 at control or expansion joints;
 - .3 at other locations where sealants are shown.
- .27 Top or air space seal – alternate: may be self-sealing, self adhering closed cell foam friction fit between back of topmost masonry units and face of rigid insulation. Closed cell foam shall be expandable to fill air space tightly.
- .28 Saw-cut masonry veneer units a set to form straight, plumb lines for all control joint locations.
- .29 Construct control joints both ends of bearing for each window or door opening and from foundation level to above soffit level for control joints shown near corners of building and for cavity sealers.

3.2 CONSTRUCTION

- .1 Exposed masonry
 - .1 Inspect all masonry units prior to installation and do not lay damaged units. If damaged units are found in the wall, 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; 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 Strike backside of veneer masonry joints flush to brick face and prevent mortar from accumulating in the air space.
- .3 Tying and Bonding Masonry Veneer Units:
 - .1 Install masonry veneer ties specified within Section 04 08 00 at 410 mm each way.
- .4 Cutting
 - .1 Cut out for electrical switches, outlet boxes, light fixtures, plumbing devices, louvers, grilles and other recessed or built-in objects. All louvers shall receive through wall flashing at topside whether indicated on drawings or not.
 - .2 Make cuts straight, clean, and free from uneven edges.
- .5 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 Build in loose steel lintels over square top openings in each case unless block lintels are indicated.
 - .5 Build in hot-dipped galvanized, loose steel lintels for masonry veneer over all openings through veneer masonry.
- .6 Support of loads
 - .1 Use 20 MPa concrete to Section 03 30 00 Cast-in-Place Concrete, where concrete fill is used in lieu of solid units.
 - .2 Use grout to CSA A179 where grout is used in lieu of solid units.
 - .3 Install building paper below voids to be filled with concrete, grout or mortar; keep paper 25 mm back from faces of units.
 - .4 Provide hot-dipped galvanized ladder reinforcing every second course of load-bearing masonry around cells. Provide reinforcing steel within filled masonry cores where shown on drawings.
- .7 Provision for movement
 - .1 Leave space at juncture of interior masonry and exterior walls or columns.
 - .2 Build masonry to tie in with stabilizers, with provision for vertical movement.
 - .3 Leave 3/8" clear space and fill with foam rope and sealant or as noted for deflection space between top of non-load bearing walls and partitions and structural elements whether indicated on drawings or not. Do not use wedges. Use fire caulking as sealant for fire rated non-load bearing partitions around service rooms.
- .8 Loose steel lintels
 - .1 Install loose steel lintels. Centre over opening width.
 - .2 All loose steel lintels shall be hot-dipped galvanized following fabrication when used with exterior masonry veneer and within exterior wall assemblies.
- .9 Control joints and expansion joints:
 - .1 Construct continuous control joints as indicated and each side of each door or window opening through any masonry wall.
 - .2 Supply and install control joint filler as backing continuously within all control joints. Allow 10mm x 10mm (3/8"x3/8") exterior sealant application for face finish of control joints.
 - .3 Apply control joint filler between top side of masonry and underside of rigid structural steel. Joint shall be filled completely with 3/8" thickness material and exterior finish shall be 10mm x 10mm (3/8"x3/8") exterior masonry sealant.
 - .4 Supply and install control joint filler as backing continuously within all control joints. Allow 10mm x 10mm (3/8"x3/8") exterior sealant application for face finish of control joints. Apply control joint filler between top side of masonry and underside of rigid structural steel. Joint shall be filled

completely with 10 mm (3/8") thickness material and exterior finish shall be 10mm x 10mm (3/8"x3/8") exterior masonry sealant. Build-in continuous expansion joints indicated complete with fillers and sealants colour-matched to masonry mortar. Install expansion joints above openings built in new masonry walls.

3.3 BUILD IN FLASHINGS IN MASONRY IN ACCORDANCE WITH CAN3-A371 AS FOLLOWS.

- .1 Through-wall flashings:
 - .1 Self-adhesive flashings shall be provided in 610mm (24") wide rolls, minimum, but with 305mm (12") minimum vertical return on ICF back-up wall in all situations. All joints in self-adhesive flashings shall be lapped 100mm (4") and sealed.
 - .2 Apply primer to surfaces that will receive flashings in all cases.
 - .3 Install flashings on primed surfaces, under exterior masonry bearing on foundation walls, slabs, shelf angles, and steel angles over openings and return over primed vertical surfaces such as wall sheathings minimum 305mm (12") for all cases. Install flashings under weep hole courses and as indicated.
 - .4 Apply appropriate primer for all surfaces that are to receive flashings.
 - .5 Apply materials smooth and tight to all surfaces, free of fish mouths or gaps.
 - .6 Apply all through-wall flashings prior to Section 07 21 30 Sprayed-in-Place Foam is applied to walls.
 - .7 Install mortar net at base of air space above all through wall flashings following application of sprayed-in-place foam.
 - .8 Install weep hole ventilators above all through wall flashings.
 - .9 **For window and door openings:** Apply self-adhesive through wall flashing on primer on substrate as applicable. Lap flashing under air retarder and over air barrier continuity strips at openings to create shingle pattern for wall drainage in every case or as indicated. All self-adhesive membranes shall be supported by structure, framing or similarly secured surfaces. At outer surface of flashing assembly create 20mm (3/4") overhanging drip edge with flashing. This applies to metal lintels, angles, channels and loose steel lintels and base course flashing.
 - .10 **For base course flashing:** install self adhesive through wall flashing on primed concrete surface. Ensure that flashing project beyond outer edge of concrete wall 20mm (3/4").
- .2 For Concrete Unit (block) Walls:
 - .1 General:
 - .1 Co-ordinate mechanical and electrical penetrations of block walls by understanding the nature of each penetration and installing masonry to accommodate the services.
 - .2 Modify existing concrete masonry walls by saw-cutting and disassembly.
 - .3 Co-ordinate installation of new doors and frames, louvers and all other openings in block walls.
 - .4 Ensure that walls affected by masonry cutting are supported temporarily with shoring designed to support loads imposed in each circumstance.
 - .5 Provide concrete masonry unit lintel blocks complete with concrete fill and steel reinforcing as lintels for each penetration or opening in masonry whether noted on drawings or not. When there is doubt about the required lintel, do not complete masonry without instruction from the consultant.
 - .6 Mortar to be type S for load bearing walls.
 - .7 Install ladder type reinforcement in all block walls constructed under this contract. Use hot-dipped galvanized reinforcing for all wall assemblies. Install ladder reinforcing every second course.
 - .8 Tool all mortar joints slightly concave, nominal 10 mm (3/8") height.
 - .9 Install control joints in load bearing masonry wall at each side of each archway or door opening continuous for height of wall.
 - .2 Interior Walls:
 - .1 Work included: Interior masonry walls: masonry partitions constructed as fire-rated and secure wall construction and load-bearing walls supporting cast-in-place concrete.

- .2 Supply and install reinforcing for load-bearing walls as indicated on drawings and provide bond beams as indicated. Fill all voids with mortar as work progresses where vertical reinforcing is required.
- .3 Install control joints in interior masonry wall at each side of each archway, door opening or window located at outer edge of loose steel lintel (at edge of bearing point) or continuous for height of wall at max. 6100 mm (20'-0") on centre.
- .4 Reinforce all interior masonry using hot-dipped galvanized ladder reinforcing every second course and as required for intersection with other building components and as shown or specified on drawings.
- .5 Co-ordinate building in of door frames, electrical devices, etc. as the work progresses.
- .6 Tool all mortar joints slightly concave, nominal 10 mm (3/8") height.
- .3 Reinforced masonry
 - .1 Provide reinforcing steel within masonry unit cores following cutting of units to accommodate reinforcing.
 - .2 Fill masonry units with reinforcing and grout - refer to structural notes.
 - .3 Connect masonry walls to structural steel members with strap anchors where they are specified.
- .3 Through-wall Flashing:
 - .1 Refer to Section 07 25 00 for materials.
 - .2 Extend flashing to exterior wall face.
 - .3 Lap continuous flashing pieces at least 152mm (6") and seal with compatible sealant
 - .4 Support flexible flashing across gaps and openings and extend beyond the face of exterior wall a minimum of 50mm (2").
 - .5 End through-wall flashing on vertical substrate and integrate with weather-resistive barrier.
 - .6 Fasten edge of flashing into framing members using nails spaced at 152mm on-centre.
 - .7 Prime all surfaces that will receive self-adhering flashing materials.
 - .8 Build-in through-wall flashing for all exterior openings and at juncture of veneer masonry and top of foundation walls.
 - .9 Through-wall flashing shall be installed before application of insulating sheathing for all circumstances.
 - .10 Maintain 20mm drip edge clear of exterior face of masonry for all through-wall flashings.
 - .11 Lap joints in all flashings and at corners minimum 102mm (4") and seal completely with lap adhesive or self-adhere over lapping sheets of self-adhering flashings prior to laying veneer units on flashings.
 - .12 Install weep hole ventilators continuously in base course of masonry veneer units at 600mm (24") on centre. Do not install weep hole ventilators at top of veneer walls.

3.4 FOR QUARRIED STONE MASONRY VENEER:

- .1 Quarried stone masonry will be masonry veneer construction with ties connecting it to masonry walls, steel studs and wood studs.
- .2 Provide loose steel lintels, hot-dipped galvanized over all openings.
- .3 Through-wall Flashing and Transition Membrane:
 - .1 Provide through-wall flashing above all new loose steel lintels when installed in exterior walls.
 - .2 Install transition membrane below all new and repositioned windows within new or modified window openings.
 - .3 Lap flashing minimum 100 mm (4") at joints and corners and as end dams for all sills. Seal all joints with lapped sheets of self-adhering flashings.
 - .4 Install mortar net at base of wall.
 - .5 Install weep-hole ventilators each 410 mm on centre, continuously.
- .4 Joints:
 - .1 Joints to be nominal 10mm (3/8"), tooled slightly concave.
 - .2 Install control joints and expansion joints with fillers and butyl sealant in locations indicated. Cut masonry plumb each side of joint. Joints nominal 10mm (3/8") wide or to suit expansion/contraction of wall.

.5 Ties:

- .1 Install veneer tie system complete with all accessories in accordance with tie manufacturer's instructions. All metal components of veneer ties and reinforcement shall be stainless steel.
- .2 Ties shall be fastened through insulating sheathing.
- .3 Ties shall be spaced 410 mm each way.

.6 Cutting:

- .1 Saw-cut masonry components neatly as required to complete the installation shown.

.7 Precast Concrete Window Sills:

- .1 Install within window openings over transition membrane flashing.
- .2 Install new stone window sills selected and shaped to match existing for all new windows.

.8 Feature band: plant pre-cast concrete units installed below metal flashing.

3.5 SITE TOLERANCES

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

3.6 FIELD QUALITY CONTROL

- .1 Inspection and testing will be carried out by Testing Laboratory designated by the Consultant.
- .2 Testing may include testing of masonry units, mortar, grout and masonry sand.

END OF SECTION

PART 1 General

1.1 RELATED SECTIONS

- .1 All sections of division one
- .2 Section 03 48 00 Plant Precast Architectural Concrete Specialties
- .3 Section 04 05 10 Masonry Procedures
- .4 Section 04 08 00 Masonry Reinforcing and Connectors
- .5 Section 04 09 00 Masonry Accessories
- .6 Section 04 22 00 Concrete Masonry Units
- .7 Section 04 43 23 Quarried Stone Veneer Cladding
- .8 Section 05 12 10 Structural Steel for Buildings
- .9 Section 05 50 00 Metal Fabrications

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA A179-94, Mortar and Grout for Unit Masonry.

1.3 SAMPLES

- .1 Submit samples of mortar for colour selection in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit samples of each masonry unit specified.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 Construction Waste Management and Disposal.
- .2 Collect and separate plastic, paper packaging, boxboard and corrugated cardboard in accordance with Waste Management Plan.

PART 2 Products

2.1 MATERIALS

- .1 Use same brands of materials and source of aggregate for entire project.
- .2 Mortar and grout: CSA A179.
- .3 Use aggregate passing 1.18 mm sieve where 3/8" (10 mm) thick joints are indicated.
- .4 Mortar for quarried stone veneer assembly shall be colour and selected from manufacturer's standard range.
- .5 Mortar for interior concrete blocks - concrete interior masonry units - shall be natural grey.
 - .1 Loadbearing: Type S based on Property or Proportion specifications.
 - .2 Non-loadbearing: Type N based on Property or Proportion specifications.
- .6 Mortar for foundation walls, manholes, sewers, pavements, walks, patios and other exterior masonry at or below grade: Type M based on Property or Proportion specifications.
- .7 Non-staining mortar: use non-staining masonry cement for cementitious portion of specified mortar type.
- .8 Grout: to CSA A179, Table 3.
- .9 Parging mortar: Type N to CSA A179.

2.2 MIXES

- .1 Colour and admixtures: Mix grout to semi-fluid consistency.
- .2 Coloured mortars: Incorporate colour and admixtures into mixes in accordance with manufacturer's instructions.
 - .1 Use clean mixer for coloured mortar.

Execution

2.3 CONSTRUCTION

- .1 Do masonry mortar and grout work in accordance with CSA A179 except where specified otherwise.
- .2 Apply parging in uniform coating not less than total 10 mm (3/8") thick, where indicated.

2.4 SCHEDULE

- .1 Use coloured mortar for all exterior masonry veneer where joints are exposed to view.
- .2 Grout masonry components as indicated on drawings.
- .3 Provide load-bearing and non-load-bearing concrete masonry unit walls illustrated on drawings.

END OF SECTION

PART 1 General**1.1 RELATED WORK**

- .1 Section 03 48 00 Plant Precast Architectural Concrete Specialties
- .2 Section 04 05 10 Masonry Procedures
- .3 Section 04 06 00 Mortar and Masonry Grout
- .4 Section 04 09 00 Masonry Accessories
- .5 Section 04 22 00 Concrete Masonry Units.
- .6 Section 04 43 23 Quarried Stone Veneer Cladding
- .7 Section 05 12 10 Structural Steel for Buildings
- .8 Section 05 50 00 Metal Fabrications
- .9 Section 07 27 10 Weather Barrier, Air Barrier and Transition Membrane

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA-A23.1-M94, Concrete Materials and Methods of Concrete Construction.
 - .2 CSA-A370-M94, Connectors for Masonry.
 - .3 CSA-A371-M94, Masonry Construction for Buildings.
 - .4 CSA G30.14-M1983 (R1998), Formed Steel Wire For Concrete Reinforcement.
 - .5 CSA G30.18-M92, Billet-Steel Bars for Concrete Reinforcement.
 - .6 CSA-S304-.1M94, Masonry Design for Buildings.
 - .7 CSA W186-M1990, Welding of Reinforcing Bars in Reinforced Concrete Construction.
 - .8 CSA A179-94, Mortar and Grout For Unit Masonry.

PART 2 Products**2.1 MATERIALS**

- .1 Joint reinforcing for all concrete unit masonry walls regardless of bearing conditions or location:
 - .1 Wire reinforcement: to CSA-A370-14, truss type.
 - .2 Corrosion protection: to ASTM A153; 1.5 oz per square foot; hot-dipped galvanized after fabrication to CSA-S304 and CSA-A370 after fabrication for all ties, connectors and truss wire reinforcement.
- .2 Joint reinforcement – new concrete unit masonry walls.
 - .1 Truss ladder reinforcing fabricated of 9-gauge wire hot-dipped galvanized after fabrication, installed at every second course.
 - .2 Acceptable Materials:
 - .1 Blok Lok BL 30.
 - .1 Hohmann Barnard 120 Truss Mesh
- .3 Veneer Masonry Ties Exterior Cavity Wall Construction with Quarried Stone Veneer:
 - .1 Meet or exceed CSA A370.14 and ACI 530.1/ASCE 6/TMS 602
 - .2 Design Load Calculations for veneer tie system to CSA CAN3-A370-M84 "Connectors for Masonry" complete with factor of safety of 2.25 as per Table 3 of the standard.
 - .3 16-gauge base metal thickness for plate; 3/16" diameter wire tie meeting or exceeding ASTM A580; all parts stainless steel Type 304 to meet or exceed ASTM 167.
 - .4 All ties stainless steel Type 304 per ASTM 167, ASTM A666, ASTM A480/480M, and ASTM A240/A240M AISI Type 304.
 - .5 Acceptable Materials:
 - .1 Wood Stud and Steel Stud Wall Assembly Masonry Veneer ties:
 - .1 Hohmann Barnard HB-213-2x, adjustable veneer anchor, stainless steel, 16 ga base metal thickness. Fasten with stainless steel screws.
 - .2 FERO Thermal Tie - Heavy-Duty Holed Rap-Tie Masonry Connector, 16 ga base metal thickness, stainless steel.
 - .2 Concrete masonry unit assembly as back-up for quarried stone masonry veneer - ties:

- .1 Hohmann Barnard HB-5213-2x, stainless steel type 304, 16-ga, brass anchor bolt.
- .3 Ferro Slotted Rap Tie, complete with 3/16" diameter wire "V" tie.

2.2 LOOSE STEEL LINTELS:

- .1 Interior lintels:
 - .1 Refer to structural engineering drawings for design size.
 - .2 Minimum interior steel lintel in all cases shall be primed steel, 100 mm x 125 mm x 9 mm thick for each angle or larger as noted on structural engineering drawings.
 - .3 Fabricate interior steel angles in pairs for interior concrete masonry unit openings.
- .2 Exterior Masonry Veneer Loose Steel Lintel:
 - .1 Hot-dipped galvanized following fabrication in all instances.
 - .2 Refer to structural drawings for sizes.
 - .3 Minimum exterior steel lintel in all cases shall be hot-dipped galvanized after fabrication with a minimum size of 100 mm x 125 mm x 9 mm thick for each angle or larger as noted on structural engineering drawings, except all instances shall be hot-dipped galvanized after fabrication.
- .3 Concrete Unit Masonry Angles:
 - .1 For exterior wall assemblies: toe-to-toe and back-to-back angle assemblies shall be hot-dipped galvanize after fabrication and Minimum interior steel lintel in all cases shall be primed steel, 100 mm x 125 mm x 9 mm thick for each angle or larger as noted on structural engineering drawings.
 - .2 Fabrication details marked on structural drawings, except all instances shall be hot-dipped galvanized after fabrication.

2.3 FABRICATION

- .1 Fabricate connectors in accordance with CSA-A370 and as specified in this section.
- .2 Obtain Consultant's approval for locations of reinforcement splices other than shown on placing drawings.
- .3 Ship reinforcement and connectors, clearly identified in accordance with drawings.
- .4 All masonry ties and connectors shall be hot-dipped galvanized following fabrication in all cases. Screws for all masonry ties and connectors shall be stainless steel.

PART 3 Execution

3.1 GENERAL

- .1 Supply and install masonry connectors and reinforcement in accordance with CSA-A370, CSA-A371 and CSA-S304.1 unless indicated otherwise.
- .2 Prior to placing concrete, mortar or grout, obtain Consultant's approval of placement of reinforcement and connectors.
- .3 Supply and install additional reinforcement to masonry when indicated on drawings and shop drawings.
- .4 Veneer Masonry Ties Exterior Cavity Wall Construction with Quarried Stone Veneer:
 - .1 Space ties 410 mm on centre in each direction.
 - .2 Meet or exceed CSA A370.14 and ACI 530.1/ASCE 6/TMS 602
 - .3 Design Load Calculations for veneer tie system to CSA CAN3-A370-M84 "Connectors for Masonry" complete with factor of safety of 2.25 as per Table 3 of the standard.
 - .4 16-gauge base metal thickness for plate; 3/16" diameter wire tie meeting or exceeding ASTM A580; all parts stainless steel Type 304 to meet or exceed ASTM 167.
 - .5 All ties stainless steel Type 304 per ASTM 167, ASTM A666, ASTM A480/480M, and ASTM A240/A240M AISI Type 304.

3.2 BONDING AND TYING

- .1 Load-bearing and non-load bearing standard Concrete Block Reinforcing Interior or exterior walls and partitions: Hot-Dipped galvanized ladder or truss reinforcing installed at every second course.
- .2 Lateral support provided by continuous angles fixed to underside of steel deck roof structure at 1220 mm on centre using Red-Head anchors or equivalent approved by structural engineer.

- .3 Interior lateral support angles shall be fixed to permit movement of roof structure while retaining block units in place.
- .4 Interior lateral support angles shall be primed steel finish painted by Division 09 when exposed to view in service.

3.3 REINFORCED LINTELS AND BOND BEAMS

- .1 Reinforce masonry lintels as indicated or utilize loose steel lintels.
- .2 Place and grout reinforcement in accordance with CSA-S304.1, CSA-A371, and CSA-A179.

3.4 GROUTING

- .1 Grout masonry in accordance with CSA-S304.1, CSA-A371 and CSA-A179 and as indicated.

3.5 ANCHORS

- .1 Supply and install metal anchors as indicated.

3.6 LATERAL SUPPORT AND ANCHORAGE

- .1 Supply and install lateral support and anchorage in accordance with CSA-S304.1 and as indicated.

3.7 MOVEMENT (EXPANSION) JOINTS

- .1 Reinforcement will not be continuous across movement joints unless otherwise indicated.

3.8 FIELD BENDING

- .1 Do not field bend reinforcement and connectors except where indicated or authorized by Consultant.
- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars and connectors, which develop cracks or splits.

3.9 FIELD TOUCH-UP

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcement steel and connectors with compatible finish to provide continuous coating.

END OF SECTION

PART 1 General

1.1 RELATED SECTIONS

- .1 Section 03 48 00 Plant Precast Architectural Concrete Specialties
- .2 Section 04 05 10 Masonry Procedures
- .3 Section 04 06 00 Mortar and Masonry Grout
- .4 Section 04 08 00 Masonry Reinforcing and Connectors
- .5 Section 04 09 00 Masonry Accessories
- .6 Section 04 22 00 Concrete Masonry Units
- .7 Section 05 12 10 Structural Steel for Buildings
- .8 Section 05 50 00 Metal Fabrications
- .9 Section 07 21 30 Sprayed Insulation Polyurethane
- .10 Section 07 27 10 Air Barriers, Transition Membrane Assemblies
- .11 Section 07 62 00 Sheet Metal Flashing

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D 2240-97e1, Standard Test Method for Rubber Property - Durometer Hardness.
- .2 Canadian Standards Association (CSA)
 - .1 CAN3-A371-M94, Masonry Construction for Buildings.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 Construction Waste Management and Disposal.
- .2 Collect and separate plastic, paper packaging, boxboard and corrugated cardboard in accordance with Waste Management Plan.

PART 2 Products

2.1 MATERIALS

- .1 Control joint filler: purpose-made, closed cell, masonry veneer expansion joint filler produced to a uniform thickness and density as a flexible neoprene sponge. Product must be easily compressed and has a recovery of 95% or more of the original thickness. Pressure-sensitive adhesive on one site. Neoprene/SBR 3/8" (9 mm) minimum thickness; 1/2" (12.7 mm) wider to suit expansion joints.
 - .1 Meet or exceed:
 - .1 ASTM D1056-00, Grade 2 A 1, or Class RE41.
 - .2 ASTM D 5249, Type 2;
 - .3 ASTM D 1752, Sections 5.1 - 5.4, with compression requirement modified to 10 psi (7.03 g/mm2) minimum and 25 psi (17.58g/mm2) maximum.
 - .4 ASTM D 7174-05
 - .2 Acceptable materials:
 - .1 W. R. Meadows Ceramar Flexible Foam;
 - .2 Hohmann & Barnard Inc. NS-Control and Expansion Joint;
- .2 Weep hole vents: purpose-made for cavity venting.
 - .1 Acceptable Materials:
 - .1 Blok Lok Cell Vent, clear colour
 - .2 Hohmann and Barnard QV Quadro-Vent, clear colour.
 - .3 Wilco Aluminum weephole ventilator as supplied by Blok-Lok. Mill finish aluminum.
- .3 Through-wall flashings and flashings behind sills and used to form end dams:
 - .1 Acceptable Materials:
 - .1 Henry Blueskin S/A. self-adhering flashing and associated primer
 - .2 Soprema Sopraseal Stick 1100T self-adhesive flashing

- .3 WR Meadows Sealtight Air Shield, self-adhering.
 - .4 Tremco Exo-Air 110, self-adhering.
- .4 Through-wall flashing membrane primers:
 - .1 Supply and Apply primers for all flashings in all situations.
 - .2 Acceptable Materials – select to match manufacturer of flashing membrane:
 - .1 Henry Company Blueskin Primer and Blueskin Spray Prep
 - .2 Soprema Flastocol Stick or Flastocol Stick H2O.
 - .3 Primers purpose-made for other specified flashing.
- .5 Mortar Net (Trap):
 - .1 General:
 - .1 10 mm – 25 mm (0.4 - 1.0 inch) thick: High Density Polyethylene (HDPE) mesh
 - .2 Recycled polyester mesh.
 - .3 Alternate: Nylon strands woven into a 20 mm (0.80") thick mesh
 - .4 Meet or exceed ASTM E514 (Modified) -- Test Method of Water Permeance of Masonry.
 - .2 Acceptable Materials:
 - .1 Blok Lok Mortar Break polymer core geomatrix composed of nylon strands woven into a 20 mm (0.80") thick mesh.
 - .2 Mortar Net - polyester mesh, dove tail shape as manufactured by Mortar Net USA Ltd. of Gary Indiana.
 - .3 Hohmann and Barnard Mortar Trap.

PART 3 Execution

3.1 INSTALLATION

- .1 The wall assemblies are designed as pressure equalized rain screen assemblies with the following characteristics:
 - .1 Through-wall flashings shall be installed over all horizontal supports for masonry veneer and to seal air cavity locally.
 - .2 Air cavity shall be separated from soffit ventilation in all cases and divided at each vertical corner or as shown on drawings coincident with a vertical control joint.
 - .3 Weep hole ventilators shall be installed above all through-wall flashings to permit ingress of air and to release moisture in the wall cavity.
 - .4 No weep hole flashings shall be provided at the top of the air space cavity below through wall flashings.
 - .5 Air space shall be sub-divided with vertical cavity seals formed from wipe coated galvanized sheet metal bent to form 90-degree angle for fastening to sheathing behind rigid insulation and extended into a prepared control or expansion joint.
- .2 Install continuous control/expansion joint fillers in control joints at locations indicated and as referenced herein.
- .3 Install weep hole vents in vertical joints immediately over all through wall flashings, in exterior wythes of masonry veneer wall construction, at maximum horizontal spacing of 400 mm (16") on centre, continuously. Install weep hole vents symmetrically over window and door openings such that each opening has at least three weep hole vents spaced with one near each left and right end of the opening and one at the centre of the opening.
- .4 No weep hole vents are required at top of wall locations.
- .5 Install mortar net continuously at top of foundation wall. Mortar net product to rest directly on through-wall flashing.
- .6 Refer to Section 04 05 10 Masonry Procedures for additional notes on installation.
- .7 Seal top of wall locations with through wall flashing material to disconnect masonry air space from attic or soffit ventilation.

- .8 Top or air space seal – alternate: may be self-sealing, self adhering closed cell foam friction fit between back of topmost masonry units and face of rigid insulation. Closed cell foam shall be expandable to fill air space tightly.
- .9 Saw-cut masonry veneer units a set to form straight, plumb lines for all control joint locations.
- .10 Construct control joints both ends of bearing for each window or door opening and from foundation level to above soffit level for control joints shown near corners of building and for cavity sealers.

3.2 CONSTRUCTION

- .1 Control Joints and expansion joints:
 - .1 Supply and install control joint filler as backing continuously within all control joints. Allow 10mm x 10mm (3/8"x3/8") exterior sealant application for face finish of control joints.
 - .2 Apply control joint filler between top side of masonry and underside of rigid structural steel. Joint shall be filled completely with 3/8" thickness material and exterior finish shall be 10mm x 10mm (3/8"x3/8") exterior masonry sealant.
- .2 Build in flashings in masonry in accordance with CAN3-A371 as follows.
- .3 Through-wall flashings:
 - .1 Self-adhesive flashings shall be provided in 610mm (24") wide rolls, minimum, but with 305mm (12") minimum vertical return on ICF back-up wall in all situations. All joints in self-adhesive flashings shall be lapped 100mm (4") and sealed.
 - .2 Apply primer to surfaces that will receive flashings in all cases.
 - .3 Install flashings on primed surfaces, under exterior masonry bearing on foundation walls, slabs, shelf angles, and steel angles over openings and return over primed vertical surfaces such as wall sheathings minimum 305mm (12") for all cases. Install flashings under weep hole courses and as indicated.
 - .4 Apply appropriate primer for all surfaces that are to receive flashings.
 - .5 Apply materials smooth and tight to all surfaces, free of fish mouths or gaps.
 - .6 Apply all through-wall flashings prior to Section 07 21 30 Sprayed-in-Place Foam is applied to walls.
 - .7 Install mortar net at base of air space above all through wall flashings following application of sprayed-in-place foam.
 - .8 Install weep hole ventilators above all through wall flashings.
 - .9 **For window and door openings:** Apply self-adhesive through wall flashing on primer on substrate as applicable. Lap flashing under air retarder and over air barrier continuity strips at openings to create shingle pattern for wall drainage in every case or as indicated. All self-adhesive membranes shall be supported by structure, framing or similarly secured surfaces. At outer surface of flashing assembly create 20mm (¾") overhanging drip edge with flashing. This applies to metal lintels, angles, channels and loose steel lintels and base course flashing.
 - .10 **For base course flashing:** install self adhesive through wall flashing on primed concrete surface. Ensure that flashing project beyond outer edge of concrete wall 20mm (¾").
- .4 Control Joints and expansion joints:
 - .1 Supply and install control joint filler as backing continuously within all control joints. Allow 10mm x 10mm (3/8"x3/8") exterior sealant application for face finish of control joints.
 - .2 Apply control joint filler between top side of masonry and underside of rigid structural steel. Joint shall be filled completely with 10 mm (3/8") thickness material and exterior finish shall be 10mm x 10mm (3/8"x3/8") exterior masonry sealant.

END OF SECTION

PART 1 General

1.1 RELATED SECTIONS

- .1 All sections of Division 01
- .2 Section 03 48 00 Plant Precast Architectural Concrete Specialties
- .3 Section 04 05 10 Masonry Procedures
- .4 Section 04 06 00 Mortar and Masonry Grout
- .5 Section 04 08 00 Masonry Reinforcing and Connectors
- .6 Section 04 09 00 Masonry Accessories
- .7 Section 04 43 23 Quarried Stone Veneer Cladding
- .8 Section 05 12 10 Structural Steel for Buildings
- .9 Section 05 50 00 Metal Fabrications: Steel lintels
- .10 Section 07 27 10 Air Barriers, Transition Membrane Assemblies
- .11 Section 07 62 00 Sheet Metal Flashing

1.2 REFERENCES

- .1 American Society for Testing Materials:
 - .1 ASTM C55 Specification for Concrete Building Brick
 - .2 ASTM C90 Specification for Loadbearing Concrete Masonry Units
 - .3 ASTM C270 Specification for Mortar for Unit Masonry
 - .4 ASTM C476 Specification for Grout for Masonry
 - .5 ASTM C1634 Specification for Concrete Facing Brick and Other Concrete Masonry Facing Units
- .2 Canadian Standards Association (CSA International)
 - .1 CAN3 A165 SERIES-94 (R2000), CSA Standards on Concrete Masonry Units covers: A165.1, A165.2, A165.3.
 - .2 CSA A371 Masonry Construction for Buildings
 - .3 CSA A179 Mortar and Grout for Unit Masonry
 - .4 CSA A370 Connectors for Masonry
- .3 National Concrete Masonry Association
 - .1 NCMA TEK 8-4A Cleaning Concrete Masonry
 - .2 NCMA TEK 9-1A Mortars for Concrete Masonry
 - .3 NCMA TEK 8-3A Control and Removal of Efflorescence
 - .4 NCMA TEK 10-4 Crack Control for Concrete Brick and other Concrete Masonry Veneers
 - .5 NCMA TEK 19-5A Flashing Details for Concrete Masonry Walls

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, boxboard packaging material in appropriate containers on-site for recycling in accordance with Waste Management Plan.
- .4 Divert damaged or unused concrete materials from landfill to local facility approved by the Consultant.

PART 2 Products

2.1 MATERIALS

- .1 Solid concrete stretcher unit for decorative, smooth course; continuous around the building above windows.
 - .1 Shouldice Tex stretcher: 90 mm bed dimension, 290 mm high face dimension, 590 mm length with 15 mPa strength. Colour from standard range. Texture exposed to view is shot blasted "Tex" finish. No bevel on corners.
- .2 Standard hollow concrete block units Type N or S: to CAN3-A165 Series (CAN3-A165.1). Use type N units for all walls unless structural drawings indicate "S" type.
- .3 Classification of Hollow Block:

- .1 H/15/A/M, minimum 15 MPa unit strength.
- .4 Hollow unit (60% solid) minimum 15 MPa net area compressive strength, normal weight, moisture controlled.
- .5 Fire Endurance: nominal 200mm (8") unit is required to meet equivalent thickness for 1.5-hour fire resistance rating OBC Supplement SB-2, 1.6 and 2.1 or 113mm required equivalent thickness.
- .6 Lintel Blocks – Use to best advantage where lintels are required:
 - .1 Size to match wall in which lintel occurs.
 - .2 Install reinforcing steel and ladder reinforcing noted on drawings.
 - .3 Alternative Lintel: loose steel; singly or used in pairs.
- .7 Fill units with grout to accommodate vertical reinforcing steel.
- .8 Size: modular.
- .9 Special shapes:
 - .1 Provide purpose made shapes for lintels.
 - .2 Provide bullnose corner units for interior block partitions and load-bearing wall construction at all openings (doors, archways and windows) where block will be exposed to view in service.

PART 3 Execution

3.1 INSTALLATION

- .1 Standard Hollow Concrete block unit thicknesses – 90 mm, 140 mm, 190 mm 240 mm, 290 mm bed depths. Locations for wall thickness are marked on drawings.
- .2 Bond: running.
- .3 Coursing height: 200mm (8 inches) for one block and one joint.
- .4 Jointing: concave in all cases.
- .5 Install reinforced lintel blocks or loose steel lintels or structural steel beams in all openings as noted on Structural Engineer's drawings.
- .6 Install bullnose corner units at all exterior corners used for openings inside of the building (archways, doors).
- .7 Fill units with grout and accommodate where noted within reinforcing layout, grout-filled cores, etc.

3.2 CLEANING

- .1 Standard block: Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block and finally by brushing.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 00 00 Cast-In-Place Concrete.
- .2 Section 03 48 00 Plant-Pre-Cast Concrete Specialties.
- .3 Section 04 05 01 Masonry Procedures.
- .4 Section 04 05 16 Mortar and Masonry Grout.
- .5 Section 04 05 19 Masonry Reinforcing and Connectors.
- .6 Section 04 05 23 Masonry Accessories.
- .7 Section 04 22 00 Concrete Masonry Units.
- .8 Section 05 50 00 Metal Fabrications.
- .9 Section 07 27 10 Weather Barrier, Air Barrier and Transition Membrane.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A108.1-2013, Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4 -.13, A118.1-.10, A136.1).
- .2 ASTM International
 - .1 ASTM C144-11, Standard Specification for Aggregate for Masonry Mortar.
 - .2 ASTM C207-06 (2011), Standard Specification for Hydrated Lime for Masonry Purposes.
 - .3 ASTM C568/C568M-10, Standard Specification for Limestone Dimension Stone.
 - .4 ASTM C616/C616M-10, Standard Specification for Quartz-Based Dimension Stone.
- .3 Canadian Standards Association (CSA)
 - .1 CSA A179-94, Mortar and Grout for Unit Masonry.
 - .2 CSA-A371-94, Masonry Construction for Buildings.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for quarried stone veneer cladding and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit literature for veneer ties and bonding.
- .4 Samples:
 - .1 Submit sample for each finish masonry products specified, and complete sets representing manufacturer's full range of available colours, textures, and patterns.

1.4 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports including sand gradation tests in accordance with CAN/CSA-A179 showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control:
 - .1 Construct mock-up panel of exterior quarried stone veneer construction 3000 x 3000 mm, showing colours and textures, use of reinforcement, ties, through wall flashing, weep holes, jointing, coursing, mortar and quality of work.
 - .2 Mock-up used:

- .3 To judge quality of work, substrate preparation, operation of equipment and material application.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations.
 - .2 Store and protect quarried stone veneer cladding damage and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return to manufacturer pallets, crates, padding, packaging materials.

1.6 SITE CONDITIONS

- .1 Ambient Conditions:
 - .1 Do not install at temperatures below 12 degrees C or above 38 degrees C.
 - .2 Maintain temperatures at or above 12 degrees C until cementitious materials have fully cured.
 - .3 Do not apply epoxy mortar and grouts at temperatures below 15 degrees C or above 25 degrees C.
- .2 Field Measurements:
 - .1 Make site measurements necessary to ensure proper fit of members.

Part 2 Products

2.1 MATERIALS

- .1 Limestone: to ASTM C568/C568M, category II - Medium Density, colour and texture to match approved samples.
- .2 Acceptable Stone Products:
 - .1 Arriscraft Adair Limestone, quarried at Wiarton. Blue-Grey Split Face, Adair Georgian Blend.
 - .1 Random Ashlar created with 3 sizes:
 - .1 Size 1: AGB22: 2-5/16" H x Random L x 3-5/8" (+/-1/4") Depth.
 - .2 Size 2: AGB50: 5" H x Random L x 3-5/8" (+/-1/4") Depth.
 - .3 Size 3: AGB75: 7-5/8" H x Random L x 3-5/8" (+/-1/4") Depth.
 - .2 Owen Sound Ledgerock, split-face front and back; sawn top, bottom and sides, full bed veneer, "Hope Bay" colour.
 - .1 Random Ashlar pattern created with the following sizes: Bed width: ~ 3 3/8". Face Heights: 3 3/8", 7 3/8", 11 3/8", 15 3/8". Length: 23 3/8".
 - .3 Limberlost Stone, split-face front and back; sawn top, bottom and sides, 4" bed for full bed veneer, "Limberlost Eramosa Sawn Bed Coursing".
 - .1 Random Ashlar pattern created with the following sizes: Bed width: 4". Face Heights: 2.25", 5", 7.75", 10.5". Length: variable.
 - .2 Anchors, cramps, dowels: stainless steel type 302 or 304.
 - .3 Backup materials: Refer to drawings.
 - .4 Sealants: control and expansion joint fillers and Tremco sealant.

2.2 MORTAR AND ADHESIVE MATERIALS

- .1 Portland cement: to CAN/CSA-A3000, type GU.
- .2 Sand: to ASTM C144, passing 16 mesh.
- .3 Hydrated lime: to ASTM C207, Type S and SA to suit the situation.

- .4 Latex additive: formulated for use in Portland cement mortar and thin set bond coat.
- .5 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.
- .6 Dry set Portland cement mortar: to ANSI A108.1.
- .7 Latex Portland cement mortar: to ANSI A108.1.
- .8 Bond Breaker: preformed, compressible, resilient, non staining, non waxing, closed-cell polyethylene foam pad, non absorbent to liquid and gas, 3.2 mm thick or polyethylene sheet, 6 to 10 mil thick.

2.3 GROUT

- .1 Portland cement grout: to ANSI A108.1.
- .2 Refer to Section 04 06 00 Mortar and Grout for Masonry.
- .3 Epoxy grout: to ANSI A108.1.
- .4 Grout preparation: to manufacturer's written instructions.
- .5 Latex-Portland cement grout: to ANSI A108.1.
- .6 Furan mortars and grout: to ANSI A108.1.

2.4 FINISHES

- .1 Sawn top and bottom bed; cleaved (guillotined) front, sides and back.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for quarried stone veneer cladding installation in accordance with CSA-A371-94, Masonry Construction for Buildings and supplier's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation following rectification of unacceptable conditions, and after receipt of written approval to proceed from Consultant.

3.2 PREPARATION

- .1 Protect adjacent finished materials from damage due to masonry work.
- .2 Cut stone to shape and dimensions and full to square with joints as indicated. Dress exposed faces true.
- .3 Make joints 8 mm thick.
- .4 Cut-in reglets for flashings where indicated.
- .5 Execute moulded work from full size details. Make exposed arrises in true alignment and ease slightly to prevent snipping.
- .6 Back-check stone contacting structural members as indicated. Allow minimum of 25 mm clearance between back of stone and steel and concrete structural members. Shape beds of stone resting on structural work to fit supports.
- .7 Cut stones for anchors, clamps, dowels and support systems. Provide Lewis pin and clamp holes in pieces which can not be manually lifted. Do not cut holes in exposed surfaces.

3.3 INSTALLATION

- .1 Construction in accordance with CAN/CSA-A371.
- .2 Apply asphalt emulsion to concrete surfaces, shelf angles, structural steel supports against which stone is to be applied.
- .3 Clean stone exposed surfaces by washing with stiff fibre brush and water.
- .4 Drench dry stones with clean water just before setting.
- .5 Install anchors, dowels and cramps.

- .6 Set stones plumb, true, level in full bed of mortar with vertical joints slushed full except where otherwise specified. Completely fill anchor, dowel and lifting holes. Keep edges and faces aligned to respect indicated tolerances.
- .7 Embed in mortar ends only of lugged sills and steps. Leave balance of joint open for final pointing.
- .8 Place plastic or lead setting pads under stones to maintain joint thickness. Set heavy stones and projecting courses after mortar in courses below has hardened sufficiently to support weight.
- .9 Prop and anchor projecting stones until wall above is set.
- .10 Use soaked softwood wedges to support stone in proper alignment until mortar has set. Remove wedges when dry and without breaking them off, fill voids with pointing mortar.
- .11 Install 6 to 10 mil polyethylene sheet to prevent bond between back of stone facing and concrete substrate or install 3 mm polyethylene foam bond breaker. Maintain minimum projection requirements of stone anchors into concrete substrate.
- .12 Use plastic weep hole vents. Refer to Section 04 09 00 Masonry Accessories.
- .13 Install air breather vents above foundation ledge, shelf angles or above flashed, structural support.
- .14 Tool joints after initial set has occurred.
- .15 Rake out control and expansion joints to 25 mm depth and make ready for pointing with joint filler and sealant. Sponge stone face along joints and remove droppings and splashed mortar immediately.
- .16 Set window sills, projecting belt courses, with unfilled vertical joints.
- .17 Grouting: pack ends of exposed joints with plastic foam joint filler and after wetting ends of stone, fill joint with grouting mortar to within 20 mm of top.
 - .1 Grout vertical joints of projecting belt courses.
 - .2 After grout has set, remove packing for pointing.
- .18 Pointing: remove dirt and loose mortar from joints by using pressure air stream.
 - .1 Wet joints for mortar pointing. Dry joints for sealant pointing.
 - .2 Point joints with pointing mortar in 2 stages. Rub smooth with plastic tool to slightly concave joint.
 - .3 Point control and expansion joints with sealant. Do work in accordance with Section 07 92 00 - Joint Sealants.

3.4 TOLERANCES

- .1 To CAN/CSA-A371.

3.5 FIELD QUALITY CONTROL

- .1 Site Tests Inspection: in accordance with Section 04 05 10 – Masonry Procedures.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 At end of each working day, brush off loose mortar from stone face.
- .3 At completion, wash stonework with stiff-fibre brushes and clean water.
- .4 Waste Management: separate waste materials for reuse and recycling as granular.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION

- .1 Brace and protect quarried stone veneer cladding in accordance with Section 04 05 10 – Masonry Procedures.

3.8 SCHEDULE

- .1 Refer to drawings.

END OF SECTION

PART 1 General

1.1 RELATED SECTIONS

- .1 Section 04 05 10 Masonry Procedures
- .2 Section 04 06 00 Mortar and Masonry Grout
- .3 Section 04 08 00 Masonry Reinforcing and Connectors
- .4 Section 04 09 00 Masonry Accessories
- .5 Section 04 22 00 Concrete Masonry Units
- .6 Section 04 43 23 Quarried Stone Veneer Cladding
- .7 Section 05 50 00 Metal Fabrications
- .8 Section 06 10 00 Rough Carpentry
- .9 Section 07 21 13 Board Insulation
- .10 Section 07 53 00 EPDM Roofing
- .11 Section 09 91 23 Painting

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 36/A 36M, Specification for Structural Steel.
 - .2 ASTM A 193/A 193M-98, Specification for Alloy-Steel and Stainless-Steel Bolting Materials for High-Temperature Service.
 - .3 ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
 - .4 ASTM A 325, Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - .5 ASTM A 325M, Specification for High-Strength Bolts for Structural Steel Joints Metric.
 - .6 ASTM A 475 - Standard Specification for Zinc-Coated Steel Wire Strand.
 - .7 ASTM A 490, Specification for Heat Treated, Steel Structural Bolts, 150 ksi (1035 MPa) Tensile Strength.
 - .8 ASTM A 490M, Specification for High-Strength Steel Bolts, Classes 10.9 and, for Structural Steel Joints.
 - .9 ASTM A 500/A 500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - .10 ASTM A 529/A 529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
 - .11 ASTM A 563 - Standard Specification for Carbon and Alloy Steel Nuts.
 - .12 ASTM A 572/A 572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
 - .13 ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .14 ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55 Percent Aluminum-Zinc Alloy-Coated by Hot-Dip Process.
 - .15 ASTM A 992/A 992M - Standard Specification for Structural Steel Shapes.
 - .16 ASTM A 1011/A 1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength, Low-Alloy and High-Strength Low-Alloy with Improved Formability and Ultra-High Strength.
 - .17 ASTM A 1018/A 1018A - Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Carbon, Commercial, Drawing, Structural, High-Strength, Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- .2 Canadian General Standards Board (CGSB):
 - .1 CAN/CSA G40.20-13/G40.21-13 - General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

- .2 CAN/CSA S16-09, Design of Steel Structures
- .3 CAN/CSA S136-07, North American Specification for the Design of Cold-Formed Steel Structural Members, including Appendix B, Provisions Applicable to Canada.
- .4 CAN/CSA W47.1-09, Certification of Companies for Fusion Welding of Steel.
- .5 CAN/CSA W59-13 Welded Steel Construction (Metal Arc Welding).
- .6 CAN/CGSB-1.40-97, Primer Structural Steel, Oil Alkyd Type.
- .7 CGSB 85-GP-14M-78, Painting Steel Surfaces Exposed to Normally Dry Weather.
- .8 CAN/CGSB-85.100-93, Painting.
- .3 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA).
 - .1 CISC/CPMA1-73b, Quick-Drying, One-Coat Paint for Use on Structural Steel.
 - .2 CISC/CPMA2 -75, Quick-Drying, Primer for use on Structural Steel.
- .4 Canadian Standards Association (CSA)
 - .1 CAN/CSA-G40.20-M92, General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CSA-G40.21-M92, Structural Quality Steels.
 - .3 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .4 CAN/CSA-S16.1-94, Limit States Design of Steel Structures.
 - .5 CAN/CSA-S136-94, Cold Formed Steel Structural Members.
 - .6 CSAW47.1-92, Certification of Companies for Fusion Welding of Steel Structures.
 - .7 CSAW48 Series- Various Dates, Electrodes.
 - .8 CSAW55.3-1965, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
 - .9 CSAW59-M1989, Welded Steel Construction (Metal Arc Welding).
 - .10 CAN/CSA-G164-M92 (R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .5 Underwriters Laboratories of Canada (ULC):
 - .1 CAN/ULC S 101, Fire Endurance Tests of Building Construction and Materials
 - .2 CAN/ULC S 102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
 - .3 CAN/ULC S 134, Fire Test of Exterior Wall Assemblies

1.3 SHOP DRAWINGS

- .1 Submit shop drawings including fabrication and erection documents and materials list in accordance with Section 01 33 00 Submittal Procedures.
- .2 On erection drawings, indicate all details and information necessary for assembly and erection purposes including description of methods, sequence of erection, type of equipment used in erection and temporary bracings. Show locations of all hot-dipped galvanized items.
- .3 Delegated Design: Ensure elements designed by the fabricator, assemblies designed by the fabricator, all structural components including gussets, plates, angles and brackets, knife connections, bolted and welded connections and beam, channel and angle selections and connections are shown on drawings which are stamped and signed by qualified professional engineer licensed in the Province of Ontario, Canada.

1.4 DESIGN OF DETAILS AND CONNECTIONS

- .1 Refer to structural drawings for general notes.
- .2 Design details and connections in accordance with requirements of CAN/CSA-S16.1 and CAN/CSA-S136 with CSAS136.1 to resist forces, moments and shear and those connections are designed to permit reasonable and anticipated movements including acceptable deflection, acceptable deformations due to loads and thermal effects.
- .3 If a connection is intended to accommodate shear forces, only (standard connection), the following process is required:
 - .1 Select framed beam shear connections from an industry accepted publication such as "Handbook of the Canadian Institute of Steel Construction".

- .2 If shear forces are not indicated, select or design connections to support reaction from maximum uniformly distributed load that can be safely supported by beam in bending, provided no point loads act on beam.
- .4 For non-standard connections, submit sketches and design calculations stamped and signed by qualified professional engineer licensed in the Province of Ontario, Canada.

1.5 QUALITY ASSURANCE

- .1 Upon request, submit copies of mill test reports showing chemical and physical properties and other details of steel to be incorporated into work at least 4 weeks prior to fabrication of structural steel. Mill test reports shall be certified by metallurgists qualified to practice in the Province of Ontario, Canada.
- .2 Ensure Fabricator of structural steel, in addition, provides an affidavit stating that materials and products used in fabrication conform to applicable material and products standards specified.

PART 2 Products

2.1 MATERIALS

- .1 Applicable reference standards for structural steel elements are listed on drawings and as follows:
 - .1 Shop paint primer: to CAN/CGSB-1.40.
 - .2 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m².
 - .3 Where hot-dipped galvanized materials are specified, all bolts, nuts and washers associated with that assembly shall be hot-dipped galvanized.
 - .4 All anchor bolts and base plates for columns shall be hot-dipped galvanized.
 - .5 All masonry lintels and bearing plates shall be hot dipped galvanized.
 - .6 Shear studs: to CSAW59, Appendix H.

2.2 FABRICATION

- .1 Fabricate structural steel in accordance with CAN/CSA-S16.1 and in accordance with approved shop drawings.
- .2 Install shear studs in accordance with CSAW59.
- .3 Continuously seal members using continuous welds. Grind smooth.
- .4 Elements noted as "galvanized" on drawings shall be hot-dip galvanized elements or assemblies.
- .5 Perform hot-dipped galvanizing according to specified standard and after fabrication.
- .6 Determine extent of hot-dip galvanizing for assemblies through analysis of bolted connections and to eliminate welding hot-dipped galvanized elements in the field.
- .7 Whether noted on drawings or not, the following items shall be hot-dipped galvanized after fabrication:
 - .1 Surfaces to be encased in concrete including anchor bolts and base plates.
 - .2 Below grade surfaces in contact with soil, granular material or exterior concrete.
 - .3 Surfaces exposed to road salts or exterior weather in service.
 - .4 Exterior steel elements associated with the Main Entrance Canopy construction.

2.3 SHOP PAINTING

- .1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16.1.
- .2 Clean all members, remove loose mill scale, rust, oil, dirt and other foreign matter. Prepare surface according to SSPCSP1 (brush) blast.
- .3 Apply one coat of primer in shop to all steel surfaces and:
 - .1 Surfaces to receive field installed stud shear connections.
 - .2 Surfaces and edges to be field welded.
 - .3 Faying surfaces of friction-type connections.
- .4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5°C.
- .5 Maintain dry condition and 5°C minimum temperature until paint is thoroughly dry.
- .6 Strip paint from bolts, nuts, sharp edges and corners before prime coat is dry.

2.4 HOT-DIP GALVANIZING:

- .1 All steel structure and miscellaneous steel members exposed to view and to weather and on the exterior or the building shall be hot-dipped galvanized after fabrication according to ASTM A123.
- .2 Structural steel utilized within the construction of the Main Entrance Canopy and the canopy over the rear porch structure adjacent to the Council Chamber and including all elements exposed to view in service, shall be hot-dipped fabricated during construction.

PART 3 Execution

3.1 GENERAL

- .1 Structural steel work: in accordance with CAN/CSA-S16.1.
- .2 Welding: in accordance with CSAW59.
- .3 Companies to be certified under Division 1 or 2.1 of CSAW47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.

3.2 CONNECTION TO EXISTING WORK

- .1 Verify dimensions and condition of existing work; report any discrepancy and potential problem areas to Consultant for direction before commencing fabrication.

3.3 MARKING

- .1 Mark materials in accordance with CAN/CSA-G40.20. Do not use die stamping. If steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.
- .2 Match marking: shop mark bearing assemblies and splices for fit and match.

3.4 ERECTION

- .1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16.1 and in accordance with reviewed erection shop drawings.
- .2 Continuously check plumb and level condition for structural elements and adjust alignments, to establish specified drainage and slopes, plumb conditions where a plumb arrangement is intended and level situations for floors and other flat surfaces.
- .3 Continuously verify position of members, dimensions required in service and erect to permit adjustment until final alignments and service arrangement is established.
- .4 Cutting or altering structural members in the field: seek review of all such circumstances from Consultant prior to effecting alteration. Do not alter or cut members without agreement for the alteration by the Consultant.
- .5 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
- .6 Continuously seal members using continuous welds where sealing is indicated. Grind smooth.

3.5 FIELD QUALITY CONTROL

- .1 This section remains solely responsible to ensure that testing is carried out in accordance with the Contract documents, the OBC and authorities having jurisdiction.
- .2 The testing agency may be the Consultant or his designees, the field engineer or a separate agency engaged for testing.
- .3 Any fabricated component or group of components or assembly may be tested in the field by a testing agency engaged specifically for this Contract.
- .4 Testing undertaken routinely during manufacturing of standard structural components, paints and coatings that are typically selected from suppliers catalogues and inventories, including, but not limited to, bolts, washers, nuts, fabricated or formed steel beams, columns, channels, angles, tubular sections and plates, welding supplies, paints and other coatings shall not be tested by a testing agency engaged under this Contract, but shall be paid by manufacturers. Such tests include all tests associated with compliance to CSA, ASTM, mill tests and any institution, association or agency responsible for establishing the standard for manufacturing, material performance or material quality and material properties. Test reports associated with such tests shall be provided to the Consultant upon request.

- .5 The cost of field testing or laboratory testing not specified as a part of the scope of work for this section shall be paid out of cash allowance amounts assigned for the Contract.
- .6 This section is solely responsible to report any finding arising out of a field inspection or out of the work of a testing agency that reveals or results in a recommendation for any remedial work, correction, replacement or adjustment to any part of the work completed or that reveals the failure of any item tested to achieve performance, quality or material standards referenced in the Contract Documents to the Contractor and the Consultant immediately.
- .7 Inspection and testing of materials, assemblies and workmanship undertaken at the place of the work will be carried out by testing agency designated by Consultant.
- .8 Samples collected at the place of the work may be tested off site in laboratories through the agencies assigned to test the work in the field.
- .9 Provide safe access and working areas for consultant and his designees, the field engineer and testing agencies on site and to all locations which require testing or that may reasonably be requested by these parties. The Consultant or his designees, the field engineer or the testing agency shall determine number, location and nature of each required test unless otherwise specified.
- .10 Submit test reports describing results of field or laboratory tests to Consultant within 2 weeks of completion of inspection. Should field conditions found by the testing agency cause the requirement for review, design work or commentary by design engineer, the Contractor shall report this requirement immediately
- .11 Test shear studs in accordance with CSAW59.

3.6 FIELD PAINTING

- .1 Paint in accordance with Section 09 91 23 Painting.
 - .1 Touch up all damaged surfaces and surfaces without primer or exhibiting damage to primer with additional primer material in the field in accordance with CAN/CGSB-1.40 except as specified otherwise. Apply primer in accordance with CGSB 85-GP-14M.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 00 00 Cast-in-Place Concrete
- .2 Section 04 05 10 Masonry Procedures
- .3 Section 04 22 00 Concrete Unit Masonry
- .4 Section 05 12 10 Structural Steel for Buildings
- .5 Section 05 50 10 Steel Stairs and Ladders
- .6 Section 06 10 00 Rough Carpentry
- .7 Section 07 21 13 Board Insulation
- .8 Section 07 61 00 Sheet Steel Siding
- .9 Section 09 22 16 Non-Structural Metal Stud Framing
- .10 Section 09 91 23 Painting
- .11 Mechanical and Electrical division for brackets, stands, hangers and supports for mechanical and electrical equipment or pipe.

1.2 WORK INCLUDED:

- .1 Design, fabrication and installation of metal items for use at the site including, but not limited to, all items listed in this specification or shown on drawings, in accordance with applicable Ontario Building Code and other standards indicated.
- .2 Field measurement as required to confirm the installation, conditions at the site and dimensions for fabrication. Field-verify mounting, fastening and suitability for installation.
- .3 Preparation of Shop Drawings.
- .4 Delivery to site for installation by this section or others as determined by the Contractor.
- .5 Metal items schedule:
 - .1 Stainless steel backsplash panels for service sinks.
 - .2 Equipment stands and device brackets associated with mechanical and electrical devices mounted on ground or the structure or suspended from building structure.
 - .3 Steel Bollards: Hot-dipped galvanized after fabrication, with steel caps.
 - .1 Steel angles, steel plates, steel HSS welded to steel plates forming lintels for openings, steel channels steel brackets and other elements associated with connection of new and modified structural steel to existing structural steel bent frames (beams). Angles and channels necessary to support openings in sheet steel roof decking and openings in load-bearing masonry.
 - .2 Steel plates used to connect structural steel to cast-in-place concrete together with their embedded anchors.
 - .3 Bearing plates, saddles and brackets not part of structural steel.
 - .4 Components for steel stair landings.
 - .5 Steel masonry support lintels together with steel plates and stiffeners, welded together and subsequently hot-dipped galvanized after fabrication in all cases, excluding steel lintels used for interior of building.
 - .6 Hangers, suspension frames and components of a suspension or support system intended to resist including device brackets and stands.
 - .7 Supports for washroom vanities; brackets and posts with top and bottom plates.
 - .8 Steel plate covers and supporting angles for sump pits and grease interceptors where such covers are not supplied with the products.
 - .9 Refer to Section 01 35 73 Delegated Design for requirements associated with any designer who applies a seal to a Submittal.

1.3 REFERENCES

- .1 ANSI ASC A14.3 - 2008, American National Standard for Ladders, Fixed – Safety Requirements

- .2 American National Standards Institute/National Association of Architectural Metal Manufacturers (ANSI/NAAMM)
 - .1 ANSI/NAAMM MBG531-93, Metal Bar Grating Manual.
- .3 ASTM International
 - .1 ASTM A 36/A 36M-97, Specification for Structural Steel.
 - .2 ASTM A53/A53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .3 ASTM A 193/A 193M-98, Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
 - .4 ASTM A269-08, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .5 ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .6 ASTM A 325-97, Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - .7 ASTM A 325M-97, Specification for High-Strength Bolts for Structural Steel Joints Metric.
 - .8 ASTM A 490-97, Specification for Heat Treated, Steel Structural Bolts, 150 ksi (1035 MPa) Tensile Strength.
 - .9 ASTM A 490M-97, Specification for High-Strength Steel Bolts, Classes 10.9 and, for Structural Steel Joints.
 - .10 Sheet Steel: Structural Quality ASTM A570M.
 - .11 Sheet Steel: Commercial Quality ASTM A366M stretcher levelled or temper rolled.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
 - .3 CAN/CGSB-1.108-M89, Bituminous Solvent Type Paint.
 - .4 CAN/CGSB-1.181-92, Ready-Mixed, Organic Zinc-Rich Coating.
 - .5 CGSB 85-GP-14M-78, Painting Steel Surfaces Exposed to Normally Dry Weather.
 - .6 CAN/CGSB-85.100-93, Painting.
 - .7 CAN/CSA-G164-M92 (R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .8 CAN-CSA-B44 section 5.2, Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks.
- .5 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA).
 - .1 CISC/CPMA1-73b, Quick-Drying, One-Coat Paint for Use on Structural Steel.
 - .2 CISC/CPMA2 -75, Quick-Drying, Primer for use on Structural Steel.
- .6 Canadian Standards Association (CSA):
 - .1 Hollow Steel Section: CAN/CSA-G40.20-M and CAN/CSA-G40.21-M, Grade 350W.
 - .2 CSA G40.20/G40.21-04 (R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .3 CAN/CSA G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .4 CSA S16-09, Design of Steel Structures.
 - .5 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .6 CSA W59-M03 (R2008), Welded Steel Construction (Metal Arc Welding) Metric.
- .7 National Association of Architectural Metal Manufacturers NAAMM, Metal Stair Manual (AWP 510-92).
- .8 NBC – National Building Code, latest edition.
- .9 OBC – 2012 Ontario Building Code, latest edition.
- .10 Steel Structures Painting Council (SSPC), Systems and Specifications Manual, Volume 2.
- .11 USDOL – OSHA, 1910.27 Fixed Ladders

1.4 DESIGN OF ASSEMBLIES, DETAILS AND CONNECTIONS

- .1 Designs prepared by an engineer who applies a seal to Submittals is the Delegated Design and shall provide review of installations at the Place of the Work together with written reports. Refer to section 01 35 73 Delegated Design.
- .2 Design assemblies, details and connections in accordance with requirements of CAN/CSA-S16.1 and CAN/CSA-S136 with CSAS136.1 to resist forces, moments, shear and allow for movements imposed by installation or operation of mounted equipment.
- .3 Design metal stair balustrade and landing construction and connections to OBC Part 4 vertical and horizontal live load requirements.
- .4 Detail and fabricate guards and railings to NAAMM Metal Stairs Manual.

1.5 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Data sheets:
 - .1 Silicone adhesive used for wall-mounting of stainless-steel panels.
 - .2 Concrete anchors associated with structural steel.
 - .3 Expansion anchors used to connect metal fabrications to concrete.
 - .4 All hot-dipped galvanized elements and fasteners.
 - .5 Stainless steel wall and corner protection materials.
- .3 Shop Drawings:
 - .1 Prepare Shop Drawings for all metal fabrications, including, but not limited to:
 - .1 Bollards and their caps.
 - .2 Sign mount bollards.
 - .3 Hand railing assemblies and mounting brackets.
 - .4 Metal covers and surrounding brackets and angles for sump pits.
 - .2 Refer to 1.2.5 above.
 - .3 Shop Drawings shall be sealed by professional engineer licensed in the Province of Ontario, who will be the Delegated Designer, for the following elements:
 - .1 Ground-mounted equipment stands,
 - .2 Structural steel lintels and assemblies associated with structural steel;
 - .3 Bearing plates, brackets and supports associated with structural steel.
 - .4 Connectors, plates, brackets, channels and angles associated with support of plant pre-cast hollow core and solid concrete structure.
 - .5 Guards associated with stairwell hand railings.
 - .6 Stands associated with roof-mounted equipment.
 - .7 Structural lintels fabricated for concrete unit masonry assemblies.
 - .8 Steel framing associated with roof-mounted metal panel and metal roof ductwork enclosure.
 - .4 Attend site and field measure existing conditions prior to production of Shop Drawings.
 - .5 Indicate materials, core thicknesses, finishes, connections, adjacent materials, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
 - .6 Request confirmation of load information for load bearing metal fabrications, including device and equipment stands and brackets, prior to preparing Shop Drawings.
 - .7 Submit calculations and designs for equipment stands and device supports.
 - .8 Do not commence fabrication until consultant has provided annotated Shop Drawings noted "Reviewed as Noted" or "Reviewed" to this section.
 - .9 Fabricate frames as single sections and hot dip galvanize after fabrication for exterior elements and washroom countertop support brackets and posts, including equipment stands and brackets.
 - .10 Following fabrication, grind welds smooth prior to hot-dip galvanizing.
 - .11 Deliver to site for installation by this section or others as determined by the Contractor.

- .12 All metal fabrications for exterior items shall be hot-dipped galvanized following fabrication, including metal elements associated with main entrance canopy structure (drop off canopy).

1.6 DELIVERY, STORAGE, HANDLING AND PROTECTION

- .1 Establish delivery sequence for metal fabrications to align with Contractor's schedule and to avoid delay in erection of masonry or steel structure.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, within dry location and within a clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for recycling, packaging materials specified for recycling within Waste Management Plan and in accordance with Section 01 74 19.
- .5 Protection:
 - .1 Cover all interior stainless-steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
 - .2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.
 - .3 Do not permit adhesives to cure on exposed stainless-steel surfaces.

Part 2 Products

2.1 MATERIALS STANDARDS

- .1 Steel sections and plates: to CSA G40.20;
- .2 G40.21, Grade 350W, Class C, for hollow structural sections, including 152 mm diameter bollards with 6 mm thick walls, hot-dipped galvanized with fabricated hot-dipped cap.
- .3 G40.21, Grade 350W for W shape sections and
- .4 G40.21 Grade 3000 W, for channels, angles.
- .5 Welding materials: to CSA W59 and as follows:
 - .1 CSAW47.1-92, Certification of Companies for Fusion Welding of Steel Structures.
 - .2 CSAW48 Series- Various Dates, Electrodes.
 - .3 CSAW55.3-1965, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
 - .4 CSAW59-M1989, Welded Steel Construction (Metal Arc Welding).
 - .5 Welding electrodes: to CSA W48 Series.
- .6 Bolts and Anchor Bolts: to CAN/CSA-G40.21, Grade 300W; ASTM A325M.
- .7 Steel pipe: to ASTM A 53/A 53M, standard weight, schedule 40 seamless black.
- .8 Steel tubing: to CAN/CSA-G40.20/G40.21, Grade 350 W wall thickness, sizes and dimensions as indicated.
- .9 Steel pipe: to ASTM A53/A53M standard weight, hot-dipped galvanized finish.
- .10 Metal bar grating: to ANSI/NAAMM MBG 531, steel, Type W-19-4, with abrasive nosings.
- .11 Stainless Steel:
 - .1 Stainless steel tubing: to ASTM A269, Type 302, commercial grade with AISI No. 4 finish.
 - .2 Stainless steel sheets: Type 304, 18-8 alloy, commercial grade, 1.27 mm thickness (18 gauge), number 4 finish.

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 screws on items requiring assembly by screws or as indicated.
- .3 Stair Well Guards, Hand Railings and Miscellaneous Metals:
 - .1 Fabricate stair well guards and hand railings to meet or exceed Fabricate to NAAMM, Metal Stair Manual.

- .4 Hot-Dipped Galvanize the following assemblies:
 - .1 Hot dipped galvanized assemblies include, but are not limited to the following:
 - .1 All fasteners associated with any hot dipped galvanized assembly in any location shall be hot-dipped galvanized or substitute stainless steel.
 - .2 Review all drawings for specific reference to hot-dipped galvanized materials. Any notation "galvanized" means hot-dipped galvanized as defined within this section.
 - .3 Apply zinc rich coatings to all damaged surfaces on hot dipped galvanized assemblies (ZRC or Galvafruid or equal) following receipt of written consent for application of zinc rich coating from consultant.
 - .4 Hot-dip galvanize following fabrication all structure and miscellaneous metals for entrance canopies on the southern face and northern face of the building.
 - .5 Hot-dip galvanize bollards used in the site work after fabrication.
 - .6 Use hot-dipped galvanized steel for exterior steel elements, including, but not limited to, bollards, exterior, exposed loose steel lintels and interior exposed concrete unit masonry lintels.
 - .7 Stands for ground and roof- mounted HVAC units.
 - .8 Use hot-dipped galvanized steel for interior or exterior elements cast into concrete. Including all metal fabrication elements that are intended for embedment in concrete.
 - .9 Hot-dip galvanized after fabrication all loose steel lintels and lintel assemblies made with plates, gussets, brackets, angles, bolts and channels that support masonry veneer construction or concrete unit masonry whether used loose or connected to structural steel frame.
 - .10 Structural steel beams and columns exposed to weather on the exterior of the building.
 - .2 Limit field welding to minimum required to complete the installation or substitute stainless steel.
 - .3 Hot-dip galvanizing shall be undertaken after items are fabricated.
 - .4 Use hot dipped galvanized steel angles, plates and bolts, screws and other fasteners for all exterior steel assemblies.
 - .5 Provide appropriate pre-drilled holes for required fasteners and conduct hot-dipped galvanizing process after holes are bored in elements.
 - .6 Stainless steel fasteners and stainless-steel material and other components such as angle, flat bar or tubular sections, plates and sheet steel may be used as a substitute for any hot dipped galvanized component that is not structural.
 - .7 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164.
- .5 Prepare work to receive items intended for connection to work of this section, through careful review of product literature, Shop Drawings and contract documents.
- .6 Provide plate, bracket assemblies, angles and other sections to support equipment or building elements intended for support by assemblies fabricated by this section and ensure that final assembly will not result in contact between dissimilar metals.
- .7 Finish exposed stainless steel sheets to consistent sheen, edge to edge, free of dimples, scratches, dents or another disfiguration and as follows:
 - .1 Orient grain of stainless steel vertically for wall-mounted sheets in all instances and horizontally across countertop.
 - .2 Hem sheet metal edges where indicated; grind, buff and produce smooth edge free of burs, arises and checks for all edges not hemmed.

2.3 WELDING

- .1 Welding and welding materials:
 - .1 CSAW47.1, Certification of Companies for Fusion Welding of Steel Structures.
 - .2 CSAW48 Series- Various Dates, Electrodes.
 - .3 CSAW55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
 - .4 CSAW59-M, Welded Steel Construction (Metal Arc Welding).

- .2 Zinc rich coating for application to field welds.
- .3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush free of inconsistencies, pits, arises. Pay particular attention to elements that come in contact with persons including hand railings, guards, countertops, countertop supports, corner and wall guards.
- .4 Pitting, arises and welding that does not completely extend across the face or edge of a connected element shall be considered deficient work when it is exposed to view to any extent.

2.4 FINISHES

- .1 Select finishes complying with product specifications or service conditions for assembly or manufacturer in the case of a discrete element with specific instruction.
- .2 Sheet metal wipe coat galvanizing is permitted for interior sheet metal components and components protected by weather-proof coverings.
- .3 Plating:
 - .1 Plating is an acceptable finish for fasteners used within proprietary assemblies such as doors, windows and electrical or mechanical equipment and devices where the entire assembly is previously approved in its completed state.
 - .2 Plating is an acceptable finish where its purpose is to resist corrosion for specific instances and used within the interior of the building.
 - .3 Fasteners protected with plated finishes are not acceptable for use on exterior materials such as siding, roofing, exterior metal fabrications, flashings or parts of exterior metal assemblies.
 - .4 Where plating is permitted, it shall be chromium plating on steel with plating sequence of 0.009 mm thickness of copper 0.010 mm thickness of nickel and 0.0025 mm thickness of chromium.
- .4 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .5 Bituminous paint: to CAN/CGSB-1.108.
- .6 Zinc rich coating such as ZRC or Galvafruid applied to damage incurred to hot-dipped galvanized fabrications. Do not apply zinc rich coating until explicit written permission for such application is received from the consultant.
- .7 Shop Painting:
 - .1 Clean, prepare surfaces and shop prime structural steel not intended for galvanizing in accordance with CAN/CSA-S16.1.
 - .2 Shop coat primer: to CAN/CGSB-1.40.
 - .3 Apply one coat of primer in shop to all steel surfaces and:
 - .1 Surfaces to be encased in concrete.
 - .2 Surfaces to receive field installed stud shear connections.
 - .3 Surfaces and edges to be field welded.
 - .4 Faying surfaces of friction-type connections.
 - .4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees C.
 - .5 Maintain dry condition and 5°C minimum temperature until paint is thoroughly dry.
 - .6 Strip paint from bolts, nuts, sharp edges and corners before prime coat is dry.
- .8 Hot-dipped galvanizing:
 - .1 Galvanizing:
 - .1 Elements noted on drawings or within this specification as “galvanized” shall be hot-dipped galvanized after fabrication in every case where the element is not a sheet steel that is galvanized through a coating process.
 - .2 Sheet steel coated with zinc shall not be used for exterior elements fabricated to support exterior equipment if it will be exposed to weather in service.
 - .3 All elements exposed to weather in service shall be hot-dipped galvanized or stainless steel in assemblies fabricated such that assemblies need not be welded in the field following the hot-dipped process.

- .4 Hot dip galvanizing shall result in a coating that is equal to a minimum of 600 g/m² over the entire element, applied in accordance with and meeting or exceeding CAN/CSA-G164.
- .2 Do not field-weld hot-dipped galvanized components.
- .3 Fit and shop assemble work, ready for erection and weld connections prior to hot dip galvanizing process.
- .4 For all exterior elements including all parts of equipment stands and brackets fabricated of multiple elements, fabricate frames, plates, angles and brackets as single sections and hot-dip galvanize after fabrication. Stainless steel is an acceptable alternate material to hot dipped galvanized steel in any situation. Grind all welds smooth.

2.5 ISOLATION COATING

- .1 Specified transition membrane material or any other approved gasket material including, but not limited to, butyl tapes, EPDM, PVC, or rubber may be used to form gaskets to isolate materials.
- .2 Select isolation gaskets and methods or coating with careful consideration for chemical compatibility of isolation material with all elements in contact with the isolation material and the exposure conditions for the product. Exposure conditions include areas subjected to thermal stress that could degrade, melt or otherwise fracture or cause a change of state in the material deleterious to appearance or efficacy over time; areas subjected to UV light exposure and areas subjected to moisture from any source including interior sources.
- .3 Select isolation materials to accommodate vibration whenever elements being isolated are subject to machine vibration (fans or motors) or vibration due to wind effect on elements within the assembly.
- .4 Isolate metals from following components, by means of bituminous paint or transition membrane or gasket or other approved alternative means:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
 - .2 Concrete, mortar and masonry.

2.6 EQUIPMENT AND DEVICE BRACKETS AND STANDS

- .1 Review mechanical and electrical drawings and specifications for all required equipment stands and brackets, including support for chimneys, exhaust stacks, vent stacks, transformers, fixtures and mechanical equipment and all other equipment or devices requiring stands, supports or mounts.
- .2 Exterior elements roof or wall-mounted:
 - .1 All elements to be hot-dipped galvanized after fabrication or stainless steel bolted or welded. Field welding not permitted for hot-dipped galvanized elements.
 - .2 For welded connections, hot-dip galvanize after fabrication.
 - .3 For bolted connections, use hot dipped galvanized bolts, washers and nuts or use stainless steel.
 - .4 Support on concrete slabs, provide base plates with 4 anchors into concrete for each post or stand element unless design indicates that fewer or more fasteners are required. Ensure that fastener position will accommodate all loads and avoid failure due to tear-out.
 - .5 Fabricate all brackets, supports and stands to support loads imposed by construction, equipment or device, wind, snow and rain loads. Wind pressure resistance required: 32 kPa; 260 kph wind speed.
 - .6 Provide designs for all equipment and device stands including calculations of loads and connections designed to resist specified wind pressures.
 - .7 Provide hot-dipped galvanized metal grate for horizontal surfaces where such surfaces must be continuous as a support surface for personnel or equipment in exterior applications. This includes laundry room grate behind clothes washers.
 - .8 Permit drainage of all surfaces exposed to precipitation or condensation or condensate produced by equipment. Such drainage shall be piped to sanitary drains when located within building and piped to roof surface for roof mounted equipment. Position, arrange and otherwise install condensate drains to prevent failure due to freezing temperatures for all exterior mounted equipment.
 - .9 Report all damage to galvanized coating found to consultant. Where consultant permits its use, coat damaged areas using a zinc-rich coating such as Galvafruid or ZRC.

- .3 Exhaust fan and condensing unit mount stands: where indicated on drawing or schedules or specified in Mechanical, field verify mounting conditions and do not proceed with mounting if substrates are found inadequate.
- .4 Fabricate brackets, supports and stands to support loads imposed by construction, equipment or device, wind, snow and rain loads. Wind pressure resistance required: 32 kPa; 260 kph wind speed.
- .5 Provide designs for all equipment and device stands including calculations of loads and connections designed to resist specified wind pressures.
- .6 Exterior or roof-mounted equipment stands shall be:
 - .1 Fabricated from aluminum or hot-dipped galvanized steel.
 - .2 Hot-dipped galvanized components for stands shall be assembled using hot-dipped galvanized bolts (not field-welded) or entire assembly shall be hot-dipped after fabrication.
 - .3 Do not install roof mounted stands or anchors without rough carpentry adequate blocking or structural steel previously positioned and completed.
 - .4 Set bolts or connectors to permit waterproofing through counter-sinking of bolts or connections below roof sheathing or surfaces of sleepers to provide smooth, continuous and flat surfaces for flashing above roof assembly.
 - .5 Use HSS or steel tubular sections for all vertical supports that penetrate roof assembly.
- .7 Interior steel structure associated with support of roof-mounted device stands may be welded within the building provided that such welding does not degrade the galvanized coating where it is exposed to weather.

2.7 STAINLESS STEEL WALL-MOUNTED PANELS

- .1 Panels are mounted on walls as backsplash associated with janitorial sinks.
- .2 All panels shall be fabricated using 304 stainless steel, number 4 brushed finish, grain oriented vertically in all cases, 18-gauge (0.0403") base sheet metal thickness, all exposed edges hemmed.
- .3 Provide panels with releasable protective film.
- .4 Adhere to wall using adhesive acetoxycure silicone (Henkel Loctite, equivalent manufactured by Dow Corning or equivalent alternate).
- .5 Provide shop drawings for all wall mounted panel situations fabricated by this Section.
- .6 Field-measure all parts of the installation prior to producing shop drawings.
- .7 Field-verify all dimensions prior to fabrication.
- .8 Field-verify mounting conditions, fastenings, blockings and clearances prior to fabrication. If conditions are or might eventually be detrimental to the installation, do not commence fabrication until Contractor clarifies and rectifies deficiencies detrimental to this installation.
- .9 Coordinate blocking and anchorage requirements for implementation by other sections when these are required to support any part of the assembly.
- .10 Obtain written approval of modifications prior to completing fabrication.
- .11 Schedule of wall mounted panels:
 - .1 Mop sink installation. Bend corners, flashings and install to drain panels into floor mounted sink.

2.8 HANGING AND SUSPENSION

- .1 Provide threaded rods, pipe or tubular sections or angles sized to support loads applied by element suspended. Connect suspended frames to structure using steel brackets, bolts and saddles to suit site conditions.
- .2 Distribute loads across multiple suspension points where point suspension would compromise structural capacity of suspension system (hangers and fasteners or fastener inserts).
- .3 Provide Shop Drawings for suspension assemblies that require custom fabrication or use of steel elements larger than Unistrut. This provision does not include Unistrut style hangers supporting conduits or plumbing that are provided by Mechanical or Electrical Divisions.
- .4 Do not install suspended elements if there is doubt about structural configuration or capacity. Contact consultant for clarification.

- .5 Coordinate with Section 06 10 00 Rough Carpentry for solid blocking required for any installation.

2.9 SHEET STEEL COVERS

- .1 Supply sheet steel covers fabricated of minimum 0.9 mm (1/32") thick galvanised steel sheet to Mechanical and Electrical requiring covers over temporarily unused sleeves in vertical plane. Openings in slabs and openings in other horizontal planes shall be structurally sound to suit application and size of opening and shall be in conformance with NBC requirements.

2.10 LOOSE STEEL ANGLE LINTELS

- .1 Review all contract documents and establish that masonry is supported in all cases and for all openings. Openings required for mechanical ducts and equipment or devices are not shown on architectural drawings in every case and each such opening requires a loose steel lintel. The presence of the device, duct, equipment, etc. penetrating the masonry implies the requirement for a steel lintel, or a lintel formed with reinforcing steel and special lintel blocks. This section shall supply all such lintels and co-ordinate sizing where there is uncertainty about the capacity or loads imposed on the lintel.
- .2 Fabricate lengths of lintels to suit masonry openings to provide minimum 203 mm (8") end bearing or end bearing dimension noted on drawings for each side of masonry opening.
- .3 Weld or bolt back-to-back or toe to toe or angle and plate assemblies where such fastening is noted to create profiles indicated or required due to conditions in the field.
- .4 Provide steel lintels (back-to-back or toe to toe angles) to support concrete masonry units over all openings within existing and new concrete masonry units. Where lintel sizes are not noted on drawings, utilize back-to-back angles 152 mm vertical leg x 100 mm x 9 mm thick long-leg oriented vertically. This requirement for lintels includes mechanical device or duct openings and pipe penetrations larger than 203 mm diameter or in horizontal dimension. This includes electrical devices larger than 203 mm in horizontal dimension. This includes all door openings within interior concrete masonry walls.
- .5 Design lintels to support loads imposed in service and construction. Where there is any doubt about the lintel design, contact Consultant for clarification.
- .6 Hot-dip galvanize all loose steel lintels used for exterior masonry.

2.11 COUNTERTOP SUPPORT ANGLES:

- .1 Install within men's and women's washroom below countertop assembly supported on adjacent brackets or gables or wall construction to stiffen and support countertops. Use 38 mm x 38 mm x 6 mm thick steel angles.

2.12 STEEL BOLLARDS, CONCRETE FILLED:

- .1 Select 152 mm diameter with 6 mm wall thickness long enough to be set into concrete at least 1400 mm and extend above finished ground level 1060 mm. Hot-dip galvanize the bollard following fabrication. Fabricate a flat metal cap using 6 mm thick plate made to fit over the top of the bollard and hot-dip galvanize cap following fabrication.
- .2 Fill bollard with concrete prior to placing cap.

2.13 MISCELLANEOUS METALS

- .1 Provide steel sections which are:
 - .1 Not indicated and identified on Structural Drawings, unless noted to be supplied by another section of the Project Manual.
OR
 - .2 Not noted on Drawings to be supplied by another section of the Project Manual.
OR
 - .3 Not specified under another section of the Project Manual.

2.14 INTERIOR CUSTOM FABRICATED PIPE RAILINGS

- .1 Field measure and plan fabrication based on criteria for railings specified herein.

- .2 Terminate sections occurring at natural divisions in the railing assembly with flat cap welded to ends of tubing and all edges ground smooth. Natural divisions occur at door locations (usually, doors are located on a landing that is level with a finished floor level).
- .3 Within stairwell, pipe railing must be continuous along walls surrounding landings that have no door openings (usually the mid-floor level landing and along walls without doors at floor levels). Extend hand railing to within 200mm of door openings on either side of each door in the case of a door on a landing.
- .4 Steel pipe handrails shall be fabricated of 38mm (1.5") diameter pipe formed and welded in sections to create continuous, smooth pipe rail mounted to purpose-made brackets suitable for mounting on wall or to steel guard assemblies using exposed steel lag fasteners (anchored into blocking or concrete) or welds made to guard assemblies as the case requires.
- .5 Handrails shall be mounted on the picket and guard assembly as is illustrated on drawings for the centre portion of the stairwell.
- .6 All handrails, except as noted specifically on drawings or within this specification, shall extend 12" beyond nosing at top of any run of stairs and 24" beyond nosing of last riser for bottom of stairs as shown. 24" extension is comprised of horizontal run and sloped run in accordance with OBC. Set horizontal sections of railings so extended to maintain 36" dimension above finished floor, maximum, or to match distance between handrail and last nosing as shown on drawings.
- .7 Prepare shop drawings for Consultant's review prior to fabrication in accordance with Section 1330 Submittals.
- .8 Grind all welds smooth and apply primer to prepared steel prior to delivery to site. Ship as assembled in large sections with joints in sections occurring at natural divisions in the railing assembly. The Consultant must approve the use of field welds prior to execution.
- .9 Pipe to be shop fabricated and all welds ground smooth then shop-primed.
- .10 Supply pipe railings to section 06101 Rough Carpentry for installation.

2.15 ENTRANCE CANOPY AND BAY VIEWING PORCH ON THE NORTHERN WALL - COMPONENTS:

- .1 Provide angles, brackets, channel shapes all hot-dipped galvanized where steel components are exposed to view.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
 - .1 Inform Owner, Contractor and Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation following correction of unacceptable conditions and subsequent receipt of Consultant's written approval to proceed.
- .2 Install fabricated items to suit site conditions. Field-measure all installations and trial fit pre-assembled items requiring hot-dip galvanizing.
- .3 Coordinate mechanical, electrical and structural items prior to fabrication and prior to installation in order to verify interference with services, penetrations, load bearing elements and moving parts.
- .4 The section is responsible for verifying adequacy of fasteners on the job site including location, spacing, embedment in concrete for both service condition (tear-out, cracking) and depth. This includes review and acceptance of blocking or other substrates. If the conditions found are inappropriate for the intended installation, do not proceed with installation but report inadequacy to Contractor and Consultant in writing.
- .5 Commencement of installation indicates that this section.

3.2 ITEMS INSTALLED BY OTHER SECTIONS

- .1 The following items may be installed by any Section or Division to suit Contractor. Contractor shall receive metal fabrications for installation at appropriate time when this Section is not providing

installation. The following does not attempt to assign installation responsibility, which remains with the Contractor.

- .1 Provide loose steel lintels to mason for installation and building-in.
- .2 Provide sump pit cover and frame to Division 03 for installation in concrete or to mechanical.
- .3 Provide lintels and structural supports for building into masonry.
- .4 Provide bollards to Contractor for installation in site works.
- .5 Provide stainless steel sheets to Contractor for installation.

3.3 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 Contractor, Owner and Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles and through-bolting.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Supply components for work by other trades in accordance with Shop Drawings and schedule.
- .6 Make field connections with bolts to CSA S16 or weld field connection. Do not weld hot-dipped galvanized materials in field.
- .7 Deliver items over for casting into concrete together with setting templates to appropriate location and construction personnel.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion using primer for painted and primed elements. Use zinc rich primer where galvanized elements are burned by field welding.
- .9 Use zinc rich primer where galvanized elements are damaged in field following receipt of written permission to apply such coatings.
- .10 Provide all metal fabrications in a sequence intended to achieve the Contractor's goals for schedule and sequence of the construction work.

3.4 FIELD QUALITY CONTROL

- .1 Inspection and testing of materials and workmanship may be carried out by testing laboratory designated by Field Engineer if required by Owner.
- .2 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Engineer.
- .3 Submit test reports to Engineer within 2 weeks of completion of inspection.
- .4 Owner will pay costs of tests as specified in Section 01 21 00 - Allowances.

3.5 PRODUCTS FOR HANGING, SUSPENSION OR STRUCTURE

- .1 Ensure that products are fabricated according to requirements of device, installation or element associated with the product.
- .2 Field measure and coordinate design requirements with appropriate section including Section 06 10 00 Rough Carpentry and Mechanical and Electrical Divisions.
- .3 Deliver elements to comply with Contractor's schedule.
- .4 Do not install work if site conditions are found inappropriate for installation. Verify that all required blocking, supporting and fastening structure is in place prior to installation.
- .5 Coordinate penetration of waterproof elements including roofing and exterior wall assembly with persons providing flashings, air and vapour barrier elements and sprayed-in-place polyurethane foam.

3.6 STAINLESS STEEL SHEET INSTALLATIONS:

- .1 Do not deliver products until work that creates dust within the area of the work is completed and cabinets or plumbing fixtures are installed to effect field measurements.
- .2 Produce shop drawings based on field measurements. Do not fabricate items until shop drawings are "reviewed", "Reviewed As Noted" and noted adjustments are made to products.

3.7 INSTALLATION OF STAIR WELL RAILINGS AND GUARDS:

- .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. Grind all welds exposed to view smooth, free of holes, pits and protrusions to produce a smooth and consistent surface all sides of weld.
- .5 Touch up shop primer to bolts, welds, and burned or scratched surfaces at completion of erection.
- .6 Commencement of installation indicates that this section has approved all site conditions as appropriate to the intended installation.

3.8 ENTRANCE CANOPIES:

- .1 Coordinate provision of structure.

3.9 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .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 11.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.10 FIELD PAINTING

- .1 Paint in accordance with Section 09 91 23.
- .2 Touch up all damaged surfaces and surfaces without shop coat with primer to CAN/CGSB-1.40 except as specified otherwise. Apply in accordance with CGSB 85-GP-14M.

3.11 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION

PART 1 General

1.1 RELATED SECTIONS

- .1 Section 03 00 00 Cast-in-Place Concrete
- .2 Section 05 12 10 Structural Steel for Buildings
- .3 Section 05 55 00 Metal Fabrications
- .4 Section 06 10 00 Rough Carpentry

1.2 REFERENCES

- .1 American National Standards Institute/National Association of Architectural Metal Manufacturers (ANSI/NAAMM):
 - .1 ANSI/NAAMM MBG531-93, Metal Bar Grating Manual.
- .2 American Society for Testing and Materials (ASTM):
 - .1 ASTM A 53/A 53M-99b, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A 307-97, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .3 ASTM A 325M-97, Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- .3 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
 - .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 CAN-CSA-B44 section 5.2, Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks.
- .4 Canadian Standards Association (CSA):
 - .1 CSA W59-M1998, Welded Steel Construction (Metal Arc Welding).
- .5 National Association of Architectural Metal Manufacturers NAAMM, Metal Stair Manual (AWP 510-92).
- .6 Steel Structures Painting Council (SSPC), Systems and Specifications Manual, Volume 2.

1.3 DESIGN REQUIREMENTS

- .1 Design metal stair, balustrade and landing construction and connections to OBC Part 4 vertical and horizontal live load requirements.
- .2 Detail and fabricate stairs to NAAMM Metal Stairs Manual.

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.

PART 2 Products

2.1 MATERIALS

- .1 Steel sections: to CAN/CSA-G40.20/G40.21 Grade 300 W.
- .2 Steel plate: to CAN/CSA-G40.20/G40.21, Grade 260 W.
- .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 seamless black.
- .5 Steel tubing: to CAN/CSA-G40.20/G40.21, Grade 350 W wall thickness, sizes and dimensions as indicated.
- .6 Metal bar grating: to ANSI/NAAMM MBG 531, steel, Type W-19-4, with abrasive nosings.
- .7 Welding materials: to CSA W59.
- .8 Bolts: to ASTM A 307.
- .9 High strength bolts: to ASTM A 325M.

2.2 FABRICATION

- .1 Fabricate to NAAMM, Metal Stair Manual.
- .2 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.
- .3 Accurately form connections with exposed faces flush; mitres and joints tight. Make risers of equal height.
- .4 Grind or file exposed welds and steel sections smooth.
- .5 Shop-fabricate stairs in sections as large and complete as practicable.
- .6 Weld 3mm thick (1/8") closure plate and end filler to exposed stringer channels to eliminate voids. This applies for top and bottom of stringer run in every case.

2.3 CONCRETE FILLED STEEL PAN STAIRS

- .1 Fabricate stairs with riser steel pan construction (concrete filled).
- .2 Construct stairs according to this section unless drawings indicate alternative sizes and configurations. This section is general in nature; drawings are specific and shall govern for this work.
- .3 Form treads and risers from 3 mm thick steel plate. Secure treads and risers to steel angle 35 x 35 x 5 horizontal and vertical welded to stringers. Treads are to be a metal pan to be filled with concrete.
- .4 Form wall stringers from MC 310 x 15.8.
- .5 Form outer stringers from MC 310 x 15.8 with 5 mm thick plate fascia welded affixed.
- .6 Extend stringers around mid landings to form steel base.
- .7 Close ends of stringers where exposed.

2.4 PIPE/TUBING BALUSTRADES

- .1 Construct balusters and handrails from steel tubing as shown and specified within Section 05 50 00 Metal Fabrications.

2.5 FINISHES

- .1 Shop coat primer: to CAN/CGSB-1.40.
- .2 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.

2.6 SHOP PAINTING

- .1 Clean surfaces in accordance with Steel Structures Painting Council Manual Volume 2.
- .2 Apply one coat of shop primer except interior surfaces of pans.
- .3 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.

PART 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. Grind all welds exposed to view smooth, free of holes, pits and protrusions to produce a smooth and consistent surface all sides of weld.
- .5 Touch up shop primer to bolts, welds, and burned or scratched surfaces at completion of erection.
- .6 Commencement of installation indicates that this section has approved all site conditions as appropriate to the intended installation. **END OF SECTION**

PART 1 General

1.1 RELATED SECTIONS

- .1 Section 03 00 00 Cast-In-Place Concrete
- .2 Section 05 55 00 Metal Fabrications
- .3 Section 06 10 00 Rough Carpentry
- .4 Section 08 80 00 Glass and Glazing
- .5 Section 09 22 16 Non-Structural Metal Framing and Furring

1.2 REFERENCES

- .1 American National Standards Institute/National Association of Architectural Metal Manufacturers (ANSI/NAAMM)
 - .1 ANSI/NAAMM MBG531-93, Metal Bar Grating Manual.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 53/A 53M-99b, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A 307-97, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .3 ASTM A 325M-97, Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- .3 Product Test Reports: For tests performed by a qualified testing agency, in accordance with ASTM E894, ASTM E935, ASTM E2353, and ASTM E2358
- .4 AWS D1.1/D1.1M, Structural Welding Code - Steel.
- .5 AWS D1.6/D1.6M, Structural Welding Code - Stainless Steel.
- .6 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
 - .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 CAN-CSA-B44 section 5.2, Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks.
- .7 Canadian Standards Association (CSA)
 - .1 CSA W59-M1998, Welded Steel Construction (Metal Arc Welding).
- .8 National Association of Architectural Metal Manufacturers NAAMM, Metal Stair Manual (AWP 510-92).
- .9 Steel Structures Painting Council (SSPC), Systems and Specifications Manual, Volume 2.
- .10 Evaluation Reports: From ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
 - .1 For glazed decorative metal railings.
 - .2 For post-installed anchors.

1.3 DESIGN REQUIREMENTS

- .1 Design metal railings and guards and connections to Ontario Building Code Part 4, vertical and horizontal live load requirements for balconies.
- .2 Definition:
 - .1 Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor and exterior deck areas and for pedestrian guidance and support, visual separation, or wall

protection, all designed to resist forces specified within the Ontario Building Code and to have dimensions and restrict openings in compliance to the Ontario Building Code.

1.4 SUBMITTALS AND SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01330 - Submittal Procedures.
- .2 On shop drawings, include plan views, elevation views, cross section details and assemblies viewed in cross sections, and all attachment details.
- .3 Shop drawings shall demonstrate compliance to Ontario Building Code for the strength of the guard system including the connection to the building, the requirements for the strength of the building elements to which the guard is fastened, and dimensions conforming with Ontario Building Code.
- .4 Indicate the dimensions for critical clearances for the guard during installation and during service.
- .5 Indicate construction sizes of guard components and their cross-sectional shapes and thickness of metal.
- .6 Indicate finishes.
- .7 Indicate method of attaching glass panels, rails, upright and horizontal supports.
- .8 Indicate connection between bayonet and stud framing.
- .9 Indicate fastener locations and finishes.
- .10 Shop drawing shall bear the seal of a qualified professional engineer registered in Canada, Province of Ontario that illustrate the design of the guard and the connection to the building.
- .11 Product Data:
 - .1 Metal railings assembled from standard components.
 - .2 Fasteners.
 - .3 Bituminous paint.
 - .4 Non-shrink, nonmetallic grout.
 - .5 Anchoring cement.
- .12 Samples for Verification:
 - .1 Provide a material sample displaying shape and colour for each type of exposed finish required as follows:
 - .1 Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
 - .2 Base channel.
 - .3 Fittings and brackets.

1.5 DELIVERY, STORAGE, AND PROTECTION

- .1 Protect mechanical finishes on exposed surfaces of railings from damage by applying a strippable, temporary protective covering before shipping.
- .2 Properly crate, wrap, or package railing components for shipment and on-site storage.
- .3 Store railing components in a dry well-ventilated area remote from heat sources and direct sunlight. Do not expose to damp or wet conditions.
- .4 Do not scratch or otherwise mar finished surfaces during hoisting and erection of the work.
- .5 Maintain squareness of railings during hoisting and installation.

1.6 FIELD CONDITIONS

- .1 Field Measurements:
 - .1 Attend the site and obtain measurements of actual conditions prior to fabricating guards.
 - .2 Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 WARRANTY

.1 Special Warranty on Railing Finishes:

.1 Manufacturer agrees to repair finish or replace metal railings that show evidence of deterioration of factory-applied finishes within specified warranty period and as follows:

.1 Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

.1 Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.

.2 Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.

.3 Cracking, checking, peeling, or failure of paint to adhere to bare metal.

.2 Warranty Period: **Five** years from date of Substantial Completion.

1.8 COORDINATION AND SCHEDULING

.1 Coordinate installation of anchorages, including bayonet fastening system, for railings.

.2 Furnish setting drawings, templates, bayonets and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, bayonet connector plates and items with integral anchors, that must be provided in advance of the guard assembly in order to maintain Contractor's construction sequence and schedule.

.3 Deliver items to Project site in to permit installation when stud framing is being undertaken for openings that require guards.

PART 2 Products

2.1 MATERIALS

.1 Steel sections: to CAN/CSA-G40.20/G40.21 Grade 300 W.

.2 Steel plate: to CAN/CSA-G40.20/G40.21, Grade 260 W.

.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 seamless black.

.5 Steel tubing: to CAN/CSA-G40.20/G40.21, Grade 350 W wall thickness, sizes and dimensions as indicated.

.6 Metal bar grating: to ANSI/NAAMM MBG 531, steel, Type W-19-4, with abrasive nosings.

.7 Welding materials: to CSA W59.

.8 Bolts: to ASTM A 307.

.9 High strength bolts: to ASTM A 325M.

2.2 BASIS-OF-DESIGN:

.1 Subject to compliance with requirements, provide GRECO, a CSW Industrials Company

.2 Source Limitations for Decorative Metal Railing Components: Obtain from single source from single manufacturer for each component and installation method.

.3 Product Options: Information on Drawings and in the Specifications establishes requirements for railing system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

.4 Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

2.3 PERFORMANCE REQUIREMENTS

.1 Delegated Design:

- .1 Engage a qualified professional engineer, with a license to provide professional engineering services within the Province of Ontario and, further, with the legislated ability to design decorative metal guard and railing systems, including attachment to building construction.
- .2 General Design Requirements:
 - .1 Select laminated glass for installation in the guard and railing system having a total minimum thickness of 10 mm comprised of two panes of 5 mm thick glass laminated with an appropriate interlayer.
 - .2 Side-mount guard and railing upstands to face of cast-in-place concrete slabs forming the top of patios and terraces that require guards.
 - .3 Design guards and railings to withstand structural loads stipulated within the Ontario Building Code for guards used in this application or in similar applications, and
 - .4 Determine loads and allowable design stresses imposed upon the guard and railing system with appropriate and diligent consideration of the following limitations:
 - .1 For components fabricated using aluminum, select as a limit for the design, the lesser of a minimum yield strength divided by 1.65 or the minimum ultimate tensile strength of the material divided by 1.95.
 - .2 For components fabricated using stainless steel, select as a limit for the design a value that is a maximum of 60 percent of minimum yield strength.
 - .3 For components fabricated using steel, select as a limit for the design a value that is a maximum of 72 percent of the minimum yield strength.
 - .5 Structural Performance:
 - .1 Railing and guard systems, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - .1 Handrails and Top Rails of Guards must resist loads stipulated for guards used on balconies within the Ontario Building Code and all associated standards.
 - .6 Thermal Movements: Design of the guard and railing system shall accommodate movement caused by ambient and surface temperature changes.

2.4 GENERAL REQUIREMENTS FOR METALS:

- .1 Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- .2 Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

2.5 REQUIREMENTS FOR ALUMINUM

- .1 Pre-consumer recycled content, minimum for aluminum: 15 percent.
- .2 Recycled Content of Aluminum Products: Post-consumer recycled content plus one-half of pre-consumer recycled content shall be no less than 7.5 percent.
- .3 Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
- .4 Extruded Bars and Shapes, Including Extruded Tubing: ASTM B221 (ASTM B221M), Alloy 6063-T5/T52.
- .5 Yield strength:
 - .1 for Alloy 6063-T6 is 25 ksi (172 MPa).
 - .2 for Alloy 6063-T832 is 35 to 36 ksi (240 to 250 MPa).
- .6 Use Alloy 5005-H32 for anodizing and as follows.
 - .1 Plate and Sheet: ASTM B209 Alloy 5005-H32.

- .2 Die and Hand Forgings: ASTM B247.
- .3 Castings: ASTM B26/B26M, Alloy A356.0-T6.

2.6 STAINLESS STEEL

- .1 Recycled Content of Stainless Steel Products: Post-consumer recycled content plus one-half of pre-
- .2 Tubing: ASTM A554, Grade MT 304 or Grade MT 316 to suit application.
- .3 Pipe: ASTM A312/A312M, Grade TP 304 or Grade TP 316 to suit application.
- .4 Retain first option in "Castings" Paragraph below with Type 304; retain second option with Type 316 or Type 316L.
- .5 Castings: ASTM A743/A743M, Grade CF 8 or Grade CF 20 or Grade CF 8M or Grade CF 3M to suit application.
- .6 Sheet, Strip, Plate, and Flat Bar: ASTM A666 or ASTM A240/A240M, Type 304 or Type 316 to suit application.
- .7 Bars and Shapes: ASTM A276, Type 304 or Type 316 to suit application.

2.7 STEEL AND IRON

- .1 Pre-consumer recycled content for steel shall be no less than 15 percent.
- .2 Recycled Content of Steel Products: Post-consumer recycled content plus one-half of pre-consumer recycled content shall be no less than 7.5 percent.
- .3 Tubing: ASTM A500/A500M (cold formed) or ASTM A513/A513M.
- .4 Bars: Hot-rolled, carbon steel complying with ASTM A29/A29M, Grade 1010.

2.8 FASTENERS

- .1 Fastener Materials: Unless otherwise indicated, provide the following:
 - .1 Aluminum Components: Type 304 or Type 316 stainless steel fasteners.
 - .2 Dissimilar Metals: Type 304 or Type 316 stainless steel fasteners.
- .2 Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and to enable the assembly and the connections to the building capable of withstanding design loads.
- .3 Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless otherwise indicated.
- .4 Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.
- .5 Post-Installed Anchors: Fastener systems with working capacity greater than or equal to design load, in accordance with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308 as applicable.
- .6 Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/ASTM F1941M, Class Fe/Zn 5, unless otherwise indicated.

2.9 MISCELLANEOUS MATERIALS

- .1 Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.
- .2 Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- .3 Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- .4 Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

- .5 Water-Resistant Anchoring Cement: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.10 GLASS PANELS

- .1 Refer to Section 08 80 50 for specification of laminated glass.

2.11 FABRICATION

- .1 Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but perform no fabrication that would reduce performance below that required to support structural loads.
- .2 Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- .3 Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- .4 Form work true to line and level with accurate angles and surfaces.
- .5 Connections: Fabricate railings with mechanical connections unless otherwise indicated. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.
- .6 Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- .7 Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- .8 Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- .9 Form changes in direction as follows:
 - .1 As detailed.
- .10 Close exposed ends of hollow railing members with prefabricated end fittings.
- .11 Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, handrail brackets, miscellaneous fittings, and anchors to interconnect railing members to other work where indicated.
 - .1 For bayonet bracket fastened to framed partitions and concrete masonry, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and to prevent bracket or fitting rotation and crushing of substrate.
 - .2 Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

PART 3 Execution

3.1 GENERAL INSTALLATION REQUIREMENTS

- .1 Comply with Contract Drawings and manufacturer's written instructions for installation.
- .2 Deliver bayonet brackets to job site when Contractor is performing framing work around the openings and prior to setting of windows.
- .3 Perform cutting, drilling, and fitting required for installing metal railings and as follows:
 - .1 Fit exposed connections together to form tight, hairline joints.
 - .2 Install railings level, plumb, square, true to line; without distortion, warp, or rack.

- .3 Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
- .4 Do not weld, cut, or abrade surfaces of metal railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
- .5 Set posts plumb within a tolerance of 1/16 inch in 3 ft. (2 mm in 1 m).
- .6 Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 ft. (5 mm in 3 m).
- .4 Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials and as follows:
 - .1 Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with bituminous paint.
- .5 Adjust railings before anchoring to ensure matching alignment at abutting joints.
- .6 Fastening to in-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 METAL RAILING CONNECTIONS

- .1 Mechanical Connections:
 - .1 Use mechanical or adhesive joints for permanently connecting railing components.
 - .2 Use wood blocks and padding to prevent damage to railing members and fittings.
 - .3 Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
- .2 Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
 - .1 For aluminum railings, attach posts as indicated on manufacturer's shop drawings using fittings designed and engineered for this purpose.

3.3 FIELD QUALITY CONTROL

- .1 Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and to prepare test reports. Payment for these services will be made by Contractor from the testing and inspecting allowance, as authorized by Change Orders.
- .2 Extent and Testing Methodology: Testing agency will randomly select completed railing assemblies for testing that are representative of different railing designs and conditions in the completed Work. Test railings in accordance with ASTM E894, ASTM E935, ASTM E2353, and ASTM E2358 for compliance with performance requirements.
- .3 Remove and replace railings where test results indicate that they do not comply with specified requirements unless they can be repaired in a manner satisfactory to Architect and comply with specified requirements.
- .4 Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional work with specified requirements.

3.4 CLEANING

- .1 Clean aluminum and stainless steel by washing thoroughly with water and soap, rinsing with clean water, and wiping dry.

3.5 PROTECTION

- .1 Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

- .2 Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 All Sections of Division 01
- .2 Section 02 41 19 Selective Demolition
- .3 Section 06 41 00 Millwork, Fine Carpentry, Cabinetry and Plastic Laminate
- .4 Section 07 21 13 Board Insulation
- .5 Section 07 21 16 Batt Insulation
- .6 Section 07 21 30 Sprayed Insulation Polyurethane
- .7 Section 07 27 10 Air Retarder, Air Barriers, Transition Membrane Assemblies.
- .8 Section 07 46 23 Wood Siding
- .9 Section 07 62 00 Sheet Metal Flashing
- .10 Section 07 84 00 Fire Stopping
- .11 Section 07 92 00 Joint Sealants
- .12 Section 08 11 00 Steel Doors and Frames
- .13 Section 08 21 00 Wood Doors
- .14 Section 08 31 00 Access Doors Mechanical and Electrical
- .15 Section 08 50 00 Windows
- .16 Section 08 71 00 Door Hardware
- .17 Section 09 11 00 Steel Stud Metal Framing
- .18 Section 09 12 00 Steel Stud Framing – Ceilings and Bulkheads
- .19 Section 09 21 16 Gypsum Board Assemblies
- .20 Section 09 31 00 Ceramic Tile
- .21 Section 09 58 00 Acoustic Ceiling Assemblies
- .22 Section 09 91 23 Painting and Finishing
- .23 Section 10 21 14 Toilet and Urinal Partitions
- .24 Section 10 28 10 Bathroom Accessories
- .25 Section 10 26 00 Wall Protection, Corner Guards and Wall Covering
- .26 Sections of mechanical and electrical work.
- .27 Section 31 00 00 Earthwork
- .28 Section 32 01 90 Tree and Shrub Preservation

1.2 REFERENCES

- .1 American National Standards Institute/National Particleboard Association (ANSI/NPA)
 - .1 ANSI/NPA A208.1, Particleboard.
- .2 American Society for Testing Materials:
 - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvaneal) by the Hot-Dip Process.
 - .3 ASTM C578-11a, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
 - .4 ASTM C1396/C1396M, Standard Specification for Gypsum Board.

- .5 ASTM D1761, Standard Test Methods for Mechanical Fasteners in Wood.
- .6 ASTM C1396/C1396M-11, Standard Specification for Gypsum Board.
- .7 ASTM D5456, Standard Specification for Evaluation of Structural Composite Lumber Products.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-11.3-M, Hardboard.
 - .2 CAN/CGSB-51.32-M, Sheathing, Membrane, Breather Type.
 - .3 CAN/CGSB-51.34-M, Vapour Barrier, Polyethylene Sheet for Use in Building Construction and amendment.
 - .4 CAN/CGSB-71.26-M, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.
- .4 Canadian Standards Association (CSA) International
 - .1 CAN/CSA-A123.2, Asphalt Coated Roofing Sheets.
 - .2 CAN/CSA-A247-M, Insulating Fiberboard.
 - .3 CSA B111, Wire Nails, Spikes and Staples.
 - .4 CSA O112.9-, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).
 - .5 CSA O121-08, Douglas Fir Plywood.
 - .6 CAN/CSA O122, Structural Glued-Laminated Timber.
 - .7 CSA O141, Softwood Lumber.
 - .8 CSA O151, Canadian Softwood Plywood.
 - .9 CSA O153-M, Poplar Plywood.
 - .10 CSA O325, Construction Sheathing.
 - .11 CSA O437 OSeries, Standards on OSB and Waferboard.
 - .12 CAN/CSA-Z809-08, Sustainable Forest Management.
- .5 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001, FSC Principle and Criteria for Forest Stewardship.
- .6 National Lumber Grades Authority (NLGA):
 - .1 Standard Grading Rules for Canadian Lumber 2010.
- .7 Sustainable Forestry Initiative (SFI):
 - .1 SFI-2010-2014 Standard.
- .8 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S706-09, Standard for Wood Fibre Insulating Boards for Buildings.

1.3 SUBMITTALS

- .1 Provide documents and items in accordance with Section 01 33 00 Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for engineered wood products, connectors, post saddles, hold-down anchors, shear connectors and accessories and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada for the following:
 - .1 LVL or PSL or similar members and composite studs or joists complete with details for connections, hangers, bracing, bolts, fasteners and all other pertinent items.

.4 Warranty:

- .1 Collect and include warranties and certificates for all materials received by this Section for inclusion in project close-out manuals.

.5 Painting and Finishing:

- .1 Collect instructions on painting and finishing for products by this section and turn over to Section 09 91 23 prior to including in manuals.

.6 Maintenance Materials:

- .1 Collect cleaning and maintenance instructions and documents for inclusion in closeout materials manual for materials installed by this Section when materials are exposed to view in service.

1.4 QUALITY ASSURANCE

- .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.
- .3 Sustainable Standards Certification:
 - .1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 and manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store all material handled by this Section (wood material, wood doors, glazing materials, hardware, etc.) off ground in dry location or sufficiently wrapped in water proof material and in accordance with manufacturer's recommendations. Provide air circulation around materials when recommended by manufacturer.
 - .2 Store and protect all materials handled by this Section from nicks, scratches, and blemishes, dust, moisture, excessive humidity, excessive heat and other damage.
 - .3 Replace defective or damaged materials with new.
 - .4 Recycle packaging when it is paper, cardstock or corrugated cardboard. Recycle metal and plastics acceptable to Municipal recycling program. Return pallets to source for re-use.
- .4 Materials designated within local Municipal recycling programs will not be accepted at Municipal transfer station or landfill sites. Review Section 01 74 19 – Construction Waste Management and Disposal

1.6 SCOPE OF WORK FOR THIS SECTION:

- .1 The following scope of work is not intended to limit or restrict responsibility for tasks indicated to the Work of this Section. Contractor may assign any task or duty listed below to any trade or section to best advantage of Contractor. This list anticipates that some or all of the listed tasks may be assigned to this Section and that this Section shall undertake the tasks listed when no other section has the task assigned to it.
- .2 Temporary Enclosures:

- .1 Supply and installation of framed enclosures for openings in exterior wall and roof assembled as dust, weather, and access Control and protective barriers required by the progress of the work. Maintain building increasingly water tight.
- .2 Framing and panels used to provide temporary covers for holes and
- .3 protection of materials and finished parts of the Work.
- .3 Interior Protection and Dust Control:
 - .1 Supply and install Dust Control Barriers to separate and protect parts of the building while work is in progress. Isolate areas where work occurring has deleterious effects on adjacent spaces.
 - .2 Access and Dust Control Barriers shall be fabricated using wood or metal stud framing, plywood or OSB panels together with plastic sheets and rip-stop nylon taped to barrier components and adjacent wall, floor and underside of structure. Select isolation sheeting materials appropriate to process being isolated and tape joints air tight for processes generating fine dust or liquids.
 - .3 Supply and installation of Access Control and Dust Control Barriers, flooring protection, protection of cabinets and finished surfaces shall be undertaken by this section unless assigned to others by Contractor.
 - .4 Supply and install heavy card stock, plastic sheeting and plywood to protect flooring after it is installed.
 - .5 Refer to Section 01 56 00 for construction of access control barriers.
- .4 Structural Lumber Framing:
 - .1 Supply and installation of continuous foam gasket for lumber framing in contact with concrete.
 - .2 Installation of sole plates and associated bolts.
 - .3 Supply and installation of wood nailing blocks applied to concrete for the connection of various components including installation of bolts and fastener sleeves or plugs.
 - .4 Supply and installation of all structural framing including studs, wood beams, LVL's, together with all required bracing, lookouts, furring and blocking and associated plywood and OSB sheathings.
 - .5 Supply and installation of accessories and connectors, anchors, straps, saddles, hold down anchors, shear anchors, bolts and expansion anchors of every type associated with structural framing.
 - .6 Supply and installation of wood blockings and anchorages for connectors, posts, equipment, curbs, railings, curbs, trims, attic access ladder, countertop supports and profiles indicated.
 - .7 Supply and installation of transition and isolation membranes for various situations as framing progresses and to co-ordinate with installation of all doors and windows when such items are not installed by door and window installer.
 - .8 Application of small quantities of sprayed-in-place polyurethane, closed-cell foam for sealing of service and device or metal fabrication penetrations and for openings when such foam is not applied by installer of the element requiring the seal. Seal shall form a continuous air and vapour barrier using a combination of the foam applied and transition membranes specified.
 - .9 Window surrounds and plywood boxes forming the interior support for finishes around all doors and windows
- .5 Exterior Finishes:
 - .1 Provide and install all strapping and framing necessary to support metal siding finishes and cedar lumber finish on the exterior of the building including all soffit material shown.
 - .2 Provide and install strapping and blocking, furring and wedges locally on the existing building frame to establish plumb surfaces for new siding and soffits on the existing building.

- .3 Provide and install blocking, supports and framing for steel roof installation, ventilation and all penetrations through attic and roofing for both existing and new construction.
- .4 Trims and metal flashings associated with exterior wood trims; exterior wood siding and all associated strapping and furring.
- .5 Supply and installation of cedar soffits and associated trims.
- .6 Partition Framing, Non-Load-Bearing:
 - .1 Supply and installation of all non-load bearing partition framing specified under this Section if contractor had not commissioned this directly with a trade performing the Work.
 - .2 Partitions may be framed using 92 mm (3-5/8") steel studs and tracks except where Spruce, Pine and Fir lumber, number 2 grade wood studs is shown in order to support finished carpentry.
 - .3 Stud partitions shall be extended to underside of existing structure in all instances except where existing continuous membrane ceiling is present (gypsum board or plaster applied to underside of existing floor or roof structure).
 - .4 All metal studs shall be erected in accordance with metal stud manufacturer recommendations and assembly shall accommodate trims, devices, grilles and other items with wood blocking installed to facilitate connection of same to the framing.
 - .5 If steel studs are used, electrician must supply and install appropriate grommets to protect conductors that are not sheathed in metal.
- .7 Finish Carpentry and Millwork:
 - .1 Coordination of installation of finish carpentry items and requirements for its installation including wood and lumber wall finishes.
 - .2 Provide wood blocks in steel stud partitions to support trims and panelled wall assemblies.
 - .3 This section shall provide all blocking associated with countertops, shelving, plumbing fixtures, cabinets, shelving units, closet shelving, closet hanging rods, brackets and cleats associated with millwork together with all supports, posts and brackets.
 - .4 Coordinate installation of cabinetry, countertops and shelving with Sections 06 41 00 Cabinetry and Millwork. Install blocking and steel angles to support front edges of countertops within all washrooms. Provision of blocking associated with countertop supports, posts and brackets and other miscellaneous metal items including angle supporting knee wall.
 - .5 Provision of blocking, framing and anchorage required for each item supplied by Section 06 20 00 Fine Carpentry including mechanical or electrical devices and equipment. Provision of blocking associated with installation of standing and running trim where not supplied and installed by Section 06 20 00.
- .8 Ceiling finishes and bulkheads:
 - .1 Provide and install metal framing specified within 09 22 17 Framing Ceiling and Bulkheads when this framing is not installed by that Section.
 - .2 Provide and install wood framing required for all bulkheads and dropped ceilings shown on drawings or required to conceal services within finished areas. Mechanical and Electrical Rooms and Storage Rooms do not require concealment of overhead ducts or conduits or piping.
 - .3 Provide and install all ceiling framing for dropped ceilings finished with gypsum board used as the ceiling finish within various rooms and corridors.
 - .4 Provide framing for bulkheads and decorative features or associated with concealment of mechanical and electrical ducts, devices, equipment or conductors in finished spaces. Coordinate requirements with Mechanical and Electrical divisions prior to installation and do not install finishes

- until mechanical and electrical devices, services, ducts and equipment is installed when such devices or services or equipment is concealed.
- .9 Fire Stopping:
- .1 This section shall install appropriate blocking or framing to support fire stop materials.
 - .2 Installation of blocking to support fire stop materials used for combustible pipe service penetrations and, penetrations as required.
 - .3 Supply and installation of wood blocking required to support fire dampers associated with ductwork.
- .10 Division 08 Installation of Doors and Hardware:
- .1 Installation of doors and hardware including final adjustments, hardware, blocking and spaces for items specified in sections of Division 08 when these items are not installed by other sections.
 - .2 Interior Windows: Install blocking associated with interior windows; install windows.
- .11 Division 10 Items - Washroom Accessories:
- .1 Accessories and dispensers supplied by Owner and Installed by this Section:
 - .1 Soap, hand sanitizer dispensers and paper towel dispensers - one of each at each new or relocated sink. Provide blocking; install units.
 - .2 Receive from the Owner toilet tissue dispensers and install one adjacent to each toilet.
 - .3 Miscellaneous wall or ceiling mounted devices, equipment or fixtures including sinks, countertops, electrical devices and mechanical devices, wall protection and interior corridor and stairwell handrailings
- .12 Wall Protection
- .1 Corner Guards: provide blocking within wall assembly to support screw-fastening of corner guard base bracket. Secure base bracket with double-side tape and screws.
- .13 Equipment Supports, Backer Boards and Framing:
- .1 Provide plywood supports for each window to facilitate installation of window covering blinds and solid surfacing window sill.
 - .1 Electrical and mechanical backboards, when required:
 - .2 Install blocking to support wall-mounted cabinets shown on drawings in various rooms and spaces - fire extinguisher cabinets, electrical and mechanical devices and equipment.
 - .3 Telecommunications Service Backer Panel:
 - .1 16 mm (5/8") plywood applied over gypsum board.
- .14 Plumbing and HVAC:
- .1 Supply and installation framing and blocking associated with service penetrations through walls and roof intended to accommodate plumbing and ventilation equipment.
 - .2 Review mechanical and electrical work for requirements and frame openings with headers and additional blocking to create voids in floor and wall assemblies including liners and bucks in walls. Accommodate equipment anchorage to building structure.
- .15 Other Work:
- .1 If any section requests additional mechanical fasteners or blocking associated with the efficacious performance of their work, this Section shall immediately provide such fastenings and blocking without additional cost to the Owner.
 - .2 Supply and installation of masking and panel material, hoarding for security and protection against weather.
 - .3 Supply and installation of wood or plywood hoarding and platforms intended to protect building from inclement weather.

- .1 Where wood is used, stud grade may be used for temporary barriers.
- .2 Aspenite sheathing, 7/16" may be used for hoarding sheathing.
- .4 Installation of various elements and materials when not installed by other sections, including, but not limited to:
 - .1 Installation of doors and their side lights, interior windows.
 - .2 Installation of access doors or hatches not supplied by other sections.
 - .3 Installation of interior wood trims and laminates.
 - .4 Installation of interior hardware items.
 - .5 Adjustment of door operation throughout.
 - .6 Setting and adjusting of hollow steel doors and frames when these are not installed under Division 08.
 - .7 Remove, alter and install existing interior wood trims. Supply and install new wood trims to replace damaged trims.
- .5 Provide shims, strapping and furring associated with establishing plumb or level conditions for ceilings, bulkheads, floor sheathings or wall finishes, whether interior or exterior.
- .6 Add furring to existing walls where differences in assembly dimensions warrant addition of framing in order to achieve flush and plumb finished wall surfaces. This provision includes accommodating distortions of existing walls found on site that could be perceived from within rooms and spaces (walls out of alignment, plumb or exhibiting curvature). For short lengths of walls (72" or less) such distortions shall not be considered visible provided that each of the 72" sections so designated is terminated or bounded by a new partition, bulkhead, finish or framing element that creates a 90-degree change in plane for that element. For longer walls that are uninterrupted by changes in plane by new framed elements or 90-degree changes in direction of finishes and surfaces, walls shall be furred out to create a new plumb and square surface with respect to all new elements within the same space.
- .16 This section shall, among all other items, provide the following labour and services:
 - .1 Collect product literature and maintenance information for items installed or supplied by this section.
 - .2 Coordinate work of other trades providing and installing or, providing accommodations or preparation for any items installed by this Section or items requiring attachment to structural or non-load-bearing wood framed elements.
 - .3 Coordination of trades providing devices, light fixtures, device boxes, electrical or mechanical elements including hangers, conduits, conductors, piping and ductwork for installation of blocking, fitment framing, firestop blocking, and other elements required for installation.
 - .4 Provide required blocking for Division 09 and 10 items.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 Construction Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused wood materials, except pressure treated materials, from landfill to recycling, reuse or composting facility approved by Consultant.
- .5 Do not dispose of preservative treated wood through incineration.

- .6 Do not dispose of preservative treated wood with materials destined for recycling or reuse.
- .7 Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill.
- .8 Dispose of unused wood preservative material at official hazardous material collections site, at Municipal depot.
- .9 Do not dispose of unused preservative material into sewer system, into streams, lakes, onto ground or in other locations where they will pose health or environmental hazard.

Part 2 Products

2.1 TEMPORARY BARRIERS AND PARTITIONS

- .1 Stud grade, SPF or better.
- .2 Steel studs selected to suit span and exposure conditions including duration of partition.

2.2 FRAMING LUMBER - STRUCTURAL MATERIALS

- .1 Sustainability Characteristics:
 - .1 Lumber, finger jointed lumber, laminated veneer lumber, engineered roof trusses sourced to meet or exceed requirements of CAN/CSA-Z809 or FSC or SFI certified.
- .2 Lumber: softwood, S4S, moisture content 19% (S-dry) or less in accordance with following standards:
 - .1 CSA O141.
 - .2 Framing material shall be S-dry, S4S spruce, pine or fir species, minimum number 2 NLGA grade.
- .3 Glued end-jointed (finger-jointed) lumber NLGA Special Products Standard SPS, are acceptable for painted trim work used on the interior.
- .4 Furring, blocking, nailing strips, grounds, rough bucks, curbs, fascia backing and sleepers:
 - .1 S4S.
 - .2 Board sizes: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade.
 - .4 Post and timbers sizes: "Standard" or better grade.

2.3 PANEL MATERIALS:

- .1 Reference Standard:
 - .1 Plywood, particleboard, OSB shall be free of added urea-formaldehyde and meet or exceed requirements of CAN/CSA-Z809 or FSC or SFI certified.
 - .2 Panel materials shall meet or exceed CSA O325.0
 - .3 Douglas fir plywood (DFP): to CSA O121, standard construction.
 - .4 Canadian softwood plywood (CSP): to CSA O151, standard construction.
 - .5 Mat-formed structural panel boards (OSB wafer): to CAN O437.
- .2 Grades and Markings:
 - .1 Oriented strand board panels (OSB) shall be marked to disclose the following information: The manufacturer's name or logo and mill number; the CSA reference standard CSA O325.0; the span rating and end use; the nominal thickness; the direction of face alignment; the date code; the certification agency logo; the words "Exterior Bond" or "Exterior Type Binder".
 - .2 Plywood must meet or exceed CSA O121 for DFP and CSA O151 for CSP. Veneer faces are "C" grade except for exposed top surface of service panel backing boards which shall be "A" grade. "A" grade veneers shall be sanded.

- .3 15.7 mm oriented strand board meeting CAN-CSA 0325 product identified as OSB 1R24 for roof sheathing.

.3 Fastener Pattern:

- .1 Nail or screw fasten plywood and OSD panels 150mm on centre at perimeter of panels and 305mm on centre within field of panels unless fastener spacing is specified differently on drawings.

2.4 SILL GASKET, TRANSITION MEMBRANE AND ISOLATION MATERIALS:

- .1 Closed cell foam, purpose-made sill gasket for installation below all sole plates or sill plates on concrete foundation walls or for any load bearing wall set on concrete or masonry whether used for interior or exterior walls.
- .2 Self-Adhesive air barrier continuity and isolation membrane: materials specified within 07 27 10 Air Retarder, Air Barrier and Transition Membrane. Wrap all window and door openings entirely to connect air retarder to stud framing and completely cover surrounds for framed openings, connected and lapped under exterior wall foam insulation. Apply wraps prior to application of foam. Apply primers recommended by each membrane manufacturer to all surfaces prior to application of membrane. Membranes overlapping air retarder shall be nailed into framing in addition to self-adhesive fastening.

2.5 FRAMING CONNECTORS, HANGERS, BRACKETS AND POST SADDLES

- .1 All framing connectors described herein shall be as manufactured by the Simpson company from the Strong Tie line.
- .2 Framing anchors consist of a variety of components, including, but not limited to, post anchors, post saddles, joist hangers, hurricane anchors, hold down anchors and shear plates and shear connectors of any kind, all used in conjunction with wood framing and forming an integral part of the framing system.
- .3 Provide shop drawings of all such connectors used with any part of the framing system together with shop drawings for all LVL or PSL or similar composite wood beams or lintels or any other pre-engineered framing element used as a stud, joist, lintel or beam or column.
- .4 Fasteners or anchor bolts shall be selected for the structural properties required of the circumstance and as recommended for the connector.

2.6 WOOD SOFFIT, TRIMS AND SIDING FINISH

- .1 Refer to Section 07 46 23 Wood Siding, and Trim for materials. Fasten using concealed stainless steel nails.
- .2 For soffits, provide 38 mm x 89 mm framing anchored to building wall and roof framing components such that maximum span for wood panels is 400 mm.
- .3 Wood finishes are supplemented by pre-finished sheet metal flashings. These must be installed in sequence with the wood elements to ensure appropriate performance of the system.

2.7 EQUIPMENT AND SERVICE PANEL BACKER BOARDS:

- .1 Reference Standard:
 - .1 Plywood, particleboard, OSB shall be urea-formaldehyde free and meet or exceed requirements of CAN/CSA-Z809 or FSC or SFI certified.
 - .2 All panel materials shall meet or exceed CSA 0325.0
 - .3 Canadian softwood plywood (CSP): to CSA O151, standard construction.
 - .4 Poplar plywood (PP): to CSA O153, standard construction.
- .2 Grades and Markings:

- .1 All plywood shall meet or exceed CSA 0151 for Canadian Softwood Plywood (CSP). Veneer faces are "C" grade on unexposed side and shall be "A" grade on exposed side. "A" grade veneers shall be sanded.
- .3 Fastener Pattern:
 - .1 Install furring strips or independent wall stud framing to support panels where indicated on drawings.
 - .2 Fasten panels 8" (200mm) on centre for edges; 12" (305mm) on centre field.

2.8 ACCESSORIES

- .1 Polyethylene film: to CAN/CGSB-51.34, Type 1; 0.15 mm thick.
- .2 Exterior wall sheathing paper: to CAN/CGSB-51.32 spun-bonded olefin.
- .3 Sealants: in accordance with Section 07 92 0.
- .4 General purpose adhesive: to CSA O112.9.
 - .1 VOC limit 200g/L maximum to GS-36.
- .5 Nails, spikes and staples: to CSA B111.
- .6 Bolts: hot-dipped galvanized or stainless-steel bolt or threaded rod, washers and nuts for all applications, minimum 12.7 mm diameter unless indicated otherwise, complete with nuts and washers in all cases.
- .7 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer, stainless steel for exterior wall and roof or exterior use.
- .8 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer, stainless steel for exterior wall and roof or exterior use associated with siding, porch construction.
- .9 Hurricane ties, framing connectors and straps: minimum 1 mm thick sheet steel, hot-dipped galvanized after fabrication or Simpson Strong Tie Z-Max proprietary coating.
- .10 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, plastic formed to prevent dishing. Bell or cup shapes not acceptable.
- .11 Fastener Finishes:
 - .1 Galvanizing: to ASTM A123/A123M, use hot-dipped galvanized fasteners for exterior work and G185 hot-dipped galvanizing for use with pressure-preservative treated lumber.
 - .2 Stainless steel: use stainless steel for alternative to hot-dipped galvanized.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify conditions of substrates previously installed under other sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
 - .1 Inform Owner and Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation following correction of unacceptable conditions and subsequent written approval to proceed is received from Contractor.
- .2 Visually inspect structure and previous work upon which the quality of the carpentry depends.
- .3 Using survey equipment, spirit levels, string, line levels, plumb bob and triangulated measurements verify the following:

- .1 That all steel structure, angles and miscellaneous metal plates and channels and their anchors are installed and are sufficiently plumb, extended the correct lengths and appropriately installed to permit the work of this Section to proceed.

3.2 SEQUENCE AND REQUIREMENT TO PROTECT THE WORK FROM WEATHER:

- .1 Establish appropriate sequence of operations to establish increasingly water tight structure as work progresses. When feasible, maintain framing and interior in water tight condition throughout the work.
- .2 Coordinate application of transition membranes for full perimeter of framing before setting trusses. Insert transition membrane strips between top plates of wall frames. Such membranes shall be selected and adhered to provide temporary waterproof assembly and permanent air barrier continuity.

3.3 PREPARATION

- .1 Sill Plates –preparation and leveling:
 - .1 Carefully review documents to understand alignment intended for wood framing relative to foundation wall position.
 - .2 Review bolt positions and ensure that they are hot-dipped galvanized.
 - .3 Apply continuous non-shrink grout bed for sill plate bedding in order to achieve level bearing surface.
 - .4 Unroll and apply sill gasket over grout and concrete foundation wall as applicable, cut around anchor bolts and apply sealant or air bloc. Sill gasket material shall be continuous without gaps from end to end. Butt joins in gasket material. Do not overlap. Width of gasket shall be equal to the width of the sill plate, minimum and positioned such that all parts of the sill plate are isolated from concrete.
 - .5 Verify position of sill in field and make minor adjustments within tolerances of foundation wall to establish square relationship among all parts of the new framing system. Verify that all such adjustments are acceptable to the Consultant and Contractor.

3.4 SILL GASKET, TRANSITION MEMBRANE AND ISOLATION MATERIALS:

- .1 Sill plates shall match width of stud frame supported (38mm x 89mm, 38mm x 140mm, 38mm x 190mm) using sawn lumber, SPF No. 2 or better.
- .2 Sill plates may be anchored independently and wall framing may incorporate a second sole plate for standing of walls and anchorage to sill plates.
- .3 Install closed cell foam, purpose-made sill gasket below all wood sole plates or sill plates or steel stud track mounted on concrete foundation walls or below any lumber installed on concrete or masonry whether used for interior or exterior walls.
- .4 Anchor sill plates to foundation structure securely and level with min. 15.7mm dia. or larger diameter as shown on drawings, hot-dipped galvanized anchor bolts each minimum 1850mm on centre or as noted on drawings. Spacing noted on drawings or structural notes shall govern.
- .5 Wrap all window and door openings entirely using self-adhering and self-healing membranes specified within Section 07 27 10 to connect air retarder to stud framing and completely cover surrounds for framed openings, connected and lapped under exterior wall rigid foam insulating sheathing. Apply wraps prior to application of foam. Apply primers recommended by each membrane manufacturer to all surfaces prior to application of membrane. Membranes overlapping air retarder shall be nailed into framing in addition to self-adhesive fastening.

3.5 ERECTION

- .1 Provide required aids for construction of work in this section including ladders, scaffold, lifts, cranes and associated safety equipment.

- .2 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity temporarily and permanently.
- .3 Ensure that all elements are set plumb and square and in alignment with adjacent work to permit construction in accordance with arrangements shown on drawings.
- .4 Countersink bolts where necessary to provide clearance for other work.
- .5 Install temporary bracing as erection proceeds and augment this with additional braces when site will be left overnight or through weekends.

3.6 TEMPORARY AND PERMANENT BRACING:

- .1 Brace all framing as required to maintain alignment of the components in true, plumb, square and level positions or as required for the final installation of all parts. Ensure temporary bracing will resist all live, dead and construction loads for the duration of the construction.
- .2 Studs in bearing walls will require lateral support during construction to support any load. Where sheathing is not in place, provide 89mm x 38mm blocking at 900mm on centre with 3-75 mm toenails and one metal cross-brace at each end of the wall. Columns anchored at ends may be used instead of cross-bracing. Field-verify temporary measures with Consultant.
- .3 Install temporary bracing to avoid conflict with any part of the Work in progress. Remove as required by the Work after securing the stability of the Work through other means.
- .4 Remove all temporary bracing immediately as soon as it is no longer required.
- .5 Review contract drawings and shop drawings together for nailing instructions and spacing of braces. Add additional blocking to support sheathing joints for entire roof structure and for flat roof terrace area.

3.7 TEMPORARY BARRIERS AND PARTITIONS

- .1 All work shall be in accordance with Ontario Building Code and supplemented by the contract documents. Requirements on the drawings or specifications are in addition to requirements of the Building Code.
- .2 Brace all Access Control Barrier framing as required to maintain alignment of the components in true, plumb, square and level positions of all parts. Ensure temporary bracing will resist all live, dead and construction loads for the duration of the construction.
- .3 Install temporary bracing to avoid conflict with any part of the Work in progress. Remove as required by the Work after securing the stability of the Work through other means.
- .4 Remove all temporary bracing immediately as soon as it is no longer required.

3.8 INSTALLATION – STUD FRAMES

- .1 Install members true to line, levels and elevations, square and plumb.
- .2 Construct continuous panels from pieces of longest practical length.
- .3 Install spanning members with "crown-edge" up.
- .4 Through bolt all anchorage points for elements requiring more than two laminations of framing lumber.
- .5 Wall Framing:
 - .1 Wood studs interrupted by window or door openings are to be moved to each side in support of the lintel and infill studs shall be added above the lintel.
 - .2 Fasten laminations in built-up lintels and beams with 2-100mm nails at 600mm on centre or 2-89 mm nails at 500 mm on centre.
 - .3 Nailing of laminated columns shall be as follows:
 - .1 Each lamination must be fastened with 2-89mm ardox nails with 0.152" diameter each 200mm on centre or use 2-89mm x 0.12" dia. P nails at 150mm on centre.

- .2 Where a column occurs within a wall, lamination nailing may be reduced to a minimum of 2-89mm ardox nails at 600mm on centre or 89mm P nail at 400mm on centre when diaphragm sheathing is nailed as specified to the laminated face.
- .3 Nail exterior wood panel sheathing to all columns and posts for lateral support against buckling and to reduce lamination nailing requirements:
 - .1 Up to 3 laminations, 1 row of 50mm x 0.12" dia. at 305mm on centre.
 - .2 Up to 6 laminations, 2 rows, 112.7mm apart, 50mm x 0.12" dia., 305mm on centre.
- .6 For columns not laterally supported by sheathing diaphragm, laminations may be bolted together with 12.7mm diameter bolts or threaded rods with washers at 375 mm on centre, beginning 190mm from ends.

3.9 COORDINATION OF MECHANICAL AND ELECTRICAL DEVICES AND EQUIPMENT

- .1 Review all contract documents for features and framing of openings, installation of blocking and supports for the framing installation with particular attention to services and equipment specified within Divisions 15 and 16. Determine required anchorage points, openings in walls, floors or roof structures and provide solid blocking and framing to fully support loads intended.
- .2 Where there is uncertainty regarding openings, contact architect and contractor for clarification.
- .3 Support all edges of panel or deck materials for each opening required whether through wall or roof structures.
- .4 Where there is uncertainty regarding openings, contact architect and contractor for clarification.

3.10 PRE-ENGINEERED COMPOSITE STUDS AND BEAMS:

- .1 Utilize products listed on drawings without substitutions.
- .2 Provide catalogue cuts on request of the consultant. Include modulus of elasticity and other load capacity information.
- .3 All installation shall meet all requirements of shop drawings.
- .4 Do not drill or core laminated lumber, engineered joists or members of wood trusses without written instructions from Consultant.

3.11 FURRING AND BLOCKING

- .1 Locate blocks to avoid conflicts with attachment of devices, hardware, accessories or finishes.
- .2 Solid blocking is required around all openings through wall sheathings.
- .3 Insert blocking between studs in exterior wall assembly at 1220 mm on centre vertically measured from top of foundation wall. Blocking may be staggered within alternate stud spacing to permit nailing through studs into blocks.
- .4 Install furring and blocking required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding, equipment mounting boards, and other work connected to framing or sheathing.
- .5 Install blocking to support mechanical or electrical devices including lighting, junction boxes, fans, diffusers, louvers, fire stops, etc. to suit spacing indicated.
- .6 Install furring and wood blocks to facilitate nailing of all finish carpentry trims, casings, jambs and other wood components.
- .7 Supply and install blocking for all firestops. Fire stops are required for all plastic drain, waste and vent piping penetrating a fire rated assembly. For horizontal separations, fire stops are required on both sides of the assembly penetrated, except for water closets. For vertical separations, fire stops are required where the service penetrates gypsum board membranes forming part of an assembly with a fire resistance rating and where the same service leaves the enclosure formed by the rated assembly (at the

top of wall plates where plastic piping enters attic or at the face of gypsum board where plastic piping exits the wall assembly).

- .8 Provide blocking in wall assemblies where finishes change including locations where tile backer board is applied to part of the wall. Juncture of all changes in material shall be fully supported.
- .9 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .10 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .11 For Metal Fabrications specified, provide framing appropriate to item installed with through bolts through laminated framing elements that support vertical stand elements or roof top equipment. For wall mounted metal device or ductwork or electrical equipment brackets and hangers, provide continuous studs extending from lintels or floor or foundation bearing to laterally supported top plates or floor or roof framing, continuously.
- .12 Provide blocking and anchorage points connected to structural elements or use additional studs.
- .13 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .14 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.
- .15 Install furring to support new siding.
- .16 Countersink bolts where necessary to provide clearance for other work.
- .17 Isolate dissimilar metals from contact with one another throughout course of the Work using isolation membranes specified.
- .18 Isolate all wood products not pressure treated from contact with concrete or masonry using isolation membranes specified.
- .19 Do not use organic materials to fasten materials to steel, concrete or masonry.
- .20 Use dust collectors and high-quality respirator masks when cutting or sanding wood panels.

3.12 FASTENERS

- .1 All fasteners required for work related to the exterior sheathing, cladding and roofing components including all screws, sleeve anchors, nails and lag bolts and all such items utilized in cementitious products shall be hot-dipped galvanized or stainless steel. Use stainless steel exclusively where specifically indicated on drawings or within specifications.

3.13 CEDAR SOFFITS AND TRIMS:

- .1 Examine conditions and existing framing for true and level surfaces free of protrusions that would impair the soffit installation. Apply blocking and strapping to create firm, sound fastener locations in all instances.
- .2 Carefully layout installation prior to commencement of soffit installation where patterns are shown. Ensure that patterns will be symmetrically and aligned from bay-to-bay where installed between dropped false beams.
- .3 Apply in patterns shown on drawings.
- .4 Stagger all joints between courses.
- .5 Use continuous lengths for soffits constrained by trim details.
- .6 Scarf joints for runs of trim.
- .7 Provide cedar trim 20mm 1/4 round continuous for outer perimeter of cedar soffits at wall, dropped beam, fascia junctures for all cases.
- .8 Conceal all fasteners.
- .9 Use stainless wire nails for pneumatic nailing.

3.14 INSTALLATION OF EXTERIOR WINDOWS, DOORS AND FRAMES

- .1 Receive and unpack all required doors, windows and frames. Review condition of doors and frames, review intended installation and reject damaged products.
- .2 Install frames in accordance with manufacturer's instructions and all parts of this Specification.
- .3 Install foam rope backer and sealant to seal joint between windows and framing at exterior side prior to sprayed-in-place foam application. Allow clear space to face of frame of minimum 12.7mm for installation of sealant and foam rope. Sealant depth to be minimum 6mm; maximum 12.7mm. Insert backer material in clean joint all around door or window. Apply sealant and tool to concave surface to meet with adjacent exterior components.
- .4 Allow exterior caulking and backer material to cure sufficiently to retain expanding foam within the cavity.
- .5 Apply closed cell polyurethane sprayed-in-place insulation continuously between door and window frame and rough opening. Fill voids with insulation without deflection of closures. Install polyurethane foam to entirely seal joint between closure and framing. Fill voids in hollow steel frames with polyurethane foam during installation.

3.15 SHELVING, EQUIPMENT AND ACCESSORIES

- .1 Refer to contract drawings and shop drawings for number and nature of devices, shelving and furniture.
- .2 This section shall install blocking to support wall mounted devices, electrical switches, disconnects and wall mounted devices, wall mounted accessories and hangers.

3.16 INTERIOR DOORS AND FRAMES

- .1 Receive doors and frames from other Sections and install frames in partitions unless these are to be installed by division supplying frames. Ensure that all door and sidelight frames are installed plumb, level and square, ready to receive doors.
- .2 Examine doors and frames to ensure their suitability for installation and for defects in fabrication.
- .3 Ensure blocking and jamb materials including nailing blocks required for wood trims are installed within wall prior to setting frames.
- .4 Receive hardware from Section 08 71 00 and install for all doors:
 - .1 Receive and unpack all hardware materials. Review condition of materials, review intended installation and reject damaged products. Review installation requirements and ensure that adequate blocking has been installed to support all products. Install products in accordance with manufacturer's instructions.
 - .2 Install all hardware to steel and wood doors. Hang and adjust all doors and frames as required by each opening. Install all required door hardware including closing devices, lock or latch set, hinges, push plates and kick plates as required. Install door stops and adjust all hardware for smooth appropriate operation.
 - .3 Hang doors, adjust hardware and turn over maintenance materials to Contractor for inclusion in project manuals.
 - .4 Apply weather stripping when site conditions would not cause subsequent damage to products due to operations or routing of temporary services such as extension cords and hoses.

3.17 METAL FABRICATIONS:

- .1 Design Loading:
 - .1 Refer to drawings and schedules.
- .2 Review shop drawings for all Metal Fabrications in Section 05 00 00 and illustrated or noted on drawings.

- .3 Field-verify dimensions of all components prior to submitting shop drawings to consultant.
- .4 Receive metal fabrication items. Test fit all parts prior to installation. Accommodate new framing and nailers as required for adequate fit and strength.
- .5 Do not allow connections and framing supporting misc. metals items to be concealed until reviewed by consultant.
- .6 Install washroom counter reinforcement if not supplied and installed by other sections. Provide solid blocking for anchorage of flange to wall framing to suit location of counter and position of flanges.

3.18 INSTALLATION OF WASHROOM ACCESSORIES AND DIVISION 10 ITEMS:

- .1 Owner will supply hand sanitizer dispensers, and soap dispensers (1 for each sink throughout the Project) and paper towel dispensers (one for each sink). Installation is by this Section (Contractor). Blocking within walls is required for each item.
- .2 Receive and unpack all materials. Review condition of materials, review intended installation and reject damaged products.
- .3 Review installation requirements and ensure that adequate blocking has been installed to support all products.
- .4 Coordinate location of blocking with consultant if there is uncertainty.
- .5 Supply and install wood blocks in stud framed partitions, nominal 38 mm x 89 mm and larger size as follows:
 - .1 For soap dispensers and hand sanitizer at each sink. Additional hand sanitizer stations will be added by the Owner next to each entrance or exit door and near doors inside the Council Chambers. Hand sanitizer stations will be placed leading through doors separating the main corridor from entrance doors into Department Offices.
 - .2 For all paper towel dispensers - one for each sink shown or as marked on drawings.
 - .3 Adjacent to toilets for grab bar installation shown;
 - .4 For the toilet tissue roll holder – one next to each toilet;
 - .5 For countertops and mirrors as indicated.
 - .6 For all washroom partitions shown.
- .6 Install products in accordance with manufacturer's instructions.

3.19 FINE CARPENTRY AND MILLWORK ITEMS

- .1 Assist in the coordination of fine carpentry components installation.
- .2 Review Shop Drawings for connections, erection requirements, nailers and fasteners, etc.
- .3 Field-verify dimensions of components with fine carpentry supplier prior to submitting Shop Drawings to consultant.
- .4 Ensure that fine carpentry elements are installed and fastened for true alignment in all directions and that they can support all design and construction loads. Install required bracing so as to maintain wood finish in good condition.
- .5 Protect fine carpentry items from damage and accidental spills of paint or other liquids or overspray of polyurethane foams for duration of construction by wrapping in paper, plastic or other means including installation of cardboard or other packing where items and especially countertops may be subject to damage by construction work.
- .6 Install washroom counter reinforcement if not supplied and installed by other sections. Provide solid blocking for anchorage of flange to wall framing to suit location of counter and position of flanges.
- .7 Install standing and running trim for all openings where trim is scheduled or shown.

3.20 FIRE EXTINGUISHERS, FIRE ALARM PANEL, WALL MOUNTED HEATERS AND ELECTRICAL PANELS

- .1 Provide framed recess for fire extinguishers, electrical panels, annunciator panel, wall- mounted heaters in locations noted on all drawings.
- .2 Coordinate size and characteristics of framed recess with shop drawings and product literature provided by other sections.

3.21 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .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 11.
- .3 Waste Management: separate waste materials for reuse or recycling in accordance with Section 01 74 19.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.22 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by rough carpentry installation.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 06 41 00 Millwork, Fine Carpentry, Cabinetry And Plastic Laminate
- .3 Section 06 61 16 Solid Surfacing Fabrications
- .4 Section 07 92 00 Joint Sealants
- .5 Section 08 11 00 Steel Doors and Frames
- .6 Section 08 11 16 Aluminum Doors and Frames
- .7 Section 08 14 16 Wood Doors and Frames
- .8 Section 08 31 00 Access Doors
- .9 Section 08 44 16 Glazed Curtain Wall
- .10 Section 08 50 00 Aluminum Windows
- .11 Section 09 11 00 Metal Stud Framing
- .12 Section 09 12 00 Interior Ceiling and Bulkhead Framing
- .13 Section 09 21 16 Gypsum Board Assemblies
- .14 Section 09 91 23 Interior Painting

1.2 REFERENCES

- .1 American National Standards Institute (ANSI):
 - .1 ANSI A208.1, Particleboard.
 - .2 ANSI A208.2, Medium Density Fibreboard (MDF) for Interior Applications.
 - .3 ANSI/HPVA HP-1, American National Standard for Hardwood and Decorative Plywood.
- .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI):
 - .1 Architectural Woodwork Quality Standards, (AWS).
- .3 American Society for Testing Materials (ASTM):
 - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM C423: Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - .3 ASTM D2832, Standard Guide for Determining Volatile and Non-volatile Content of Paint and Related Coatings.
 - .4 ASTM D5116, Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.
 - .5 ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - .6 ASTM E1333, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber.
- .4 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-11.3-M, Hardboard.
 - .2 CAN/CGSB-71.20-M, Adhesive, Contact, Brushable.
- .5 Canadian Lumber Standards Accreditation Board (CLSAB).
- .6 Canadian Standards Association (CSA):
 - .1 CSA B111, Wire Nails, Spikes and Staples.
 - .2 CSA O121, Douglas Fir Plywood.
 - .3 CSA O141, Softwood Lumber.
 - .4 CSA O151, Canadian Softwood Plywood.
 - .5 CSA O153-M, Poplar Plywood.

- .6 CAN/CSA-Z809, Sustainable Forest Management.
- .7 Forest Stewardship Council (FSC):
 - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .8 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2010.
- .9 Sustainable Forestry Initiative (SFI):
 - .1 SFI-2010-2014 Standard.
- .10 Underwriters Laboratory of Canada (ULC):
 - .1 CAN/ULC-S104, Standard Method for Fire Tests of Door Assemblies.
 - .2 CAN/ULC-S105, Standard Specification for Fire Door Frames.

1.3 SUMMARY

- .1 Provide standing and running trims associated with selected openings and decorative features.
- .2 Provide wood panels, hardwood edging and hardwood trims associated with wall and bulkhead treatments.
- .3 Supply and installation of standing and running trims and wall panels within specific rooms for wall or ceiling mounting, including, but not limited to, trims associated with ceilings and bulkheads, cedar ceiling boards, wall panels and chair rails, wainscoting and associated details.
- .4 Hardware, fasteners and adhesives used in joinery and fabrication or installation whether concealed from view or used for mounting of elements supplied or installed or both for the Scope of work in this section.

1.4 SUBMITTALS

- .1 Provide documents or items in accordance with Section 01 33 00.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for plywood, particleboard, MDF and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit electronic copies of WHMIS MSDS in accordance with Section 01 35 29.
- .3 Shop Drawings:
 - .1 Submit Shop Drawings to Consultant prepared in accordance with AWS Manual in digital format..
 - .2 Field measure existing conditions and prepare Shop Drawings reflecting these.
 - .3 Indicate details of construction, profiles, jointing, fastening and other related details.
 - .4 Indicate materials, thicknesses, finishes and hardware.
 - .5 Submit shop drawings of grooved panel system. Technical data sheet, acoustical and fire performance test reports for the specified product to comply with the required criteria.
- .4 Samples:
 - .1 Submit duplicate samples for review and acceptance of each unit.
 - .2 Submit samples of hardwood veneers and hardwood lumber to be used in fabrication of finish carpentry items including milled profiles, standing and running trims.
 - .3 Veneer panel samples to be min. 300 mm square. Solid Hardwood samples to be minimum 300 mm long and match designed width, profile and thickness.
 - .4 Submit one sample of each factory finish for solid lumber items, minimum 300 mm x 300 mm for veneer panels and 300 mm long x design dimensions for solid lumber.
 - .5 Where materials are specified as factory finished, provide samples with specified finish.
 - .6 Where materials are specified as site finished, provide samples with finish specified within Section 09 91 23.
 - .7 Provide samples for exposed hardware items including special fasteners.
- .5 Closeout Submittals:

- .1 Digital copies of Shop Drawings, fixture or hardware technical data sheets as reviewed by all parties for inclusion in maintenance manual.
- .2 Maintenance and cleaning instructions for all surfaces.
- .3 Warranty and contact information.
- .6 Test and Evaluation Reports: submit certified test reports for wood and composite wood from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.

1.5 QUALITY ASSURANCE

- .1 Lumber by grade stamp of agency certified by Canadian Lumber Standards Accreditation Board (CLSAB).
- .2 Plywood, particleboard, OSB and wood based composite panels to CSA and ANSI standards.
- .3 AWS:
 - .1 The Architectural Woodwork Standard set out by the Architectural Woodwork Manufacturer's Association of Canada (AWMAC), latest Edition, hereafter referred to as the manual or AWS, shall be used as the reference standard for all work of this section.
 - .2 AWS utilizes specific grades to indicate both the materials and workmanship that shall be reflected in the final product.
 - .3 Lumber, panels, veneers, fabrication and assemblies for this section shall be Premium as defined in the manual and amended or supplemented herein. This section exceeds the AWS Premium Grade requirements.
 - .4 Quality standards for this section shall be as defined in the manual for the appearance of architectural woodwork and use of references to the standards in the manual means that the consultant will use this standard to evaluate the final fine carpentry or millwork product. Where this specification stipulates conditions or situations that exceed the standard in the manual, this specification section shall govern.
- .4 Exposed to View Definition and Finishing Requirements:
 - .1 Any component in the line of sight when viewed from any direction and for any mounting height or point of view 400 mm above the finished floor (FF) surface for underside of components and 2200 mm above the FF for top side of components, when viewed from any location within the building shall be considered exposed to view.
 - .2 Where any component is not referenced with respect to exposure or grade, it shall be defined as a premium grade component as referenced within the manual and for its appropriate use or classification or definition.
- .5 Compatibility of grains and colour of wood materials shall be evaluated as follows:
 - .1 Compatibility of grains between adjacent veneer panels, shall be such that at the joints, the same grain shall be used (e.g. flat grain/plain sawn or edge/quarter sawn).
 - .2 Compatibility of colour shall be tested by sample submission, establishing the range of colour variation consistent with the species selected.
 - .3 Compatibility between solid lumber and veneered materials will be with respect to general similarity in the colour of the adjacent materials rather than the grain.
- .6 Moisture Content: For custom and premium grades of lumber, the following moisture content values apply at time of installation:
 - .1 6% optimal with range of 5%-8% acceptable.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Provide protective coverings of suitable material for finish carpentry elements and factory finished panels with special emphasis on plastic laminate or melamine items. Ship materials with special precautions (cardboard or bubble wrap or equal) at corners.

- .4 Store finish carpentry items in temperature and humidity-controlled area until delivery.
- .5 Do not permit delivery of millwork to Site until area is sufficiently dry and free of dust, wet paint or flooring installation so that woodwork will not be damaged by excessive changes in moisture control.
- .6 Replace defective or damaged materials with new.
- .7 Packaging Waste Management: remove for reuse and return to supplier, pallets, crates, padding, packaging materials. Packaging not returned to supplier shall be recycled where facilities exist.

1.7 WARRANTY

- .1 Warrant work of this section against defects and deficiencies in accordance with General Conditions of the Contract. Promptly make good defects and deficiencies that become apparent within warranty period to satisfaction of Owner's Designee and at no expense to Owner. Defects and deficiencies include but are not limited to delaminating of plastic laminate or melamine work or veneers, chips, checks and warping, checking, splitting or twisting of millwork and fine carpentry items, bubbling or delaminating of veneers.

1.8 MAINTENANCE MATERIALS:

- .1 Provide literature describing use and care of materials including acceptable cleaning agents and practices.
- .2 Provide spare finishes used in the field for the Owner's future use.

Part 2 Products

2.1 AWS GRADES AND QUALITY FOR EXPOSED, FINISHED MATERIALS

- .1 Hardwood Lumber supplied by this section:
 - .1 To meet AWS Premium Grade standard – Red Oak, profile on drawings, edge grain, dry, sound lumber selected for grain and colour and to eliminate all but the slightest inherent minor blemishes. Pieces shall be smoothly machined with surfaces smoothly sanded. This grade is used for stained and transparent finish.
 - .2 Hardwood lumber: moisture content 6% or lower in accordance:
 - .1 National Hardwood Lumber Association (NHLA).
 - .2 AWS premium grade, moisture content as specified.
 - .3 CAN/CSA-Z809 or FSC or SFI certified.
- .2 Hardwood Veneer on Particle Board or Plywood Core Panels:
 - .1 CSA O115-M Type II
 - .2 Urea-formaldehyde free
 - .3 Hardwood plywood: to ANSI/HPVA HP-1.
 - .4 Particle Board Core or non-telegraphing hardwood plywood manufactured with exterior glue to suit intended use as stipulated in the manual.
 - .5 Clear and Stain Finished: slip matched Red Oak veneer indicated on drawings and where noted as hardwood veneer or hardwood on drawings using quarter sliced method.
 - .6 Unexposed faces or faces finished with opaque materials: Sound Grade (SO) Birch Veneer, all belt sanded.
 - .7 Grade M-2- 620-670 kg/m³ density
 - .8 Comply with Lacey Act Requirements 16 U.S.C.3372(f);
 - .9 Formaldehyde Emission Requirements: ≤ 0.09 ppm (CARB Phase 2);
 - .10 Recycled Content is 100 percent post industrial recovered and recycled wood fiber;
 - .11 Panel thickness:
 - .12 Panel dimensions: 1245mm X 2464mm (4' x 8') and 1549mm X 3073mm (5' x 12')
 - .13 Particleboard panels FSC certified.
 - .14 **WARNING:** Particleboard may release formaldehyde in low concentrations. Formaldehyde can cause temporary eye and respiratory irritation and may aggravate respiratory conditions or allergies. Proper ventilation will reduce the risk of such problems.
- .3 Panel Material: no added urea-formaldehyde.

- .1 CAN/CSA-Z809 or FSC or SFI certified.
- .2 Douglas fir plywood (DFP): to CSA O121, standard construction, "A" grade surfaces both faces for all work of this section.
- .3 Canadian softwood plywood (CSP): to CSA O151, "A" grade surfaces both sides for all work of this section.
- .4 Poplar plywood (PP): to CSA O153, standard construction, "A" grade faces, both sides, for work of this section.
- .5 Hardboard: to CAN/CGSB-11.3.
- .6 Low density fibreboard: to CSA-A247M.

2.2 MEDIUM DENSITY FIBERBOARD AND MELAMINE FINISH (TFL)

- .1 TFL = Thermally Fused Melamine.
- .2 Medium density fibreboard (MDF): to ANSI A208.2, density 640-800 kg/m³.
- .3 Particle board core or MDF or plywood as stipulated for intended use by the AWS Manual.
- .4 Particleboard Core for Finished, Exposed Panels:
 - .1 CAN3-O188.1-M, Grade R.
 - .2 Particle Board Properties:

.1 Density	43 - 46 pcf	690 - 740 kg/m ³
.2 Internal Bond	80 - 110 psi	547 - 752 Kpa
.3 MOR	2100 - 2800 psi	14.5 - 19.2 MPA
.4 MOE	350,000 - 600,000 psi	2.35 - 4.04 Gpa
.5 Hardness	750 - 1200 lbs	3.55 - 5.68 Kn.
.6 Screw holding:		
.1 Face	250 - 400 lbs	1100 - 1780 N
.2 Edge	175 - 275 lbs	778 - 1222 N
.7 Thickness (tolerance) Max 0.005"		0.15 mm
.8 Moisture Content		4.5 - 8.0 %
- .5 Linear Expansion: 0.35 %, maximum.
- .6 Decorative overlaid TFL composite panels:
 - .1 Decorative overlay, heat and pressure laminated to form TFM finished panel with suitable resin to thickness indicated, particleboard or MDF urea-formaldehyde free core.
 - .2 Overlay bonded to both faces where exposed two sides, and when panel material require surface on one side only, reverse side to be overlaid with a plain (buff) balancing sheet.
 - .3 Finish: wood grain pattern, pattern or solid colour selected by Consultant from manufacturer's full range of colours and patterns regardless of cost category, excluding metallics.
 - .4 Acceptable Materials:
 - .1 **Uniboard TFL Panels:**
 - .1 Finishes selected by architect from full range of Standard and Signature Finishes (14 choices).
 - .2 Consultant will select colour and pattern from 134 choices including Abstract, Solids and Woodgrain decor.
 - .2 **Panolam:**
 - .1 Colours selected by architect from full range of Nevamar and Pionite 2Be collections.
 - .2 Architect will select colour and pattern from 134 choices including Abstract, Solids and Woodgrain decor.

2.3 3MM THICK, PVC EDGE BANDS OR BANDING MATERIAL:

- .1 3mm thick, PVC edge bands are required to finish the edges exposed to view on all panel material to which a face finish consisting of any laminated product including, but not limited to, high-pressure laminate (Plastic Laminate), TFL (thermally fused melamine) or any faux wood laminated depiction of wood veneer is applied.

- .2 3mm thick PVC edge bands shall be **Rehau** or equivalent, Flat T-moulding, 3 mm thickness, colour matched to face of panel material being banded.
- .3 Use 3mm thick, PVC edge bands on any panels with exposed edges, or where drawer or door front finished with laminated finish have an exposed edge.
- .4 **No** thin melamine or PVC or plastic laminate or “tape” edge bands permitted.

2.4 GROOVED WOOD PANELS

- .1 Basis of Design: MCM Acoustical. 6860 Rexwood Road, Mississauga, ON L4V 1L8 Canada.
info@mcmacoustical.com 905-670-3733.
- .2 Quality Assurance:
 - .1 Manufacturer must have the capacity to manufacture the specified product to meet the qualified defined standard and quality for a period of not less than five years.
 - .2 Any product substitution request including the overall design, product performance, dimensional changes, mounting and finishes must be submitted to the architect within 10 working days prior to the latest tender Closing date and time.
 - .3 Dimensional tolerances and size variation of nominal 1/8” (3mm) will be expected due to the nature of wood products.
 - .4 Panels must have anti-microbial finish.
 - .5 The manufacturer must be able to certify the wood products with FSC standard, principles, and criteria for forest stewardship with chain of custody certification.
 - .6 Panels must be independently certified to conform to California Department of Public health (CDPH) Standard Method v1.2: Private Office and School Classroom.
 - .7 Wood wall and ceiling mounted panels must be tested in accordance with ASTM E84 surface burning characteristics by a third-party acceptable testing facility as a finished composite material with Class A (FS=25 or less – SD=450 or less) performance.
 - .8 All specified wood wall and ceiling panels with acoustical absorption characteristics must be tested in accordance with ASTM C423 and ASTM E795 as indicated by an authorized testing organization acceptable to authorities having jurisdiction. Approved testing organization must be independent of the manufacturer.
 - .9 The qualification, competency, and capability of an experienced installer(s) with a successful service record should be approved by the manufacturer prior to the installation.
- .3 Product: Grooved Wood Panels with nominal thickness of 16 mm (5/8”).
- .4 Veneer Option: Quarter cut maple species.
- .5 Panel Construction: Natural wood veneer to be laminated on fire rated medium density fiberboard (MDF) and grooved. Back and core of the panel to be have 9 mm perforations staggered based on face groove spacing. The MDF core material shall be furnished with special acoustical black matt at the back. Panel sizes as per reviewed shop drawings.
- .6 Maintenance Materials:
 - .1 Provide a minimum of two spare panels for the Owner’s future use together with mounting materials.

2.5 SOFTWOOD LUMBER:

- .1 S4S, moisture content 7% or less in accordance with following standards:
 - .1 CSA O141.
 - .2 CAN/CSA-Z809 or FSC or SFI certified.
 - .3 NLGA Standard Grading Rules for Canadian Lumber.
 - .4 AWS custom grade, moisture content as specified.
 - .5 Machine stress-rated lumber is acceptable.

2.6 WOOD STANDING, RUNNING TRIMS AND JAMBS FOR OPENINGS

- .1 Openings have jambs fabricated from hardwood veneer panel materials where noted on drawings. These are supplemented by solid hardwood milled trims.

- .2 Standing and Running Trims:
 - .1 Trim locations are shown on drawings.
 - .2 Solid milled hardwood finished by Section 09 91 23 including preparation of raw wood trims in work of that section. Contractor shall coordinate this division of responsibility and no cost to the owner.
- .3 Reference Standard: AWS premium grade for veneered panels, stained with clear finish, and for sawn and milled hardwood, stained with clear finish.
- .4 Refer to drawings for framed archways, door and window trim locations and openings with hardwood or veneered panelled jambs.
- .5 Painted Window Jamb, Head and Sills:
 - .1 Supply and install solid sawn poplar head and jamb material, AWS custom Grade, painted by Section 09 91 23. Material thickness 19mm.
 - .2 Window Jamb and Casing:
 - .1 Where noted on drawings, provide primed and painted 19 mm thick (3/4") plywood jamb material.
 - .2 Supply and install solid sawn poplar casing and jamb assembly, finished by Section 09 91 23, with primer and paint.
 - .3 Review drawings for location of painted wood trims and, for these, use poplar milled to profile shown.
 - .3 Apply head and jamb side trims as door and archway around openings.

2.7 ACCESSORIES

- .1 Nails and staples: to CSA B111; galvanized to ASTM A123/A123M for exterior work. Interior humid areas and where specified; stainless steel.
- .2 Wood screws: type and size to suit application.
- .3 Splines: wood, plastic or metal.
- .4 Adhesive and Sealants: in accordance with Section 07 92 00.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other sections or Contracts are acceptable for wood products installation in accordance with manufacturer's written instructions.
- .2 Attend site and review locations for all work and seek clarification regarding conditions that would not result in intended effect.
- .3 Visually inspect all substrates and report deficiencies to the Architect and Contractor immediately upon discovery.
- .4 Proceed with installation following correction of defects in substrates and subsequent receipt of architect's written notice to proceed.
- .5 Field measure existing conditions and prepare Shop Drawings reflecting these. Proceed with fabrication following receipt of reviewed Shop Drawings showing "reviewed as noted" or "reviewed" marks provided by Consultant.

3.2 INSTALLATION - GENERAL

- .1 Do finish carpentry to AWS Premium grade as specified herein.
- .2 Construct and install work as indicated on Drawings.
- .3 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.
- .4 Erect work plumb, level, square and to required lines.

- .5 Be responsible for methods of installation and for ensuring that items and materials are rigidly and securely attached and will not be loosened by work of other trades.
- .6 When installing items not shop assembled, distribute to best overall advantage defects allowed in quality grade specified.
- .7 Joints made on Site shall be equal in quality and workmanship to joints made in shop.
- .8 Blocking, Furring and Rough Framing:
 - .1 Coordinate blocking, framing and other support required in metal stud walls with Section 06 10 00. This section is responsible for ensuring that all required blocking is installed.

3.3 FASTENING:

- .1 Fasten wood nailers, blocking, framing and strapping solidly to adjacent materials in true planes.
- .2 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
- .3 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
- .4 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.
- .5 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

3.4 STANDING AND RUNNING TRIM:

- .1 Ensure that Section 06 10 00 Rough Carpentry has installed all required backing and nailing to support wood trims shown and in particular, trims installed in steel stud partitions.
- .2 Inspect all site installed trims prior to cutting, shaping or installation and reject pieces exhibiting chips, checks, knife-nicks, tear-outs and other visible defects.
- .3 Install standing and running trims continuous for all cased openings. Install longest practical lengths for situations exceeding 3600 mm.
- .4 Set exposed nails and fill with colour-matched fill for final finish. Sand filler smooth.
- .5 Apply adhesive and mechanical fasteners to joints.
- .6 Butt-join casing as illustrated on drawings.

3.5 PANELLING: WALL AND CEILING COVERING:

- .1 Apply wall coverings to walls as shown on drawings using adhesive and tack nails. Fill nail holes caused by temporary fixing with filler matching wood in colour. Secure panelling and perimeter trim using concealed fasteners. Secure panelling and perimeter trim using counter sunk screws plugged with matching wood plugs as indicated on drawings.
- .2 Ensure that solid wood items are back-primed in all cases or sealed with clear sealer.
- .3 Ensure that blocking is installed in walls where panels and trims will be applied.
- .4 Apply running and standing trims associated with wall coverings in accordance with standing and running trim installation notes above.
- .5 Painted components site finished may be repaired and filled for touch up primer prior to final painting if approved by consultant.

3.6 GROOVED WOOD PANELS

- .1 Installation shall occur after materials have been acclimatized for a minimum of 72 hours in the building with climate-controlled to be between 60 - 90 degrees Fahrenheit (15.5 - 32 degrees Celsius), only.
- .2 Humidity in the Place of the Work shall meet the optimum moisture content and relative humidity requirements of 25% to 55% as per North American Architectural Woodwork Standards.
- .3 Wood panels must be handled and installed by persons wearing clean light-weight gloves.
- .4 A reasonable percentage of extra wood panels and clips shall be furnished if specified with protective covering for storage

- .5 Warranty: Manufacturer shall provide Owner with a (1) year warranty against any manufacturing defect excluding abnormal site conditions, wood stain discoloring due to the age for all the installed material described in this specification from the final acceptance of completed work.
- .6 Preparation and Installation:
 - .1 Installation shall not begin until all substrates and the ceiling layout are properly prepared to conform with reflected ceiling plans and approved shop drawings.
 - .2 It is the contractor's responsibility to provide required support to install the panels without interference with other elements and perimeters.
 - .3 The workspace must be fully enclosed to maintain the ambient environment as described above.
 - .4 The suspension system installation and engaging the wood panels must comply with all local codes and regulations, manufacturer's installation instructions.

3.7 HARDWOOD VENEER AND TRIM:

- .1 Maple species for veneer and hardwood solids.
- .2 Review drawings for locations of panels, trims and grooved wood panels.
- .3 Apply blocking and nailing strips to build-out surfaces to smooth and plumb condition.
- .4 Grooved panel and hardwood veneered panel materials require hardwood edging. Fit edgings true and plumb and as illustrated on drawings. Form mitred joints neatly and glue and fasten with pin nails.

3.8 WINDOW JAMB AND SILL FINISH – DETAILED REQUIREMENTS

- .1 Jamb panel meeting side, head and sill of window shall be 19 mm thick plywood with primed and painted birch veneer faces. Apply Poplar or Birch or other hardwood edge, continuous on plywood panel edge.
- .2 Refer to drawings for details.

3.9 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 Cleaning.
 - .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 11.

3.10 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by finish carpentry installation.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 06 20 00 Finish and Fine Carpentry
- .3 Section 06 61 16 Solid Surfacing
- .4 Section 07 92 00 Joint Sealants
- .5 Section 08 35 00 Glass Sliding Grille
- .6 Section 09 21 16 Gypsum Board Assemblies
- .7 Section 09 31 00 Ceramic Tile
- .8 Section 09 65 19 Vinyl Tile and Plank Flooring
- .9 Section 09 91 23 Interior Painting
- .10 Section 10 26 00 Wall Protection, Corner Guards

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A208.1, Particleboard.
- .2 ANSI A208.2, Medium Density Fibreboard (MDF) for Interior Applications.
 - .1 ANSI A208.2, Medium Density Fibreboard (MDF) for Interior Applications.
 - .2 ANSI/HPVA HP-1, American National Standard for Hardwood and Decorative Plywood.
- .3 American Society for Testing Materials (ASTM):
 - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM D1761, Standard Test Methods for Mechanical Fasteners in Wood.
 - .3 ASTM D5456, Standard Specification for Evaluation of Structural Composite Lumber Products.
 - .4 ASTM D2832, Standard Guide for Determining Volatile and Non-volatile Content of Paint and Related Coatings.
 - .5 ASTM D5116, Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.
 - .6 ASTM E1333, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber.
 - .7 ASTM D2369-10e1, Standard Test Method for Volatile Content of Coatings.
 - .8 ASTM E1333, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber.
- .4 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI):
 - .1 Architectural Woodwork Standard (AWS), First Edition, 2009.
- .5 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-11.3-M, Hardboard.
 - .2 CAN/CGSB-71.20-M, Adhesive, Contact, Brushable.
- .6 Canadian Standards Association (CSA):
 - .1 CSA B111, Wire Nails, Spikes and Staples.
 - .2 CSA O112.10-08, Evaluation of Adhesives for Structural Wood Products (Limited Moisture Exposure).

- .3 CSA O121, Douglas Fir Plywood.
- .4 CSA O141, Softwood Lumber.
- .5 CSA O151, Canadian Softwood Plywood.
- .6 CSA O153-M, Poplar Plywood.
- .7 CAN/CSA-Z809, Sustainable Forest Management.
- .7 Forest Stewardship Council (FSC):
 - .1 FSC-STD-01-001, FSC Principle and Criteria for Forest Stewardship.
- .8 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .9 International Organization for Standardization (ISO)
 - .1 ISO 14040, Environmental Management-Life Cycle Assessment - Principles and Framework.
 - .2 ISO 14041, Environmental Management-Life Cycle Assessment - Goal and Scope Definition and Inventory Analysis.
- .10 National Electrical Manufacturers Association (NEMA)
 - .1 ANSI/NEMA LD-3-05, High-Pressure Decorative Laminates (HPDL).
- .11 National Hardwood Lumber Association (NHLA), Rules for the Measurement and Inspection of Hardwood and Cypress 2011.
- .12 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2010.
- .13 Sustainable Forestry Initiative (SFI)
 - .1 SFI-2010-2014 Standard.
- .14 Underwriters Laboratory of Canada (ULC):
 - .1 CAN/ULC S101: Standard Methods of Fire Endurance Tests of Building Construction and Materials
 - .2 CAN/ULC S102: Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
 - .3 CAN/ULC-S104-10, Standard Method for Fire Tests of Door Assemblies.
 - .4 CAN/ULC-S105-09, Standard Specification for Fire Door Frames.

1.3 WORK INCLUDED - SUMMARY:

- .1 Supply and installation of countertops and transaction tops shown on drawings.
- .2 Supply and installation of materials and labour necessary to construct and install cabinets, millwork doors and closures and shelving units when not provided under Section 06 20 00 Finish and Fin Carpentry.
- .3 Hardware exposed to view and semi-exposed and associated with any element within the scope of this section shall be supplied and installed by this Section and shall not be a part of any cash or contingency allowance.
- .4 Hardware, fasteners and adhesives used in joinery and fabrication or installation whether concealed from view or used for mounting of elements supplied or installed or both for the Scope of work in this section.
- .5 This section shall supply all structural or reinforcement metal components including metal legs, trims, tubular steel sections, brackets, supports, etc. and all of their related connectors and fabrications for metal connected to millwork and used to support surfaces or to connect panels to surfaces including edge reinforcement for washroom counter tops.
- .6 Prepare cabinets with solid surfacing materials for quartz countertop installation:

- .1 Perimeter Frame: Solid quartz material must be supported on a strong perimeter frame. Structural support is required to support the weight of solid quartz material and any external loads. 3/4" (19mm) thick plywood support material must be used.
- .2 Supporting Seams: Solid quartz material seams require structural support. The structural support needs to be flush with the supporting substructure. 19mm Plywood support material must be used.

1.4 SUBMITTALS

- .1 Provide information in accordance with Section 01 33 00.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for plywood, particleboard, HDF, Hardboard, MDF, high-pressure and low-pressure laminates, thermally fused melamine, and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Provide product data and catalogue sheets for door and drawer hardware, ballet barre components, Restoration Hardware Scrabble Board,
- .3 Shop Drawings:
 - .1 Field measure existing conditions and prepare Shop Drawings reflecting these for all items included in the work of this Section.
 - .2 Submit Shop Drawings to Consultant prepared in accordance with AWS Manual in digital format.
 - .3 Submit cross-section profiles of all milled shapes.
 - .4 Incorporate plans illustrating multiple levels, elevation views, enlarged details, and section views to illustrate relationship among parts and shapes, dimensions, thickness of all materials, profile of milled components, position of cabinet hardware, special installation situations and changes in materials.
 - .5 Clearly indicate material being supplied and show all connections, attachments, reinforcing, anchorage and location of exposed fastenings.
 - .6 Show direction of grain for:
 - .1 clear finished or stained wood solids and veneers or
 - .2 HDF, MDF, TFL or high-pressure laminates and solid surfacing with grain direction.
 - .7 Show all dimensions incorporating dimensions found on the site. Indicate critical clearances required.
 - .8 Show profile of all shaped elements, edges of all countertops and post-formed countertops.
 - .9 Show edge treatment for all panel materials. Indicate any edge for any panel intended to be left unfinished.
 - .10 Locate hardware items on shop drawings including hinges, door and drawer pulls, special drawers and other cabinet accessories.
- .4 Product literature
 - .1 Submit manufacturer's descriptive literature of specialty items, duplicate samples of each finish to be applied at the factory, all cabinet hardware, duplicate samples of each wood species, for the Owner's approval in accordance with G.C. 4.4 of the General Conditions of the Contract.
 - .2 Provide maintenance information to the Owner for reference and inclusion in the building's Operations and Maintenance Manual.
- .5 Samples:
 - .1 Submit duplicate samples for review and acceptance of each unit.
 - .2 Factory finished products, solid surfacing, HDF, MDF and TFL with factory-finished surfaces, high-pressure plastic laminate finishes and melamine thermally fused finishes:

- .1 Submit duplicate 300 x 300 mm or 300 mm long x width of finish material for countertops, and gables including TFL, high-pressure plastic laminate. Sample will become measure of quality for completed work once accepted.
- .3 Site Finished Materials:
 - .1 Where materials are specified as site finished, provide duplicate samples with finish specified within Section 09 91 23.
 - .2 Provide samples of all standing and running trims and baseboards milled from materials specified on drawings to profiles shown.
- .4 Hardwood Veneer and Hardwood Solids:
 - .1 Submit duplicate samples of hardwood veneers and hardwood lumber to be used in fabrication of architectural woodwork items including milled profiles and specified finishes. Veneer panel samples to be min. 300mm square. Solid Hardwood samples to be minimum 300mm long and match designed width, profile and thickness.
- .5 Door and Drawer Pulls:
 - .1 Provide samples for all exposed hardware items (drawer and door pulls and hinges) including special fasteners.
- .6 Test and Evaluation Reports:
 - .1 submit certified test reports for composite wood panels from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
- .7 Closeout Submittals:
 - .1 Digital and paper copies of Shop Drawings, fixture or hardware technical data sheets for inclusion in maintenance manual.
 - .2 Maintenance and cleaning instructions for all surfaces.
 - .3 Warranty and contact information.

1.5 QUALITY ASSURANCE

- .1 Lumber quality must be identified by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels to CSA and ANSI standards.
- .3 AWS:
 - .1 The Architectural Woodwork Standard set out by the Architectural Woodwork Manufacturer's Association of Canada (AWMAC), Architectural Woodwork Standards 2009, 1st Edition, hereafter referred to as the manual or AWS, shall be used as the reference standard for all work of this section.
 - .2 AWS utilizes specific grades to indicate both the materials and workmanship that shall be reflected in the final product.
 - .3 Lumber, panels, veneers, laminates and other factory-applied finishes, fabrication and assemblies for this section shall be Premium Grade as defined in the AWS Manual and amended or supplemented herein. This section exceeds the AWS Premium Grade requirements.
 - .4 Lumber, panels, veneers, fabrication and assemblies for this section shall be Premium Grade as described herein. The quality standard associated with Premium Grade is defined within the AWS manual and amended and supplemented herein. This section exceeds the AWS Premium Grade requirements in some respects. Where this section exceeds the AWS manual Premium Grade requirements, the requirements of this section govern.
- .4 Exposed to View Definition and Finishing Requirements:

- .5 For case work, Exposed Parts are defined in accordance with AWS Manual, Premium Grade and amended as follows:
- .1 All exposed or semi-exposed edges of TFL or Plastic Laminate finished panels shall be banded with colour matched 3mm PVC.
 - .2 Any component in the line of sight when viewed from any direction and for any mounting height or point of view 400 mm above the finished floor (FF) surface for underside of components and 2200 mm above the FF for top side of components, when viewed from any location within the building shall be considered exposed to view.
 - .3 Countertop finish must be extended along the exposed underside commencing from post-formed or square nose to nearest abutting finished and exposed cabinet surface, face frame or gable panel. This finish may be accomplished using an additional panel finished in plastic laminate and applied to the exposed underside of the countertop.
 - .4 Where any component is not referenced with respect to exposure or grade, it shall be defined as a Premium Grade component as referenced within the manual and for its appropriate use or classification or definition.
 - .5 Assembly of cabinets shall be performed to fill voids created at the intersection of any two adjacent cabinet cases when they meet at an angle lesser than 180 degrees. These voids shall be filled with panel material on the top side of the cabinets and at the underside of wall mounted cabinets.
 - .6 Exposed Parts include visible surfaces of installed casework with doors and drawers closed, including under side of cabinets mounted 400mm or more above finished floor (FF) and topside of cabinets or shelving units mounted 2135mm above the FF or lower, together with the bottom surfaces of intersecting cabinets mounted 400mm above FF or higher.
 - .7 Provide filler panels at intersection of all casework for upper and lower cabinets and treat underside of cabinets mounted 400mm or more above FF as exposed to view. Fillers shall cover voids formed by intersecting casework whether at the top or bottom or underside of casework when they are considered exposed to view as defined within this specification.
 - .8 Exposed surfaces shall also include:
 - .1 Faces of open cabinets without doors or drawers and their shelves regardless of mounting height;
 - .2 Exterior surfaces of base cabinets and wall cabinets with drawers and doors closed regardless of mounting height, including gable panel edges when they are in contact with the floor or any distance above the FF;
 - .3 Exterior bottoms of upper and wall mounted cabinet shelves and the underside of countertops mounted 400 mm or more above FF;
 - .4 Surfaces that may be visible from above including the top of any cabinet, casework or shelving mounted 2135mm above FF or lower;
 - .5 The underside of all millwork, **countertops**, casework or shelving mounted 400mm above FF or higher whether part of a larger casework assembly or independent. For washroom countertops with valances, the leading edge of the underside of the counter is exposed to view between the edge of the counter top and the face of the valence. Countertops without valances are considered exposed to view for 100mm measured from the leading edge toward a wall surface unless otherwise noted on drawings.
 - .6 Base cabinet toe kick vertical surface is considered exposed to view.
- .6 For casework, Concealed Parts are:
- .1 Non-visible parts of installed casework whether doors and drawers are open or closed.
- .7 For Casework, semi-exposed parts are:
- .1 Interior surfaces of cabinets and drawers visible when drawers and doors are open.
- .8 Finish for Semi-Exposed Parts - For cabinets with doors and drawers:

- .1 Interior vertical surfaces of gables, interior faces of upper and lower cabinet bases and upper and lower cabinet shelves:
 - .1 NEMA LQ1 Melamine decorative panels, 20mm thick.
- .9 Compatibility of grains and colour of wood materials shall be evaluated as follows:
 - .1 Compatibility of grains between adjacent pre-finished or laminated panels, shall be such that at the joints, the grain shall continue and appear contiguous to adjoining materials including where corners intersect such that the grain pattern continues across continuous lengths of the same material. Do not change orientation of grain pattern from direction illustrated on Reviewed Shop Drawing.
- .10 Moisture Content: For custom and premium grades of lumber, the following moisture content values apply at time of installation:
 - .1 6% optimal with range of 5%-8% acceptable.
- .11 Mock-ups:
 - .1 Administration of mock-ups shall be in accordance with Section 01 45 00.
 - .1 Fabricate, finish and deliver to site, one base cabinet unit, one wall cabinet, associated countertop, complete with hardware shop applied finish and install where sample unit is shown on drawings.
 - .2 Fabricate and install one solid surfacing countertop.
 - .2 Allow 48 hours for inspection of mock-up by Consultant before proceeding with balance of the Work. Review process as follows:
 - .1 Do not proceed with work prior to receipt of Consultant's written acceptance of mock-up.
 - .2 Mock-up may remain as part of finished work if accepted. Remove mock-up if modifications are required or if mock-up is rejected.
 - .3 If modifications are required, complete same and re-install mock-up for review.
 - .3 When accepted, mock-up will demonstrate minimum standard for Work.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 60 00.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address; maintain corner protection in packaging until installation.
- .3 Provide protective coverings of suitable material for all finish carpentry elements and factory finished panels with special emphasis on plastic laminate or melamine items. Ship materials with special precautions (cardboard or bubble wrap or equal) at corners.
- .4 Store plastic laminated items, finish carpentry items and millwork in temperature and humidity-controlled area until delivery.
- .5 Do not permit delivery of cabinets, millwork or countertops to Site until area is sufficiently dry and free of dust, wet paint or flooring installation so that woodwork will not be damaged by excessive changes in humidity.
- .6 Replace defective or damaged materials with new.
- .7 Develop Construction Waste Management Plan related to Work of this section.
- .8 Packaging Waste Management: remove for reuse and return to supplier, pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan. Packaging not returned to supplier shall be recycled where facilities exist.

1.7 WARRANTY

- .1 Warrant work of this section against defects and deficiencies in accordance with General Conditions of the Contract. Promptly make good defects and deficiencies that become apparent within warranty period to satisfaction of Owner's Designee and at no expense to Owner. Defects and deficiencies include but are not limited to delaminating of any laminated finish including plastic laminate or melamine work

or veneers, chips, checks and warping, checking, splitting or twisting of millwork and fine carpentry items, bubbling or delaminating of veneers.

Part 2 Products

2.1 MATERIALS

- .1 Softwood lumber for fitment framing: unless specified otherwise, S4S, moisture content 10% or lower in accordance with following standards:
 - .1 CSA O141.
 - .2 CAN/CSA-Z809 or FSC or SFI certified.
 - .3 NLGA Standard Grading Rules for Canadian Lumber.
 - .4 AWS custom grade, moisture content as specified. Pine, 117c. "C Select".
- .2 Machine stress-rated lumber is acceptable for all fitment framing purposes.
- .3 Ensure manufacturing process adheres to Lifecycle Assessment (LCA) Standards to ISO 14040/14041 LCA Standards, CSA Z760-94 Life Cycle Assessment.
- .4 Hardwood lumber: moisture content 6% or lower in accordance with following standards:
 - .1 National Hardwood Lumber Association (NHLA).
 - .2 CAN/CSA-Z809 or FSC or SFI certified.
 - .3 AWS premium grade, moisture content as specified. Species noted on Drawings, edge grain, dry, sound lumber selected for grain and colour and to eliminate all but the slightest inherent minor blemishes. All pieces shall be smoothly machined with all surfaces smoothly sanded. This grade is used for stained and transparent finish.
- .5 Douglas fir plywood (DFP): to CSA O121, standard construction, "A" grade faces both sides and to meet or exceed CAN/CSA-Z809 or FSC or SFI certified.
 - .1 Plywood resin to contain no added urea-formaldehyde.
- .6 Canadian softwood plywood (CSP): to CSA O151, standard construction, CAN/CSA-Z809 or FSC or SFI certified, "A" grade faces both sides.
 - .1 Plywood resin to contain no added urea-formaldehyde.
- .7 Poplar plywood (PP): to CSA O153, standard construction, CAN/CSA-Z809 or FSC or SFI certified.
 - .1 Plywood resin to contain no added urea-formaldehyde.
- .8 Birch plywood: to AWS Paint Grade, CAN/CSA-Z809 or FSC or SFI certified.
 - .1 Plywood resin to contain no added urea-formaldehyde.
- .9 Hardwood veneer on plywood core: to ANSI/HPVA HP-1, CAN/CSA-Z809 or FSC or SFI certified. MDF or Particle Board Core or non-telegraphing hardwood plywood manufactured with exterior glue to suit intended use as stipulated in the manual.
 - .1 AWS Premium Grade for all hardwood veneered plywood core panels.
 - .2 Clear and Stain Finished: slip matched maple veneer where noted as hardwood veneer or hardwood on drawings using quarter sliced method.
 - .3 Unexposed faces or faces finished with opaque materials: Sound Grade (SO) Birch Veneer, all belt sanded.
 - .4 Plywood resin to contain no added urea-formaldehyde.
- .10 Fibreboard must contain less than 10% roundwood by weight, using weighted average over a three-month period at manufacturing locations.
 - .1 Fibreboard resin to contain no added urea-formaldehyde.
 - .2 CAN/CSA-Z809 or FSC or SFI certified.

.11 Hardboard (HDF):

- .1 To CAN/CGSB-11.3, CAN/CSA-Z809 or FSC or SFI certified.
- .2 Hardboard resin to contain no added urea-formaldehyde.

.12 MDF (medium density fibreboard) core: to ANSI A208.2, 20 mm thick, density 769 kg/m², CAN/CSA-Z809 or FSC or SFI certified.

- .1 Medium density fibreboard performance requirements to: ANSI A208.2.
- .2 MDF resin to contain no added urea-formaldehyde.

.13 Thermally Fused Laminate (TFL):

- .1 Thermally Fused Melamine (TFL): to NEMA LD3 Grade VGL.
- .2 High wear resistant thermally fused melamine: equal or exceed 400 cycles (Minimum standard for HPL abrasion test).
- .3 Acceptable TFL Materials and Cores:
 - .1 **Uniboard TFL Panels:**
 - .1 Finishes selected by architect from full range of Standard and Signature Finishes (14 choices).
 - .2 Consultant will select colour and pattern from 134 choices including Abstract, Solids and Woodgrain decor.
 - .2 **Panolam:**
 - .1 Colours selected by architect from full range of Nevamar and Pionite 2Be collections.
 - .2 Architect will select colour and pattern from 134 choices including Abstract, Solids and Woodgrain decor.

.14 High Pressure Plastic Laminate Finish - Countertops:

- .1 Meet or exceed the following standards:
 - .1 General Purpose Grade: HGS complying with NEMA LD3.
 - .2 Horizontal Grade: HGL complying with NEMA LD3.
 - .3 Horizontal Forming Grade: HGP complying with NEMA LD3.
 - .4 Vertical Forming Grade: VGP complying with NEMA LD3.
 - .5 Sheet Thickness: selected from manufacturer's standard thicknesses.
 - .1 HGS 0.048 (1.2 mm);
 - .2 HGL 0.039 inches (1.0 mm);
 - .3 HGP 0.039 inches (1.0 mm);
 - .4 VGP 0.028 inches (0.7 mm).
 - .6 Sheet Width: selected from manufacturer's standard widths of 30 inches (762 mm), 36 inches (914 mm), 48 inches (1219 mm), and 60 inches (1524 mm).
 - .7 Sheet Length: selected from manufacturer's standard lengths of 96 inches (2438 mm), 120 inches (3048 mm) and 144 inches (3658 mm).
 - .8 Color and Texture: selected by architect from manufacturer's full range; no metallic finishes will be selected.
 - .9 Adhesive: Types as recommended by manufacturer.
- .2 Backer sheet: phenolic laminate, thickness to match face laminate thickness; black or brown colour, sanded one side.
- .3 Acceptable High Pressure Laminates – full range of colours and surface finishes:
 - .1 Formica
 - .2 Arborite.
 - .3 Pionite.
 - .4 Nevamar.

.15 Laminated plastic adhesive:

- .1 Adhesive: urea resin adhesive to CSA O112.10, or contact adhesive to CAN/CGSB-71.20 or resorcinol resin adhesive to CSA O112.10 or polyvinyl adhesive to CSA O112.10 or two component epoxy thermosetting adhesive.

.16 Particle Board Core Material for High Pressure Laminate and TFL:

- .1 Vertical gables associated with any millwork or cabinet construction.
- .2 Grade M-2- 620-670 kg/m³ density
- .3 Comply with Lacey Act Requirements 16 U.S.C.3372(f);
- .4 Formaldehyde Emission Requirements: ≤ 0.09 ppm (CARB Phase 2);
- .5 Recycled Content is 100 percent post industrial recovered and recycled wood fiber;
- .6 Panel thickness:
- .7 Panel dimensions: 1245mm X 2464mm (4' x 8') and 1549mm X 3073mm (5' x 12')
- .8 Particleboard panels FSC certified.
- .9 **WARNING:** Particleboard may release formaldehyde in low concentrations. Formaldehyde can cause temporary eye and respiratory irritation and may aggravate respiratory conditions or allergies. Proper ventilation will reduce the risk of such problems.

2.2 3MM THICK, PVC EDGE BANDS OR BANDING MATERIAL:

- .1 3mm thick, PVC edge bands are required to finish the edges exposed to view on all panel material to which a face finish consisting of any laminated product including, but not limited to, high-pressure laminate (Plastic Laminate), TFL (thermally fused melamine) or any faux wood laminated depiction of wood veneer is applied.
- .2 3mm thick PVC edge bands shall be **Rehau** or equivalent, Flat T-moulding, 3 mm thickness, colour matched to face of panel material being banded.
- .3 Use 3mm thick, PVC edge bands on any panels with exposed edges, or where drawer or door front finished with laminated finish have an exposed edge.
- .4 **No** thin melamine or PVC or plastic laminate or "tape" edge bands permitted.

2.3 SOLID SURFACING:

- .1 Refer to Section 06 61 16 Solid Surfacing.
 - .1 Perimeter Frame: Solid quartz material must be supported on a strong perimeter frame. Structural support is required to support the weight of solid quartz material and any external loads. 3/4" (19mm) thick plywood support material must be used.
 - .2 Supporting Seams: Solid quartz material seams require structural support. The structural support needs to be flush with the supporting substructure. 19mm Plywood support material must be used.

2.4 FINISH HARDWARE:

- .1 This section shall supply and install all finish hardware required for millwork items in the Contract Price.
- .2 This section shall supply and install all finish hardware required for millwork items in the Contract Price and not the hardware allowance. Items listed do not constitute the full hardware requirement but rather itemize design choices made by the Consultant. Provide finished and rough hardware indicated for the millwork shown whether indicated in this section or not.
- .3 **Drawer Slides:** Richelieu Accuride Self-Closing Eclipse Slide, full extension, T3132SC2G24, under-mount slide, self-closing, full extension slide.
- .4 **Cabinet Door Hinges:** Acceptable materials: Richelieu 170 deg. Clip Hinge.
- .5 **Drawer and Door Pulls:** Richelieu Modern Metal Pull - Model 8160, 160 mm c/c for drawer fronts; 192 mm c/c for door fronts. Width shall be 17 mm. Finish selected by architect from standard range of 8.

- .6 **Pilasters and Shelf Clips:** zinc finish pilaster Richelieu 4255X6BC and clip 6216256R2G for adjustable shelves or reviewed alternate equivalent.
- .7 **Continuous Hinge:** Utilize for folding grille storage compartment door. Richelieu Product Number 78022618310, 226HD series, commercial-grade hinge, anodized aluminum 6063-T6. Satin aluminum finish, concealed mounting.
- .8 **Coat Shelf Bracket:**
 - .1 Richelieu Heavy Duty "L" Bracket, 5 mm gauge, no. 208400, 16" long. Field spray paint black.
- .9 **Coat Shelf Rod:**
 - .1 Richelieu 122.108-140 or 122.112-140 as required, 1 1/16" diameter, chromed steel rod. Provide closed end flange at all terminations against vertical surfaces and 37030-140 central flange at mid span rod joints and each 48" on centre maximum span.
- .10 **Euro-Cargo recycling Centre:**
 - .1 Drawer Unit: Richelieu 461450100 soft-closing.
 - .2 Provide one such unit within each of Council Office 035, Executive Boardroom 037 and Coffee 000.

2.5 ACCESSORIES

- .1 Nails and staples: to CSA B111; galvanized to ASTM A123/A123M for exterior work. Interior humid areas and where specified; stainless steel.
- .2 Wood screws: type and size to suit application.
- .3 Splines: wood, plastic or metal.
- .4 Adhesive and Sealants: in accordance with Section 07 92 00.

2.6 EXPOSURES

- .1 For case work, Exposed Parts are defined in accordance with AWS Manual, Premium Grade and amended as follows:
 - .1 The underside of **countertops and transaction top** mounted 400 mm above FF or higher whether part of a larger casework assembly or independent, the leading edge of the underside of the counter is exposed to view between the edge of the counter top and the face of any valence. Countertops without valences are considered exposed to view for 100mm measured from the leading edge toward a wall surface unless otherwise noted on drawings.
- .2 **All exposed or semi-exposed edges of panels (MDF, HDF, Plywood, Hardboard or Particleboard) finished with laminated surfaces (TFL and plastic laminate - HP laminate or similar) finished panels shall be banded with colour matched 3mm thick, PVC edge bands.**

2.7 MANUFACTURED UNITS – FABRICATION GENERAL

- .1 Fabricate work in accordance with best practice by skilled craftsmen of companies specialising in work specified and to requirements of other trades. Each item shall be as indicated on Drawings and as detailed on Shop Drawings.
- .2 Use running members in greatest lengths obtainable.
- .3 Machine dressed work shall be slow fed using sharp cutter and finished members shall be free from drag, feathers, slivers or roughness of any kind. Remove machine marks by sanding.
- .4 In finished work, machine sand exposed surfaces in shop and hand sand to even smooth surfaces, free from scratches, ready for finishing.
- .5 Frame materials with tight joints rigidly held in place. Use glue blocks where necessary.
- .6 Assemble work in shop as much as is practical and deliver to site ready for installation. Leave ample allowance for fitting and scribing on site.
- .7 Take care to prevent opening up of glue lines in finished work.
- .8 Design construction methods for expansion and contraction of material.

- .9 Conceal joints and connections wherever possible. Locate prominent joints where directed by Consultant. Intermediate joints between supports not permitted.
- .10 Mortise and tenon joints shall be glued and pinned.
- .11 Joints made on Site shall be equal in quality and workmanship to joints made in shop.
- .12 All edges of plywood, HDF, MDF and particleboard shall have PVC edge bands colour-matched to surfaces or solid hardwood concealing edges and in accordance with exposure. Glue banded edging using hot press high frequency gluing process. Do not use nails.**
- .13 Glue, blind screw or blind nail all work unless otherwise specified.
- .14 Accurately scribe, cope and mitre members where required.
- .15 Finished woodwork shall be free from bruises, blemishes, mineral marks, knots, shakes and other defects and shall be selected for colour, grain and texture.
- .16 Be responsible for methods of fabrication and for ensuring that materials are rigidly and securely attached and will not be loosened by installation of items on Site or by work of other trades.
- .17 Take field dimensions and fabricate work to suit field dimensions.
- .18 Do not permit delivery of this work to Site until area is sufficiently dry so that woodwork will not be damaged by excessive changes in moisture content.
- .19 Check access clearance at Site before assembling large units or components in factory for shipment to work.
- .20 Provide blocking coming in direct contact with millwork in accordance with applicable provision specified.
- .21 Glues shall be waterproof and of type suitable for work to be joined.
- .22 Moisture content of interior woodwork shall be not less than 4% or more than 8%.
- .23 Refer to glue manufacturer's recommendations for lumber moisture content, glue shelf life, pot life, working life, mixing, spreading, assembly time, time under pressure and ambient temperature.
- .24 Factory drill holes for hardware. Check fit, adjustment, etc., prior to finishing cabinets. Remove hardware as required for finishing.
- .25 Acceptable joints:
 - .1 rabbet, dado, splined with biscuit, doweled, assembled with RTA fasteners.
- .26 Unacceptable Joints:
 - .1 Butt joints unless assembled with biscuits, dowels, etc. intended to support loads imposed.
 - .2 Use of wood screws, nails or staples unless used in conjunction with one of the acceptable joint methods.
 - .3 RTA fasteners exposed in open cabinets and shelves. RTA fasteners are acceptable in semi-exposed conditions.
- .27 Hardware shall be factory installed. Hardware may be removed for shipping, but all drilling must be completed in factory and test-fitted to hardware.

2.8 CASEWORK ASSEMBLIES:

- .1 Fabricate caseworks to AWS premium quality grade.
- .2 Furring, blocking, nailing strips, grounds and rough bucks and sleepers.
 - .1 S4S SPF species, all uses.
 - .2 Board sizes: "standard" or better grade.
 - .3 Dimension sizes: "standard" light framing or better grade.
 - .4 Free of added Urea-formaldehyde.
- .3 Framing:

- .1 Birch, maple, oak hardwood species.
- .2 Provide framed toe kick for front of cabinet with continuous solid blocking installed for entire face length of toe kick exposed to view.
- .3 Provide framing below countertop to connect gable panels across top of cabinets with doors and drawers and to serve as connection point for countertop.
- .4 Provide framing above gable end panels to enable connection of countertop to base cabinets.
- .5 Connect adjustable levelling glides on bottom of base cabinet frame.
- .4 Case bodies (interior face of exposed gable ends, interior ends semi-exposed divisions and bottoms):
 - .1 Particle board core, TFL faces, both side, interior of cabinet white.
 - .2 Backs:
 - .1 Particle board core, TFL faces, both side, interior of cabinet white.
 - .3 Shelving:
 - .1 Particle board core, TFL faces, both sides, both sides white for semi-exposed condition within cabinets. White.
 - .2 Edge banding: provide 3 mm PVC "T" moulding adhered in kerf joint in shelf; colour of edge band to match melamine colour on face of shelves.
- .4 Casework base cabinet legs: adjustable with respect to height to permit levelling, purpose made as base cabinet legs.
- .5 Base Cabinet Toe Kick: fabricated of TFL panel fixed to base cabinet framing
- .6 Interior of TFL cabinet backs to be minimum 15.7mm thick MDF or particle board core.

2.9 DRAWERS

- .1 Fabricate drawers to AWS premium grade supplemented as follows:
 - .1 Sides and Backs.
 - .1 Softwood and poplar plywood DFP or CSP or PP "A" grade both faces, square edge, 10 mm thick.
 - .2 TFL finish.
 - .3 3mm edge band on top edges of drawer sides.
 - .2 Bottoms:
 - .1 Softwood and poplar plywood DFP or CSP or PP birch veneer, square edge, 8 mm thick.
 - .3 Alternate fabrication for drawer box sides, back and bottom:
 - .1 Metal box purpose made as drawer unit, prefinished steel or aluminum with paint finish. Built-in slides shall be full extension.
 - .4 Drawer Fronts – Framed, flat, flush panel design:
 - .1 Fabricate doors to AWS premium grade supplemented as follows:
 - .1 For TFL or plastic laminate finish on particle board core or hardwood veneer finish on plywood core: panel, flush design:
 - .1 For TFL or High-pressure Plastic Laminate finish, provide 3mm thick PVC edges colour-matched to finish on the drawer front face panel; on 20 mm thick particle board core.
 - .2 For hardwood veneer on 19 mm thick plywood core, provide solid, milled hardwood edging to match door face veneer.
 - .2 Pre-drill for pull hardware.

2.10 CASEWORK DOORS – FLUSH PANEL DESIGN:

- .1 Fabricate doors to AWS premium grade supplemented as follows:
 - .1 For TFL or plastic laminate finish on particle board core or for hardwood veneer finish on plywood core: panel, flush design:

- .1 For TFL or high-pressure plastic laminate finish, provide 3mm thick PVC edges colour-matched to door face panel on 20 mm thick particle board core.
- .2 For hardwood veneer finish applied on 19 mm thick plywood core, provide solid, milled hardwood edging to match door face veneer.
- .2 Pre-drill for pull hardware.

2.11 CASEWORK FABRICATION

- .1 Set nails and countersink screws apply stained wood filler to indentations, sand smooth and leave ready to receive finish.
- .2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .3 Shelving to cabinetwork to be adjustable unless otherwise noted.
- .4 Provide cut outs for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- .6 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .7 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .8 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 2400 mm. Keep joints 600 mm from sink cut outs.
- .9 Form shaped profiles and bends as indicated, using post forming grade laminate to laminate manufacturer's instructions.
- .10 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.
- .11 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .12 Apply laminated plastic liner sheet to interior of cabinetry.

2.12 PVC EDGE BANDS:

- .1 Acceptable for all panels described above using 3mm thick, PVC edge bands in all cases. Do not use on panels finished with natural hardwood veneer.
- .2 Use solid hardwood edges 6mm thick using wood species matching face veneer for natural hardwood veneer finished panels.
- .3 Edge band materials with thickness greater than 12.7 mm (1/2").
- .4 Butt joint corners of edge bands.
- .5 Edge band front edge of shelves where semi exposed and front and two sides where adjustable.
- .6 Edge band three sides of TFL shelves in open shelving units (no gables) using 3mm PVC edge bands in all cases.

2.13 FINISHING - CABINETS

- .1 Site Finish incidental work such as semi-concealed blocking components in accordance with Section 09 91 23 where noted on drawings. No cabinet or case work shall be site finished.
- .2 Hardwood Cabinets Factory Finish System to be AWS 12: wash coat of reduced vinyl sealer, sealer, sanding with 220-grit paper, 2 topcoats polyurethane finish. All parts of factory finished cabinets shall be finished with the same finish system and colour.
 - .1 Finish Characteristics: Sanding sealer with clear or opaque topcoat with satin sheen.

2.14 HIGH PRESSURE LAMINATE FINISH FOR COUNTERTOPS

- .1 All countertop and transaction tops shall have high pressure laminate finish.
- .2 Comply with NEMA LD3, Annex A.
- .3 Post-formed shapes and square edge shapes shown on drawings.
- .4 Finish underside of countertop from leading edge back to face of finished cabinet.
- .5 Verify dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .6 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .7 Adhere 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 2400mm. Keep joints 600 mm from sinks.
- .8 Form shaped profiles and bends using postforming grade laminate formed and adhered to particleboard core in accordance with laminate manufacturer's instructions.
- .9 For square edged shapes or core stock, 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.
- .10 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .11 Apply laminated plastic finish to exposed core on underside of countertops materials exposed to view.

Part 3 Execution

3.1 SHOP DRAWINGS:

- .1 Field measure existing conditions and prepare Shop Drawings reflecting the conditions, assemblies and dimensions found. Proceed with fabrication following receipt of reviewed Shop Drawings showing "reviewed as noted" or "reviewed" marks provided by Consultant.
- .2 Blocking, Furring and Rough Framing:
 - .1 Coordinate blocking, framing and other support required in metal stud walls with Section 06 10 00. This section is responsible for ensuring that all required blocking is installed.

3.2 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other sections or Contracts are acceptable for architectural woodwork installation in accordance with manufacturer's instructions.
- .2 Attend site and review locations for all work and seek clarification regarding conditions that would not result in intended effect.
- .3 Inform Contractor and Consultant of unacceptable conditions immediately upon discovery.
- .4 Proceed with installation following correction of unacceptable conditions and subsequent receipt of Consultant's written authorization to proceed.
- .5 Confirm presence of required blocking and backing for all work.

3.3 INSTALLATION - GENERAL

- .1 Install architectural cabinetry, countertops and woodwork to meet or exceed AWS Premium Grade installation standard.
- .2 Install work in configuration shown on drawings. Millwork components fabricated remain the property of the Owner whether installed or not in the final project. Do not remove unused components from the site unless directed to do so by Owner.

- .3 Take delivery of units shop fabricated and ensure components are not damaged. Reject damaged work and order repairs as required prior to final installation of millwork. Store millwork as indicated above, packing remains in place until millwork installation is ready.
- .4 Apply bituminous coating over wood or panel framing members not protected by PVC edge bands when these are in contact with masonry or cementitious construction.
- .5 Fasten all wood nailers, blocking, framing and strapping solidly to adjacent materials in true planes.
- .6 Joints made on Site shall be equal in quality and workmanship to joints made in shop.
- .7 Blocking, Furring and Rough Framing: Coordinate all blocking, framing and other support required in metal stud walls with Section 06 10 00. This section is responsible for ensuring that all required blocking is installed.
- .8 Erect work plumb, level, square and to required lines.
- .9 Be responsible for methods of installation and for ensuring that items and materials are rigidly and securely attached and will not be loosened by work of other trades.
- .10 Review plumbing, electrical and service cut out requirements on site. This section shall cut out panels of cabinets, sink openings and electrical device box accesses. Cut outs shall be in accordance with device or fixture manufacturer templates and fit tightly to rough-in service material. Ensure that escutcheon plates proposed for plumbing will cover cut outs.
- .11 Install sealant colour-matched to plastic laminate at wall and countertop juncture.
- .12 Complete required fillers scribed to adjacent components, all sealant, finishing, etc. to match adjacent areas when final installation is in place.
- .13 When installing items not shop assembled, distribute to best overall advantage defects allowed in quality grade specified.
- .14 Fasten and anchor millwork securely.
 - .1 Supply and install heavy duty fixture attachments for wall mounted items.
- .15 Use draw bolts in countertop joints.
- .16 At junction of plastic laminate counter and adjacent wall finish, apply small bead of sealant in accordance with Section 07 92 00.
- .17 Fit hardware accurately and securely in accordance with manufacturer's written instructions.
- .18 Painted elements site finished may be repaired and filled for touch up primer prior to final painting if approved by consultant.

3.4 ROUGH HARDWARE

- .1 Supply and install rough hardware required to assemble millwork and fix millwork to permanent building components.
- .2 Fasten to hollow units with toggle bolts and to solid masonry or concrete with lead expansion shields and lag screws. No organic fibre or wood plugs shall be used.

3.5 HIGH PRESSURE LAMINATE FINISHED COUNTERTOPS

- .1 Install work plumb, true and square, neatly scribed to adjoining surfaces.
- .2 Make allowances around perimeter where fixed objects pass through or project into laminated plastic work to permit normal movement without restriction.
- .3 Use draw bolts and splines in countertop joints. Maximum spacing 450 mm on centre, 75 mm from edge. Make flush hairline joints.
- .4 Review plumbing, electrical and services requiring penetration through plastic laminate work on site. This section shall perform required cutting of plastic laminate finished panels. Such work may include cutting to create sink openings and electrical device box installations, grommets and kitchen or bathroom accessories including, but not limited to, soap dispensers. Cut outs shall be in accordance with

device or fixture manufacturer templates and fit tightly to rough-in service material. Ensure that escutcheon plates proposed for plumbing will cover cut outs.

- .5 Round internal corners for cut-outs within tolerances of flanges and escutcheons; chamfer edges and seal exposed core.
- .6 At junction of laminated plastic counter back splash and adjacent wall finish, apply small bead of sealant.
- .7 Semi-rigid and rigid adhesives like resorcinol, require a cold or hot press operation at 275kPa (40 psi) for an extended period of time. Use resorcinol for fire rated applications only.
- .8 Site-apply laminated plastic to finish cut units and exposed core or edges resulting from fitting in field. Adhere laminated plastic over entire exposed surface. Make corners with hairline joints. Use full sized laminate sheets. Make joints only where shown on "reviewed" or "reviewed as noted" Shop Drawings. Slightly bevel arises.
- .9 For site application, offset joints in plastic laminate facing from joints in core.

3.6 CLOSET AND ALCOVE SHELVING:

- .1 TFL finish on particle board core, or hardwood veneer on plywood core; as marked on drawings for shelf panel and lower valance panel as described below.
- .2 Plywood or particle board cores are 20mm (¾") thick.
- .3 Apply 3mm thick PVC edge bands on exposed edges of shelf and valance when finish applied to core is TFL or high-pressure plastic laminate.
- .4 Colour of TFL finish or high-pressure plastic laminate finish shall be selected by architect.
- .5 Hardwood maple veneer shall be used where hardwood veneer is specified on drawings. Hardwood solid, milled lumber shall be maple selected to match face finish.
- .6 Wall Cleats:
 - .1 Fix wall cleats to 2-side walls.
 - .2 Finish cleats to match hardwood veneer for plywood core panels and finish cleats to match TFL or plastic laminate finish as applicable.
 - .3 For Particle board cores, apply 3 mm thick PVC edge band to all exposed edges of cleat material.
 - .4 For plywood core with hardwood veneer finish, provide solid hardwood edge bands with finish matching face, to all edges of cleat exposed to view.
- .7 Provide one metal shelf support brackets at 1/2 point of span, fabricated using metal finished with powder coated paint selected to match wall colour paint. This bracket is required for all shelving that spans further than 1220 mm.
- .8 Coat rack shelf edge: 20mm (¾") thickness, dado joint with shelf.
- .9 Provide end and centre gable panels where shown on drawings; finish edges of gables to suit the hardwood or TFL or plastic laminate finish marked on drawings. Use hardwood edges for hardwood veneer and 3mm thick PVC edge bands for TFL or plastic laminate finished structure.
- .10 **Coat Hanging Rod:**
 - .1 Hanging Rod specified within Part 2, Products.
 - .1 Mid span bracket, one required for shelf 1220 mm span or wider, painted custom colour to match wall paint.
- .11 Shelf – cut to length suitable for removal if adjustable or for tight fit to adjacent vertical surfaces if fixed. Two finishes are marked on drawings for shelves and components: TFL or plastic laminate applied to particle board core or hardwood veneer finish applied to plywood core. All cores are 19 mm thick.
- .12 Apply 3 mm thick PVC edge band to TLF and plastic laminate finished cores.
- .13 Shelf depth shall be 400 mm measured 90-degrees from finished back wall of alcove or as shown on drawings.

- .14 Apply nosing detail to closet shelving: 20 mm thick core; 62.7 mm high with either of a 3 mm thick, PVC edge band or a hardwood solid, milled edge band joined to shelf with dado as shown on drawings.
- .15 Install cleats against walls fabricated of 20mm x 89mm square edged poplar material, AWS custom grade, finish described above.
- .16 Install hanging rod for closets with mid-point support on specified bracket if span is 1220 mm or greater.
- .17 Install pilasters and shelf clips for adjustable shelves.
- .18 Open shelving in within any coat alcove will consist of 19 mm (3/4") thick by 400 mm deep shelf panel constructed with TFM finished material or with hardwood veneer applied to plywood core.
- .19 Install heavy duty shelf brackets symmetrically for each span starting at centre for spans exceeding 60".
- .20 Install hanger rod flanged ends and central flange for each joint in rod. Cut and join rods symmetrically across span such that each span does not exceed 48".
- .21 Cover wall cleat fasteners with wood dowel, sanded smooth, finished to match shelf panel.

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .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 11 - Cleaning.
- .3 Clean millwork and cabinet work outside surfaces and inside cupboards and drawers.
- .4 Remove excess glue from surfaces.
- .5 Clean TFL and High Pressure Laminate to NEMA LD3, Annex B.
- .6 Remove traces of primer, caulking, epoxy and filler materials and clean doors and frames.

3.8 PROTECTION

- .1 Cover finished laminated plastic finished surfaces with heavy craft paper or corrugated Standing and running trim:
 - .1 Ensure that Section 06 10 00 has installed all required backing and nailing to support wood trims shown and in particular, trims installed in steel stud partitions.
 - .2 Inspect all site installed trims prior to cutting, shaping or installation and reject pieces exhibiting
 - .2 cardboard with particular attention to protection of exposed corners
 - .3 Protect installed laminated surfaces in accordance with manufacturer's written recommendations.
 - .4 Remove protection only immediately before final inspection.
 - .5 Protect installed products and components from damage during construction. Repair damage to adjacent materials caused by laminate, adhesive, and core materials installation.

END OF SECTION

PART 1 General

1.1 RELATED SECTIONS

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 06 20 00 Finished and Fine Carpentry
- .3 Section 06 41 00 Millwork, Fine Carpentry, Cabinetry and Plastic Laminate
- .4 Section 07 92 00 Joint Sealants
- .5 Section 09 11 00 Steel Stud Wall Framing and Furring
- .6 Section 09 21 16 Gypsum Board Assemblies
- .7 Mechanical Divisions for installation of sinks.

1.2 SECTION INCLUDES

- .1 Field measurement of framing installation.
- .2 Examination of installation circumstances.
- .3 Fabrication of solid surface base, cap and trim to profiles shown on drawings.
- .4 Scribing of materials to fit installation circumstances.
- .5 Post-installation buffing and polishing.

1.3 SUMMARY

- .1 Section Includes: Provide solid surfacing fabrications including but not limited to following:
 - .1 Cabinetry and countertops with solid surfacing finish shown on drawings.
 - .2 Window sills for some windows illustrated on architectural drawings.

1.4 DEFINITION

- .1 Solid Quartz Surfacing:
 - .1 Solid Quartz Surface: Quartz surface materials generally consist of natural quartz particles, reacted monomers and resins, pigments and various performance-enhancing additives manufactured as slabs of various specific calipers. Quartz surface materials are solid, non-porous and homogeneous and exhibit strength, hardness and durability.
- .2 Solid Acrylic Surfacing:
 - .1 Solid homogeneous sheet blended with acrylic resins, ATH mineral fillers, and pigments, color throughout full thickness.

1.5 REFERENCES

- .1 ANSI/NPA A208.2-09 Medium Density Fiberboard (MDF) For Interior applications.
- .2 ASTM C920-14a Standard Specification for Elastomeric Joint Sealants
- .3 ASTM D638-10 Standard Test Method for Tensile Properties of Plastics
- .4 ASTM D785-08 Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials
- .5 ASTM D790-10 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
- .6 ASTM D5420-10 Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact).
- .7 ASTM E84-14 Standard Test Method for Surface Burning Characteristics of Building Materials
- .8 ASTM E228-11 Standard Test Method for Linear Thermal Expansion of Solid Materials with a Push-Rod Dilatometer.
- .9 ASTM G21-13 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- .10 ASTM G22-76(96) Standard Practice for Determining Resistance of Plastics to Bacteria.
- .11 ASTM G155-13 Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials
- .12 CSA B45.5-11/IAPMO Z124-2011 Plastic Plumbing Fixtures

- .13 CSA O115-M82 Hardwood and Decorative Plywood
- .14 NFPA 255-06 Standard Method of Test of Surface Burning Characteristics of Building Materials
- .15 NSF/ANSI 51-07 Food Equipment Materials
- .16 SCAQMD Rule 1168 Adhesive and Sealant Applications (amended January 2005)
- .17 CAN/ULC-S102-07 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
- .18 UL 723 Standard for Test for Surface Burning Characteristics of Building Materials
- .19 UL Environment Standard for Chemical Emissions for Building

1.6 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Fabricator shall employ skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance. A minimum history of 5-years with projects of similar size and complexity is required.

1.7 WARRANTY

- .1 Warranty shall provide material and labour required to repair or fabricate using new materials to replace defective materials, including cost of removal of original material and installation of new material.
- .2 Installer's Warranty: installation of manufacturer's material shall be guaranteed to be without defect for a period of 2-years next following the date of Substantial Performance of the Contract. Defects shall include, but are not limited to, failure of adhesives, delamination of material from substrate, discolouration not caused by use in service, warp or other distortion of the material not caused by use in service, cracking or splitting not caused by use in service.
- .3 Manufacturer Warranty: Provide manufacturer's standard warranty for material only for period of 10 years against defects and deficiencies.
- .4 Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Owner and at no expense to Owner.
- .5 Damage caused by physical or chemical abuse or damage from excessive heat occurring during use by the Owner (during service) of the installed materials will not be warranted.

1.8 SUBMITTALS

- .1 Warranty certificates complete with date of substantial performance of the Work. One certificate shall warrant the product (material) and bear the manufacturer's name. A second warranty certificate shall name the fabricator and installer and provide a warranty for fabrication and installation.
- .2 Shop drawings:
 - .1 Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.
 - .2 Show full-size details, edge details, thermoforming requirements, attachments, etc.
 - .3 Show locations and sizes of furring, blocking, including concealed blocking and reinforcement specified in other Sections.
 - .4 Show locations and sizes of cutouts and holes for devices, utility boxes and fixtures installed in solid surface.
- .3 Verification Samples:
 - .1 For each type of product indicated.
 - .1 Submit minimum 6-inch by 6-inch sample in specified gloss.
 - .2 Cut sample and seam together for representation of inconspicuous seam.
 - .3 Indicate full range of color and pattern variation.

Approved samples will be retained as a standard for work.

- .4 Product data:
 - .1 Indicate product description, fabrication information and compliance with specified performance requirements.
 - .2 Test and Evaluation Reports: Submit flammability test reports confirming compliance with NSF/ANSI 51.
- .5 Maintenance data:
 - .1 Submit manufacturer's care and maintenance data, including repair and cleaning instructions.
 - .2 Maintenance kit for finishes shall be submitted.
 - .3 Include in project closeout documents.
- .6 Mock-Up:
 - .1 Mock-up countertop associated with one part of a reception area cabinet.
 - .2 Notify the architect two weeks in advance of the date of when the mock-up will be delivered.
 - .3 Should mock-up not be approved, re-fabricate and reinstall until approval is secured.
 - .4 Remove rejected units from project site.
 - .5 After approval, the mock-up may not become a part of the project.
 - .6 This mock-up, once approved, shall serve as a standard for judging quality of all completed units of work.
- .7 Maintenance Materials:
 - .1 Provide literature describing use and care of materials including acceptable cleaning agents and practices.

1.9 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01355 - Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, box board corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

1.10 DELIVERY, STORAGE AND HANDLING:

- .1 Deliver no components to project site until areas are ready for installation.
- .2 Store components indoors prior to installation.
- .3 Handle materials to prevent damage to finished surfaces.
- .4 Provide protective coverings to prevent physical damage or staining following installation for duration of project.

PART 2 Products

2.1 MANUFACTURERS

- .1 Subject to compliance with requirements, provide products by one of the following:
 - .1 Corian Quartz by DuPont (formerly known as DuPont Zodiaq Quartz Surface) www.corianquartz.com.
 - .1 Products: Corian Quartz - colour selected by architect from standard range; marked on the drawing as Quartz Solid surface and.

2.2 SOLID SURFACING - CORIAN QUARTZ MATERIAL:

- .1 Generally consisting of natural quartz particles, reacted monomers and resins, pigments and various performance-enhancing additives manufactured as slabs of various specific calipers. Quartz surface materials are solid, non-porous and homogeneous and exhibit strength, hardness and durability; meeting following criteria:

- .1 Flammability: Flame Spread Value (FSV): ≤ 5 and Smoke Development Value (SDV): ≤ 40 when tested to CAN/ULC-S102 for 2 cm (3/4") and FSV: 0 and SDV: ≤ 10 when tested to CAN/ULC-S102 for 3 cm (1-1/4").
- .2 Food Equipment Material Compliance: Food Zone to NSF/ANSI 51.
- .3 Ensure material has minimum physical and performance properties specified under "Performance/Design Criteria".
- .4 Sink/Bowl Mounting Hardware: Manufacturer's approved bowl clips, brass inserts and fasteners for attachment of undermount sinks/bowls.
- .5 Heat Reflecting Tape: Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.
- .6 Insulating Nomex Fabric: Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source.
- .7 Adhesive for Bonding to Other Products: One component silicone to ASTM C920.
- .8 Sealant: A standard mildew-resistant, FDA/UL and NSF/ANSI 51 compliant in Food Zone area, recognized silicone colour-matched sealant or clear silicone sealants.
- .9 Lavatory Tops with Undermount Bowls: 20mm (3/4") thick countertop of solid quartz surfacing material, cast to desired profiles and sizes, having edge details as indicated on Interior Design Drawings conforming to CSA B45.5/IAPMO Z124. Undermount bowl by mechanical sub-contractor. Provide countertops complete with backsplashes of size shown on Drawings. Use undermount hardware according to manufacturer's instructions.
- .2 Components:
 - .1 Reception countertop and transaction top: 2 cm (3/4") thick solid quartz material, adhesively joined with recommended seam widths not greater than 3 mm (1/8") in finished work, edge details as indicated on Architectural Drawings. Colour: selected by architect from standard range.
 - .2 Perimeter Frame: Solid quartz material must be supported on a strong perimeter frame. Structural support is required to support the weight of solid quartz material and any external loads. 3/4" (19mm) thick plywood support material must be used.
 - .3 Supporting Seams: Solid quartz material seams require structural support. The structural support needs to be flush with the supporting substructure. 19mm Plywood support material must be used.
- .3 Fabrication:
 - .1 Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved Shop Drawings and solid quartz manufacturer requirements. Provide factory cutouts for plumbing fittings and bath accessories as indicated on Drawings.
 - .2 Fabricate joints between components using manufacturer's standard joint adhesive.
 - .3 Ensure joints are as inconspicuous in appearance as possible and without voids.
 - .4 Provide holes and cutouts for plumbing and bath accessories as indicated on Drawings.
 - .5 Rout and finish component edges to a smooth, uniform finish. Rout cutouts, then sand edges smooth. Repair or reject defective or inaccurate work.
 - .6 Finish: Ensure surfaces have uniform finish:
 - .7 Gloss rating >45 .
- .4 Fabrication Tolerances:
 - .1 Variation in Component Size: ± 3 mm ($\pm 1/8$ ").
 - .2 Location of Openings: ± 3 mm ($\pm 1/8$ ") from indicated location.

2.3 ACCESSORIES - CORIAN QUARTZ:

- .1 Adhesive for Bonding to Other Products:
 - .1 One component silicone to ASTM C920.
- .2 Joint adhesive:
 - .1 Manufacturer's standard one- or two-part adhesive kit to create inconspicuous, nonporous joints.
- .3 Sealant:
 - .1 A standard mildew-resistant, FDA/UL® and NSF/ANSI 51 compliant in Food Zone area, recognized silicone colour coordinated sealant or clear silicone sealants.
- .4 Sink/Bowl Mounting Hardware:
 - .1 Manufacturer's approved bowl clips, brass inserts and fasteners for attachment of under-mount sinks/bowls.
- .5 Heat Reflecting Tape:
 - .1 Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.
- .6 Insulating Nomex fabric:
 - .1 Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source.

2.4 CORIAN QUARTZ EXECUTION

- .1 Examination of Job Site Conditions:
 - .1 Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.
 - .2 Verify actual site dimensions and location of adjacent materials prior to commencing work.
 - .3 Examine cabinets upon which counter tops are to be installed. Verify cabinets are level to within 3 mm in 3 m (1/8" in 10' - 0").
 - .4 Notify Consultant in writing of any conditions which would be detrimental to installation.
 - .5 Commencement of work implies acceptance of previously completed work.

2.5 CORIAN QUARTZ INSTALLATION

- .1 Install components plumb, level, rigid, scribed to adjacent finishes in accordance with reviewed Shop Drawings and Product installation details.
- .2 Fabricate field joints using manufacturer's recommended adhesive. Keep components and hands clean when making joints. Reinforce field joints as specified herein. Cut and finish component edges with clean, sharp returns.
- .3 Route radii and contours to template. Anchor securely to base component or other supports.
- .4 Align adjacent components and form seams to comply with manufacturer's written recommendations using adhesive in colour to match work. Carefully dress joints smooth, remove surface scratches and clean entire surface.
- .5 Install countertops with no more than 3 mm (1/8") sag, bow or other variation from a straight line.
- .6 Adhere undermount/submount/bevel mount sinks/bowls to countertops using manufacturer's recommended adhesive and mounting hardware.
- .7 Adhere top-mount sinks/bowls to countertops using manufacturer recommended adhesives and colour-matched silicone sealant. Secure seam mount bowls and sinks to counter tops using colour matched joint adhesive.
- .8 Seal between wall and components with joint sealant as specified herein and in Section 07 92 00, as applicable.

- .9 Provide backsplashes and endsplashes as indicated on Drawings. Adhere to countertops using a standard colour-coordinated silicone sealant. Adhere applied sidesplashes to countertops using a standard colour-coordinated silicone sealant.
- .10 Keep components and hands clean during installation. Remove adhesives, sealants and other stains. Ensure components are clean on date of Substantial Performance of the Work.
- .11 Coordinate connections of plumbing fixtures with Division 22 Mechanical. Make plumbing connections to sinks in accordance with Division 22 Mechanical.

2.6 REPAIR CORIAN QUARTZ:

- .1 Replace areas of severely damaged surfaces in accordance with manufacturer's recommendations.

2.7 SITE QUALITY CONTROL CORIAN QUARTZ

- .1 Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

2.8 CLEANING CORIAN QUARTZ

- .1 Remove excess adhesive and sealant from visible surfaces.
- .2 Clean surfaces in accordance with manufacturer's "Care and Maintenance Instructions".

2.9 PROTECTION CORIAN QUARTZ

- .1 Provide protective coverings to prevent physical damage or staining following installation for duration of Project.
- .2 Protect surfaces from damage until date of Substantial Performance of the Work.

2.10 ALLOWABLE TOLERANCES:

- .1 Maximum variation in size: Plus or minus 1/8 inch.
- .2 Maximum variation in location of openings: Plus or minus 1/8 inch from indicated location.

PART 3 Execution General - All Solid Surfacing

3.1 EXAMINATION

- .1 This section shall review all surfaces and elements to which solid surface material will be applied as described within scope of work and correct deficiencies before supplying and installing elements specified herein.
- .2 Examination of millwork and carpentry:
 - .1 Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.
 - .2 Verify actual site dimensions and location of adjacent materials prior to commencing work.
 - .3 Examine cabinets upon which counter tops are to be installed. Verify cabinets are level to within 3 mm in 3 m (1/8" in 10' - 0").
 - .4 Notify Consultant in writing of any conditions which would be detrimental to installation.
 - .5 Do not proceed with new work if conditions found are not conducive to efficacious assembly of new work.
 - .6 Use plumb lines, survey equipment and levels to determine position of all structure, walls, framing and lines and to check for deformities in the geometry of the existing building both in the wall or vertical plane and in the horizontal plane of any element to which the solid surfacing will be adhered.
- .3 Review all contract documents for requirements of installation with particular attention to services and equipment specified within mechanical and electrical Sections for required device boxes. Where there is uncertainty, contact architect and contractor for clarification.

3.2 ACCEPTANCE:

- .1 Commencement of work implies acceptance of previously completed work.

3.3 INSTALLATION

- .1 Keep components and hands clean during installation. Remove adhesives, sealants and other stains.
- .2 Ensure components are clean on date of Substantial Performance of the Work.
- .3 Coordinate connections of plumbing fixtures with Division 22 Mechanical.
- .4 Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
- .5 Provide product in the largest pieces available.
- .6 Install countertops with no more than 3 mm (1/8") sag, bow or other variation from a straight line.
- .7 Fabricate field joints using manufacturer's recommended adhesive, with joints being inconspicuous in finished work. Exposed joints/seams are not permitted. Keep components and hands clean when making joints. Reinforce field joints as specified herein. Cut and finish component edges with clean, sharp returns.
- .8 Align adjacent components and form seams to comply with manufacturer's written recommendations using adhesive in colour to match work. Carefully dress joints smooth, remove surface scratches and clean entire surface.
- .9 Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.
- .10 Exposed joints or seams are prohibited.
- .11 Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.
- .12 Cut and finish component edges with clean, sharp returns.
- .13 Route radii and contours to template.
- .14 Anchor material securely to wall or other supports.
- .15 Carefully dress joints smooth, remove surface scratches and clean entire surface.
- .16 Adhere top-mounted lavatories to countertops using manufacturer recommended adhesives and colour-coordinated silicone sealant.
- .17 Seal between wall and components with joint sealant as specified herein and in Section 07 92 00, as applicable.

3.4 REPAIR

- .1 Repair minor imperfections and cracked seams and replace areas of severely damaged surfaces in accordance with manufacturer's "Technical Bulletins".

3.5 SITE QUALITY CONTROL

- .1 Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

3.6 CLEANING AND PROTECTION

- .1 Keep components clean during installation.
- .2 Remove adhesives, sealants and other stains.
- .3 Provide protective coverings to prevent physical damage or staining following installation for duration of Project.
- .4 Protect surfaces from damage until date of Substantial Performance of the Work. Ensure components are clean on date of Substantial Performance of the Work.

END OF SECTION

Part 1 GENERAL

1.1 SECTION INCLUDES

- .1 Surface preparation for installation of waterproofing membrane on concrete foundation and elevator pit foundation.
- .2 Application of primer and rolled, self-adhering, waterproofing membrane system and accessories.
- .3 Application of rolled, pre-fabricated, three-dimensional, composite, drainage membrane and associated accessories.

1.2 RELATED SECTIONS

- .1 Section 03 00 00 Cast-in-Place Concrete
- .2 Section 07 21 13 Board Insulation
- .3 Section 07 92 00 Joint Sealants
- .4 Section 31 00 00 Earthwork

1.3 PERFORMANCE REQUIREMENTS

- .1 Provide self-adhesive, waterproofing sheet system consisting of a flexible membrane designed and selected for use below grade and applied to establish a continuous waterproof membrane with lapped joints, and termination bar extending from bottom of footing to height measured vertically up the foundation wall shown on drawings.
- .2 Cover waterproofing membrane with three-dimensional, composite drainage membrane complete with accessories to form complete drainage system that delivers water to soil at bottom of footing.

1.4 REFERENCES

- .1 American Railway Engineering & Maintenance of Way Association (AREMA) Specification Chapter 29 - Waterproofing.
- .2 American Society for Testing Materials:
 - .1 ASTM E96 (Method B) - Standard Test Methods for Water Vapor Transmission of Materials.
 - .2 ASTM C1311 - Standard Specification for Solvent Release Sealants.
 - .3 ASTM D146 - Standard Test Methods for Sampling and Testing Bitumen-Saturated Felts and Fabrics Used in Roofing and Waterproofing.
 - .4 ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers- Tension.
 - .5 ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
 - .6 ASTM D570 - Standard Test Method for Water Absorption of Plastics.
 - .7 ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
 - .8 ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
 - .9 ASTM D1777 - Standard Test Method for Thickness of Textile Materials.
 - .10 ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives. (T-Peel Test).
 - .11 ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

- .12 ASTM D3776 / D3776M - [2009ae2], Standard Test Methods for Mass Per Unit Area (Weight) of Fabric.
- .13 ASTM D3786 / D3786M - [2009], Standard Test Method for Bursting Strength of Textile Fabrics Diaphragm Bursting Strength Tester Method.
- .14 ASTM D4226 - Standard Test Methods for Impact Resistance of Rigid Poly(Vinyl Chloride) (PVC) Building Products.
- .15 ASTM D4355 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.
- .16 ASTM D4491 - Standard Test Method for Water Permeability of Geotextiles by Permittivity.
- .17 ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
- .18 ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
- .19 ASTM D4716 - Standard Test Methods for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
- .20 ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .21 ASTM D4833 - Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.
- .22 ASTM D5261 - Standard Test Method for Measuring Mass per Unit Area of Geotextiles.
- .23 ASTM D6241 - Standard Test Method for Static Puncture Strength of Geotextiles.
- .3 Canadian General Standards Board:
 - .1 CGSB 19-GP-14M - Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
 - .2 CGSB 37.56-M Static Puncture Resistance.
- .4 Ontario Building Code, Environmental Separation.
- .5 Underwriters Laboratory of Canada:
 - .1 CAN/ULC S742 Air Leakage Rate

1.5 QUALITY CONTROL

- .1 Manufacturer:
 - .1 Waterproofing membranes and related accessory products shall be:
 - .1 Fully compatible with one another,
 - .2 provided by a single manufacturer with a minimum of 20 years' experience in the production and sales of waterproofing products.
 - .2 Manufacturer shall be capable of providing review on site during construction.
 - .3 Manufacturers proposed for use, but not named here, shall submit evidence of ability to meet all requirements specified.
- .2 Product Selection:
 - .1 Select standard product when air temperature during application is 4 degrees Celsius or higher. Use product designed for low temperature application when conditions indicate.
 - .2 Consult manufacturer's publish temperature limits according to product and field conditions applicable when work is anticipated prior to ordering materials.
- .3 Installer Qualifications:
 - .1 Installer must have at least three (3) years experience in work of the type required by this section, demonstrate capability to comply with manufacturer's warranty requirements.

- .4 Independent Inspection:
 - .1 Owner shall engage the Field Engineer to inspect and approve substrate prior to installation; monitor waterproofing material installation compliance with the project contract documents, and the manufacturer's published literature. Inspection shall occur prior to concealment of the waterproofing by other work.

1.6 WARRANTY

- .1 Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.
- .2 Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.
- .3 Warranty period: 5 years commencing on Date of Substantial Performance of Work.

1.7 SUBMITTALS

- .1 Comply with Section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's product data and application instructions including:
 - .1 Preparation instructions and recommendations.
 - .2 Storage and handling requirements and recommendations.
 - .3 Installation methods.
- .3 Warranties for waterproofing membrane and composite drainage membrane.

1.8 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- .3 Inspect goods upon receipt and reject materials shipped in error or found to be defective. Defective materials, along with a letter outlining reasons for rejection, are to be returned to the manufacturer promptly for replacement.
- .4 Store materials in a clean dry area in accordance with manufacturer's instructions Do not permit freezing of material prior to application.
- .5 Store adhesives and primers at temperatures of 40°F (5°C) and above to facilitate handling.
- .6 Store membrane cartons on pallets with rolled goods standing on end of rolls.
- .7 Do not store at temperatures above 90°F (32°C) for extended periods.
- .8 Keep away from sparks and flames.
- .9 Completely cover when stored outside. Protect from rain and direct exposure to sunlight.
- .10 Protect materials during handling and application to prevent damage or contamination.
- .11 Avoid use of products which contain tars, solvents, pitches, polysulfide polymers, or PVC materials that may come into contact with waterproofing membrane system.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Product not intended for uses subject to abuse or permanent exposure to the elements.
- .2 Protect rolls from direct sunlight until ready for use
- .3 Do not apply membrane that is not designed for low temperature when air or surface temperatures are below 40°F (4°C).
- .4 Do not apply to frozen concrete.

- .5 Do not apply primers, adhesives and other materials to concrete insufficiently cured.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 Construction and Demolition Waste Management and return pallets to suppliers for re-use.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied product containers are sealed and stored safely for disposal. Review local recycling requirements and ensure compatibility prior to disposal in local recycling system.

Part 2 Products

2.1 ACCEPTABLE MANUFACTURER – BASIS OF SPECIFICATION

- .1 W.R. MEADOWS, Inc., PO Box 338, Hampshire, Illinois 60140-0338. (800) 342-5976. (847) 683-4500. Fax (847) 683-4544. Web Site www.wrmeadows.com.
 - .1 Mel Rol or Mel Rol Low Temp, as applicable, self-adhering membrane with Mel Drain composite drainage membrane complete with optional polyester backing film.
- .2 Acceptable Alternative Manufacturers:
 - .1 All products shall be installed in strict accordance with manufacturer's instructions.
 - .2 Provide named products together with all other primers and accessories equivalent to basis of specification including termination bars, mastics, tapes and accessory liquid membrane products.
 - .3 Self-adhering waterproofing membrane shall meet or exceed specified material performance criteria and it shall be applied to concrete surface prepared by scraping, grinding and priming using chemically compatible products specified by the membrane manufacturer.
 - .4 Composite three-dimensional, rolled, drainage matrix membrane shall have 3 parts: a needle-punched, polypropylene, geotextile filter fabric adhered to a moulded, co-polymer polypropylene, dimpled drainage core shaped to permit drainage between the geotextile and the core sheet and a polymeric backing sheet designed to prevent die-cutting damage to underlying waterproofing membrane.
 - .5 Products and Manufacturers:
 - .1 CETCO, Envirosheet self-adhere membrane with Aquadrain 15X composite drainage membrane.
 - .2 GCP Applied Technologies, Inc., Bituthene 3000/Low Temp Membrane self-adhered membrane with Hydroduct 225 composite drainage membrane.
 - .3 IKO Aquabarrier FP self-adhering membrane and Dorken Delta Drain 6200 Hi-X composite drainage membrane - Dörken Systems Inc., 4655 Delta Way, Beamsville, Ontario, L0R 1B4, Canada, Phone: 1-905-563-3255, Toll Free: 1-888-4DELTA4 (1-888-433-5824), e-mail: info@dorken.com, URL: <http://www.dorken.com>.
 - .4 MAPEI Inc. Canada, 2900 Francis-Hughes, Laval, PQ, Canada H7L3J5; ASD. Tel: 450-662-1212; Fax: 450-662-0444; Email: hhayes@mapei.com; Web: www.mapei.com/CA-EN.
 - .1 Mapei Mapethene HT/LT self-adhered membrane and Mapedrain 25 composite drainage membrane.

2.2 ROLLED, SELF-ADHERING WATERPROOFING MEMBRANE:

- .1 Polymeric waterproofing membrane protected by release paper on cross-laminated polyethylene carrier film with exposed polymeric membrane strips on both sides protected by pull-off release strips.
- .2 Performance Based Specification: Waterproofing membrane shall have the following characteristics:
 - .1 Compliance: AREMA Specification Chapter 29 - Waterproofing.
 - .2 Thickness:
 - .1 Carrier Film: 4 mils.
 - .2 Polymeric Membrane: 56 mils.
 - .3 Tensile Strength, ASTM D412, Die C:
 - .1 Carrier Film: 5,900 psi (40.71 MPa) minimum.
 - .2 Polymeric Membrane: 460 psi (3.23 MPa) minimum.
 - .4 Elongation, ASTM D412, Die C: Polymeric Membrane: 971 % minimum.
 - .5 Peel Adhesion, ASTM D903: 11.8 lbf/in. (2068 N/m).
 - .6 Lap Adhesion, ASTM D1876: 8.62 lbf/in. (1508 N/m)
 - .7 Water Vapor Permeability, ASTM E96, Method B: 0.036 perms.
 - .8 Water Absorption, ASTM D570: 0.1 percent, 72 hours maximum.
 - .9 Resistance to Hydrostatic Head: Equivalent to 230.9 feet (70.3 m) of water.
 - .10 Puncture Resistance, ASTM E154: 48.2 lbf (214.6 N).
 - .11 Static Puncture: CGSB – 37.56-M: 150N (33.72 Lb/ft).
 - .12 Exposure to Fungi, Soil Test: Pass, 16 weeks.
 - .13 Air Leakage Rate: CAN/ULCS742: A1.
 - .14 Color:
 - .1 Carrier Film: White.
 - .2 Polymeric Membrane: Black.
 - .15 Proprietary Based Specification: MEL-ROL Waterproofing System by W.R.
 - .1 MEL-ROL: For use at temperatures of 40°F (4°C) and above; Mel-Rol Low Temp for temperatures lower than 4 degrees C.
- .3 Accessories:
 - .1 Accessory items are required for the waterproofing system to result in a complete installation, and, shall be from a single manufacturer.
 - .2 Ensure compatibility of materials all accessory materials with drainage and waterproofing membrane
 - .3 Self-Adhered Waterproofing Membrane Surface Conditioner:
 - .1 Temperatures Above 40°F (4°C): Mel-Prime Water Base Primer.
 - .2 Temperatures Above 0°F (-18°C): Mel-Prime VOC Compliant Solvent Base Primer or Standard Solvent Base Primer.

2.3 COMPOSITE DRAINAGE MEMBRANE

- .1 Pre-fabricated, three-dimensional, composite, drainage membrane and associated accessories. Geotextile fabric adhered to moulded, dimpled core with polymeric backing sheet selected to resist die-cutting of waterproofing membrane.
- .2 Performance Criteria
 - .1 Drainage Core Environmental Stress Cracking of Plastics: 2000 hours to ASTM D1693-08 Condition B.
 - .2 Drainage Core Impact Resistance of Rigid Poly Building Products; 2.9 J mean failure energy at 5°C to ASTM D4226-09

- .3 Drainage Core Maximum Tearing Strength: MD 550N; CD 800 N; to ASTM D5884-04a
- .4 Drainage Core Stress Cracking Resistance: 504 hours @ 156 kPa No Cracking at Test Termination] to SAGEOS GD 001-2012.
- .5 Geotextile Permittivity: 2.0 sec^{-1} to ASTM D4491.
- .6 Geotextile Water Flow Rate: 5703 L/min/m² to ASTM D4491.
- .7 Geotextile Ultraviolet Resistance: 70 % at 500 hrs to ASTM D4355.
- .8 Geotextile Grab Tensile Strength: 445N to ASTM D4632.
- .9 Geotextile Elongation: 60% to ASTM D4632.
- .10 Geotextile Trapezoidal Tearing Strength: 200N to ASTM D4533.
- .11 Geo-composite Water Flow Rate:
 - .1 At Hydraulic Gradient 1.0: 223 L/min/m to ASTM D4716.
 - .2 At Hydraulic Gradient 0.1: 40 L/min/m to ASTM D4716.
- .12 Geotextile Puncture Resistance: 300N to ASTM D4833.
- .13 Geotextile Mullen Burst Strength: 1482 kPa to ASTM D3786.
- .14 Nominal Geotextile Weight: 135 g/m² to ASTM D5261.
- .15 Geotextile Apparent Opening Size: 0.21mm to ASTM D4751.
- .16 Working Temperature Range: Minus 30 °C to plus 80 °C.
- .17 Toxicity: Non-toxic, non-polluting to ASTM D4226.
- .3 Materials:
 - .1 Black polypropylene sheet, stabilized against oxidation, dimpled throughout field of sheet; needle-punched polypropylene geotextile adhered to top of dimples; protective polyethylene (LDPE) sheet on back side.
 - .2 Dimpled Thickness: 10 mm.
 - .3 Dimpled Sheet Compressive Strength: 830 kN/m² to ASTM D 1621.
 - .4 Drainage Core: Polypropylene.
 - .5 Needle-punched Geotextile: Non-woven polypropylene.
 - .6 Polyethylene (LDPE) back sheet.
- .4 Acceptable Product:
 - .1 WR Meadows MEL-DRAIN 5012-B: dimple raised moulded polystyrene core with a non-woven geotextile fabric bonded to the dimples of the core. Attached to the back side of the dimples is a polyethylene sheet designed to prevent soft waterproofing membranes from working their way into the back-side of the dimples.
 - .2 Dörken Systems Inc., DELTA®-DRAIN 6200 HI-X.
 - .3 Mapei Mapedrain 25 composite drainage membrane.
 - .4 GCP Applied Technologies Hydroduct 225 composite drainage membrane.
- .5 Contact adhesive or mastic:
 - .1 Use to bond drainage membrane to self-adhered sheet waterproofing membrane.
 - .2 Ensure compatibility between waterproof membrane and drainage membrane adhesive or mastic.
- .6 Accessories:
 - .1 Termination Bar: in accordance with manufacturer's instructions. TERMINATION BAR from W. R. MEADOWS.
 - .2 Pointing Mastic: POINTING MASTIC from W. R. MEADOWS.
 - .3 Mastic: Liquid mastic for filling voids, fillet and flashing material, sealing corners and sealing around penetrations, and lap and T-joints Flashing and Fillets: MEL-ROL LIQUID MEMBRANE.
 - .4 Pointing Mastic: POINTING MASTIC.

- .5 Corner Tape or repair tape and detail strips where recommended - WR Meadows Corner Tape: DETAIL STRIP.
- .6 Fasteners: hot-dipped, galvanized Tapcon or equivalent screws installed in pre-drilled holes complete with 25mm (1") dia. plastic washers

Part 3 EXECUTION

3.1 EXAMINATION

- .1 Coordinate construction sequence with Contractor including, but not limited to the following:
 - .1 All mechanical and electrical service penetrations through concrete foundation and elevator pit and shaft construction are completed; beam pockets, brackets, bearing plates and bolts are installed including elevator components.
 - .2 Complete de-watering of excavation and continuous removal of ground water during installation if applicable.
 - .3 Removal of ridges and form seams that project more than 6mm from face of foundation surfaces.
 - .4 Schedule of sub-surface drainage piping following installation of waterproofing and drainage membrane.
 - .5 Schedule of rigid board insulation and backfilling.
 - .6 Use of crushed stone backfill around drainage piping and at level of footing in bottom of excavation.
- .2 Examine surfaces to receive self-adhering membrane. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application of products until unacceptable conditions have been corrected.
- .3 Submit a written report to the General Contractor regarding substrate surface defects and work prepared by other Sections which may adversely affect quality or dimensions associated with the work of this Section.
- .4 Commencement of work of this Section implies acceptance of existing conditions.

3.2 ENVIRONMENTAL CONDITIONS

- .1 Install solvent curing sealants and vapour release adhesive materials in open spaces or using mechanical ventilation within enclosed spaces.
- .2 Maintain temperature and humidity recommended by materials manufacturers before, during and after installation.
- .3 Do not apply membranes and primers to a wet substrate.
- .4 Assess installation temperature and select membrane type to suit ambient temperature at time of installation.
- .5 Do not permit products to be stored in direct sunlight or to freeze prior to installation.

3.3 SEQUENCE

- .1 Sequence work in accordance with Contractor's critical path and to establish a progressively more water tight construction as the work proceeds.
- .2 Install sheet waterproofing in construction sequence to minimize exposure of materials to sunlight to a period on no more than manufacturer's limitations on exposure to UV radiation.

- .3 Proceed with installation when the substrate construction and preparation work is complete, only. This Section shall be responsible to accept conditions at the site prior to commencing work. Commencement of work of this Section indicates acceptance of conditions in field.
- .4 Apply protective drainage membrane as soon as feasible over installed waterproofing.

3.4 MANUFACTURER'S INSTRUCTIONS

- .1 Maintain on the site manufacturer's written installation instructions for all products used under the work of this Section.
- .2 Compliance: comply with manufacturer's written recommendations and specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .3 Safety: review MSDS sheets and utilize personal protective gear at all times during installation. Follow manufacturer's direction regarding ventilation, cleaning and accidental exposure to eyes or skin or accidental ingestion of products.

3.5 SURFACE PREPARATION

- .1 Protect adjacent surfaces not designated to receive waterproofing.
- .2 Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.
- .3 Remove by pumping all water accumulated within excavation and allow concrete to dry.
- .4 Sweep rocks, gravel and sand from horizontal surfaces include top of footings.
- .5 Remove contaminants such as dirt, debris, oil, grease, wax, cement laitance, or other foreign matter which will impair or negatively affect performance of drainage system installation from concrete.
- .6 Do not apply waterproofing to surfaces unacceptable to manufacturer.
- .7 Concrete surfaces must be clean, smooth and free of standing water.
- .8 Patch all holes in excess of 3mm in any direction and fill voids and honey-combed surfaces to establish a consistent, smooth surface, free of abrupt misalignments.
- .9 Apply surface conditioner to surfaces that will be covered within one working day according to manufacturer's recommended coverage rates.
- .10 Install corner tape on all inside and outside corners, including the footing/wall juncture. Use fillets in situations recommended by manufacturer.
- .11 Apply a 229mm (9") strip of self-adhering membrane over construction, control and expansion joints and over cracks greater than 1/16" (1.59 mm) wide.
- .12 Seal all terminations with pointing mastic.

3.6 APPLICATION – SELF-ADHERED WATERPROOFING

- .1 Horizontal Application or Vertical Application:
 - .1 Commence installation at bottom of footing at junction with bearing surface of soil.
 - .2 Wrap membrane over top of footing and vertically up foundation walls.
 - .3 Apply waterproofing membrane system in accordance with manufacturer's instructions.
 - .4 Utilize standard or low temperature compatible membranes to suit installation conditions.
 - .5 Ensure accessory materials are compatible with membrane and approved by membrane manufacturer.

- .6 Remove release paper on edge, then position the membrane.
- .7 Pull balance of release paper off, running the roll from low to high points, arrange such that all laps will shed water downward in horizontal installation. Overlap vertical sheets 65mm (2.5") over other sheets.
- .8 Immediately hand-rub the membrane firmly to the surface, removing any bubbles or wrinkles, then pressure roll the complete surface to assure positive adhesion.
- .9 Stagger end laps and overlap all seams at least 2 ½" (63.5 mm).
- .10 Seal all terminations with pointing mastic.
- .11 Inspect membrane before covering and repair as necessary. Cover tears and inadequate overlaps with membrane. Seal edges of patches with pointing mastic.
- .12 Apply membrane over joint between foundation wall and footing, across top of footing and down exterior vertical face of footing.
- .2 Penetrations
 - .1 Cut membrane to closely fit around penetrations and fill any voids with trowelled 19mm (3/4") thick fillet of seal extending up a minimum 38mm (1-1/2") and extend over the membrane.
 - .2 Where multiple penetrations are close together, install a minimum 6mm (1/4") thick around penetrations covering the entire substrate area.

3.7 APPLICATION – PROTECTIVE COMPOSITE DRAINAGE MEMBRANE

- .1 Comply with contract documents and manufacturer's product data, including product application and installation instructions.
- .2 Maintain adequate ventilation during preparation and application of materials.
- .3 Commence installation at bottom of footing where footing meets bearing soil in the excavation. Carry membrane over top surface of footing and extend up foundation wall.
- .4 Seal open edges of membrane with filter fabric where they occur.
- .5 Inspect drainage composite and repair or replace as necessary.
- .6 Warn personnel against breathing of vapors and contact with skin and eyes; wear appropriate protective clothing and respiratory equipment.
- .7 If the contractor elects to use solvent based adhesives, keep flammable products away from spark and flame. Post "No Smoking" signs. Do not allow spark producing equipment to be used during application and until vapors have dissipated.
- .8 Apply membrane over joint between foundation wall and footing, across top of footing and down exterior vertical face of footing.
- .9 Apply drainage composite to prepared surfaces starting at the low point and working to high point in overlapping shingling technique for horizontal installation.
- .10 Arrange sheets horizontally or vertically. Do not overlap. Butt side and end laps, overlapping filter fabric.
- .11 Install sheets without gaps, wrinkles, creases or tears.
- .12 Align and abut layers.
- .13 Secure to substrate at top edges of wall and use mastic or contact adhesive to secure sheets and in field to self-adhered waterproofing in accordance with drainage composite manufacturer's written recommendations.
- .14 For multiple rows of fasteners, stagger fasteners in alternate rows.
- .15 Always wrap exposed edges with geotextile.

- .16 Cover drainage composite laps with geotextile and do not leave dimples or core exposed.
- .17 At bottom of walls, extend drainage composite from wall over footing to drainage pipe, if any.
- .18 Flash and seal top edges, around openings and penetrations.
- .19 Repairs to drainage composite: Apply patch made of same material and tape around penetrations and at end joints.
- .20 After installation of termination bars, inspect drainage composite and repair damaged sheet and geotextile

3.8 CLEANING AND PROTECTION

- .1 Remove masking used on surfaces that did not receive waterproofing.
- .2 Clean spillage and soiling on adjacent construction that will be exposed in the finished work using cleaning agents and procedures recommended by manufacturer of the affected construction.
- .3 Protect membrane on vertical and horizontal applications with immediate application of rolled three-dimensional drainage matrix membrane. Fix termination bars to concrete foundation below finished grade elevation.
- .4 Insulation products may be installed after membranes have cured.
- .5 Schedule work so that the waterproofing system is covered as soon as possible after installation. If waterproofing system cannot be covered within the time prescribed by the manufacturer of the system, following installation, apply temporary UV protection such as dark plastic sheet or tarpaulins.
- .6 Backfill following complete installation of sub-surface drainage piping, rigid board insulation, and associated granular fill using care to avoid damaging waterproofing membrane system.
- .7 Ensure backfilling does not damage drainage composite.
 - .1 Backfill and compact in lifts.
 - .2 Replace drainage composite damaged during backfilling.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 00 00 Cast-in-Place Concrete
- .2 Section 07 13 26 Sheet Membrane Waterproofing
- .3 Section 07 27 10 Weather Barrier, Air Barrier and Transition Membrane
- .4 Section 07 53 23 EPDM Roofing
- .5 Section 07 62 00 Sheet Metal Flashing
- .6 Section 07 92 00 Joint Sealants
- .7 Section 09 21 16 Gypsum Board Assemblies
- .8 Section 31 00 00 Earthwork

1.2 SUMMARY OF WORK OF THIS SECTION

- .1 Thermal insulation used on exterior or interior of concrete foundation walls and subsequently covered by backfill.
- .2 Thermal Insulation used below concrete slabs placed on prepared existing slab or new, prepared, grades when the insulation is entirely covered by concrete.
- .3 General Amendment: All references within Section 07 21 13 Board Insulation to extruded polystyrene board products formerly manufactured by Dow Chemical shall be amended to current manufacturer known as DuPont de Nemours and "DuPont Performance Building Solutions". Requirements and performance information for products remains unchanged.

1.3 REFERENCES

- .1 American Society for Testing Materials (ASTM):
 - .1 ASTM B 696 Standard Test Method for Coefficient of Linear Thermal Expansion.
 - .2 ASTM C165-2012, Standard Test Method for Measuring Compressive Properties of Thermal Insulations
 - .3 ASTM C 177 Test Method for Steady-State Thermal Transmission Properties by means of the Guarded Hot Plate.
 - .4 ASTM C203 Standard Test Methods for Breaking Load and Flexural Properties.
 - .5 ASTM C303-2010, Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.
 - .6 ASTM C 423 Test Method for Sound Absorption and the Sound Absorption Coefficient by the Reverberation Room Method
 - .7 ASTM C 518 Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter
 - .8 ASTM C612-2014, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 - .9 ASTM C665-2012, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - .10 ASTM C795-2013, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
 - .11 ASTM C1104/C1104M-2013, Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
 - .12 ASTM C1338-2014, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
 - .13 ASTM D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
 - .14 ASTM D2842-06 Standard Test Method for Water Absorption of Rigid Cellular Plastics.
 - .15 ASTM E96/E96M-13, Standard Test Methods for Water Vapour Transmission of Materials.
- .2 Canadian Construction Materials Centre:

- .1 CCMC 04888-I and 11420-L
- .3 Canadian General Standards Board (CGSB)
 - .1 CGSB 71-GP-24M-AMEND-77(R1983), Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-M88, Surface Burning Characteristics of Building Materials and Assemblies
 - .2 CAN/ULC S114-2005, Standard Method of Test for Determination of Non-Combustibility in Building Materials.
 - .3 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
 - .4 CAN/ULC S701-11 Type 4
 - .5 CAN/ULC S701-11 Type 2
 - .6 CAN/ULC S702-2014, Standard for Thermal Insulation Mineral Fibre for Buildings.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for board insulation and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit list on insulation manufacturer's letterhead of materials and accessories to be incorporated into Work.
 - .3 Submit WHMIS MSDS - Material Safety Data Sheets for product.
 - .4 Include product name.
 - .5 Include preparation instructions and recommendations, installation methods, and storage and handling requirements.
 - .6 Include contact information for manufacturer and their representative for this Project.
 - .7 Test Reports: Submit evaluation service reports, if available, or other independent testing agency reports showing compliance with specified performance characteristics and physical properties.
 - .8 Field Reports: Submit manufacturer's field reports within 3 days of each manufacturer representative's site visit and inspection.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements together with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, in dry location that is well-ventilated.
 - .2 Store and protect specified materials from damage, bending, indentations, nicks, scratches, and exposure to solvents or UV radiation.
 - .3 Replace defective or damaged materials with new.
 - .4 Store in original packaging until installed.
- .4 Packaging Waste Management:
 - .1 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 in accordance with Waste Management Plan

1.6 WARRANTY

- .1 Project Warranty: Refer to Contract Conditions for project warranty provisions.
- .2 Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.
- .3 Warranty period: 1 year commencing on Date of Substantial Performance of Work.

1.7 LIMITATIONS

- .1 Plastic foamed insulation including, but not limited to, polyurethane, Styrofoam brand foam products, extruded and expanded polystyrene, and polyisocyanurate foams must be protected by a thermal barrier where they are exposed to view in service anywhere within the building and they must not be left unprotected by a thermal barrier within a concealed service space or return air plenum. These products shall be installed such that they are completely covered by concrete or backfill and separated from the interior of the building by a thermal barrier meeting or exceeding the requirements of CAN/ULC S124 including, but not limited to 12.7mm or greater thickness of gypsum board panel material installed to constitute a thermal barrier as defined within the OBC. Protect foamed plastic products from any open flame or heat source using membranes meeting or exceeding the requirements of thermal barriers stipulated within the Ontario Building Code which requires compliance with CAN/ULC S124 test for thermal barriers associated with foamed plastic.
- .2 For exterior wall construction, rigid mineral fibre boards tested in accordance with CAN/ULC S124 and found compliant with standards for thermal barriers intended to protect foamed plastic may be used where specified on drawings or with review and consent of Consultant following submission of assembly details and other materials reasonably requested by the Consultant.
- .3 Rigid board insulation placed above the top side (exterior side) of the sheet metal decking are considered to be protected against exposure to fire by gypsum board incorporated within the roof assembly. Where these foams are exposed to the inside of the building, they must be protected by a thermal barrier described above.
- .4 Rigid mineral fibre board insulation specified herein may be used as a thermal barrier to protect foamed plastic materials provided that it has a minimum thickness of 50 mm (2") and it is installed with appropriate support.
- .5 Sheet steel covers over plastic foam insulation require protection from thermal effects of fire by a material meeting or exceeding CAN/ULC S124 requirements for thermal protection of foamed plastics. The use of rigid mineral fibre board insulation specified herein with a thickness of 50mm or greater or a panel of 12.7mm thickness of gypsum board panel material are acceptable thermal barriers for foamed plastics if appropriately fastened and supported.

Part 2 Products

2.1 INSULATION - GENERAL

- .1 Alternate brands of insulation may be used if the physical properties of the alternate match the physical properties of the insulation specified.
- .2 Install all insulation materials in strict accordance with good building practice and manufacturer's recommendations in order to ensure that products perform to their best possible insulating capacity.
- .3 Store, protect and handle all insulation products to avoid damage to their proper function due to exposure to UV radiation, compression, physical damage and exposure to moisture.
- .4 Review drawings for application for types of insulation specified.

2.2 FOUNDATION AND UNDERSLAB INSULATION AND INSULATION BELOW ROOF TOP WALKWAY PAVERS:

- .1 Acceptable Material: Extruded, closed cell, polystyrene (XPS) Type 4.
 - .1 Extruded polystyrene (XPS).
 - .2 Type: 4, CAN/ULC S701-11.
 - .3 Thickness: two layers with staggered joints, thickness marked on drawings.

- .4 Size: 600mm x 2400mm.
- .5 Edges: square.
- .6 Meet or exceed CCMC 04888-L
- .7 ASTM C518/C177: Thermal resistance, R5 per inch of thickness.
- .8 ASTM E96-80, Water vapour permeance, maximum 1.0 perm.
- .9 ASTM D 2842-69, Water absorption: less than 0.3% by volume, maximum.
- .10 ASTM 1621-73, Compressive strength, 207kPa, (30 psi) min.
- .11 ULC-CAN4-S102.2-M83.
- .2 Acceptable Insulation Materials: Type 4 closed cell extruded polystyrene.
 - .1 Styrofoam SM by Dow Chemical.
 - .2 Foamular C-300 Owens Corning Canada Inc.
- .2 Polystyrene Adhesives:
 - .1 Verify that adhesive is compatible with drainage membrane.
 - .2 Type 2, Class C for trowel application to concrete.
 - .1 Acceptable Materials:
 - .1 Emhart Canada Bostik 5225.
 - .2 Canadian Adhesives Limited, PL300.
 - .3 Henry Air Bloc 21.
 - .4 Par Industries Ltd., Parr.

2.3 MINERAL WOOL, NON-COMBUSTIBLE, RIGID, WATER REPELLENT:

- .1 Mineral Wool insulation is not intended for application with Section 07 24 00 Exterior Insulation and Finishing System. Apply mineral Wool insulation to seal fire separations to irregular areas and where noted on drawings.
- .2 Exterior non-structural commercial and industrial high-performance insulation sheathing applications to meet or exceed ASTM C612, Type IVB and CAN/ULC S702, Type 1.
- .3 Size: 610 x 1219, 914 x 1219, 1219 x 1829, 1219 x 2438mm.
- .4 Thickness: 50.8mm
- .5 **Performance Criteria** - Board insulation for continuous insulation systems:
 - .1 Fire Performance: Non-combustibility to meet or exceed CAN/ULC S114.
 - .2 Surface Burning Characteristics:
 - .1 Flame spread: 0.
 - .2 Smoke developed: 0.
 - .3 Thermal Resistance (RSI value/25.4 mm at 24 ° C: 0.70 m2K/W to ASTM C518.
 - .4 Moisture resistance:
 - .1 Moisture sorption: 0.05 % maximum to ASTM C1104/C1104M.
 - .5 Water vapour transmission: 1768 ng/Pa·s·m2 to ASTM E96, Desiccant Method.
 - .6 Corrosive resistance:
 - .1 Steel to ASTM C665: Non-corrosive.
 - .2 Stainless steel to ASTM C795: Non-corrosive.
 - .7 Density: 128 kg/m3 to ASTM C303.
 - .8 Compressive strength: To ASTM C165.
 - .1 21 kPa at 10 %.
 - .2 50 kPa at 25 %.
 - .9 Recycled content: 16% minimum.
 - .10 Fungi resistance: To ASTM C1338.
 - .11 Acceptable Material: ROCKWOOL, COMFORTBOARD 80.

2.4 ASPHALT IMPREGNATED AND INSULATING FIBERBOARD

- .1 Asphalt Impregnated Fibreboard to meet or exceed CAN/CSA-A247-M86, Insulating Fibreboard.

2.5 ROOFING INSULATION BELOW ROOFING MEMBRANE:

- .1 Refer to Section 07 53 23 EPDM Roofing.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for board insulation application in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Ensure surfaces are free of snow, ice, frost, grease and other deleterious materials.
- .2 Inform Consultant and Contractor of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation following correction of deleterious conditions and following receipt of Consultant's written authorization.
- .4 Commencement of insulation installation signifies that the installer has accepted existing conditions at the Place of the Work as appropriate for the installation of the products of this Section.

3.2 INSTALLATION – GENERAL

- .1 Install insulation in accordance with manufacturer's written recommendations.
- .2 Install insulation after building substrate materials are dry.
- .3 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .4 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other penetrations or protrusions.
- .5 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 75 mm from sidewalls of CAN/ULC-S604 type "A" chimneys and CSA B149.1 and CSA B149.2 type "B" vents.
- .6 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards without chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .7 Offset both vertical and horizontal joints in multiple layer applications.
- .8 Do not enclose insulation until it has been reviewed and accepted by Consultant.
- .9 FIELD QUALITY CONTROL
 - .1 Inspection: Co-ordinate field inspection in accordance with Section 01 45 00 - Quality Control.
 - .2 Report any inconsistencies from manufacturer's recommendations immediately to Consultant.

3.3 PERIMETER FOUNDATION INSULATION

- .1 2-layers, thickness marked on drawings, square edges.
- .2 When foundation insulation is marked on drawings:
 - .1 Prior to backfilling exterior of foundation wall, install perimeter insulation from top of concrete foundation wall to top side of footing, all around exterior perimeter of new work except where new foundation abuts foundation of heated space.
 - .2 Do not use broken or cracked boards.
 - .3 Ensure that foundation walls are not frozen, that they are dry, free of grease, oil, frost, ice or dirt. Scrape or otherwise remove projections from face of concrete, ridges between concrete form boards. Remove snap ties.
 - .4 Where sprayed-on bituminous damp-proofing is used, ensure that damp-proofing which will be in contact with insulation boards is fully cured before setting insulation boards in place.
 - .5 Dab polystyrene insulation adhesive on back of each board to ensure that it remains in place.
 - .6 Attach boards vertically. Tightly butt joints between adjacent insulation boards. Ensure that each board is seated tightly against concrete foundation wall.
- .3 Protect boards from damage during completion of backfilling and compaction operations.
 - .1 Interior application: extend boards as indicated, arranged vertically extending from top of footing to top of foundation wall, installed on inside face of perimeter foundation walls.

3.4 UNDERSLAB INSULATION:

- .1 Under slab application: 2-layers, total thickness marked on drawings, square edges, laid over entire extent of existing concrete slab on grade and compacted and levelled engineered fill within service trenches below the concrete floor slab.
- .2 Ensure that slab on grade sub-base is properly installed and fully compacted before laying boards. Ensure that all buried services are installed and marked.
- .3 Lay underslab insulation directly on existing slab-on-grade and on underslab granular fill. Butt insulation panels tightly against adjoining panels. Fit insulation tightly to all surfaces: foundation walls, services and concrete piers penetrating the plane of the underslab insulation. Perform cutting and fitting to create a continuous insulating surface.
- .4 Protect insulation boards from damage, disturbance and traffic during subsequent work.
- .5 Do not use broken or damaged boards.
- .6 Lay second layer of insulation over first layer with joints staggered.

3.5 ASPHALT IMPREGNATED FIBRE BOARD:

- .1 Refer to Section 03 30 00 Cast-In-Place Concrete for other locations.
- .2 Install asphalt impregnated fibreboard at all concrete junctures indicated and as follows:
 - .1 At juncture of steel column sides and floor slab thickness.
 - .2 At juncture of new exterior slab-on-grade and foundation wall.
 - .3 At expansion joints in concrete flatwork where shown on drawings or not greater than 6 metres on centre for exterior slabs placed on ground.
 - .4 Joints between curbs and walks.

3.6 EXTERIOR INSULATING SHEATHING:

- .1 Refer to insulation manufacturer's current installation guide for detailed information regarding installation.
- .2 Apply with hot-dipped galvanized steel spiral nails or hot-dipped galvanized or stainless steel screws complete with 25mm (1") diameter plastic washer reinforced to resist buckling. Butt all joints tightly.
- .3 Insulation boards shall be fit tightly to all service penetrations with the exception of flues; tightly to window and door frames.
- .4 Apply boards using means to ensure complete, continuous insulation cover over entire surface of wall sheathing and to minimize thermal bridges.
- .5 Field Quality Control
 - .1 Inspection: Co-ordinate field inspection in accordance with Section 01 45 00 - Quality Control.

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .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 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse or recycling in accordance with Section 01 74 19 – Construction Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Mineral fibre acoustic and fire safe batt insulation for wall assemblies.
- .2 Batt insulation specified may be utilized locally around chimneys and hot vents.
- .3 Batt insulations specified may be utilized to fill gaps between assemblies with fire resistance ratings, provided solution is acceptable to local Building Official.

1.2 RELATED SECTIONS

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 92 00 Joint Sealants
- .3 Section 09 21 16 Gypsum Board Assemblies
- .4 Section 09 11 00 Steel Stud Wall Framing
- .5 Section 09 12 00 Steel Framing Ceiling and Bulkhead

1.3 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C167 - 2009, Standard Test Method for Thickness and Density of Blanket or Batt Thermal Insulations.
 - .2 ASTM C423 - 2009a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - .3 ASTM C518 - 2010, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - .4 ASTM C553 - 2011, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .5 ASTM C665 - 2011, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - .6 ASTM C795 - 2013, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
 - .7 ASTM C1104/C1104M - 2000 (2006), Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
 - .8 ASTM E90 - 2009, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - .9 ASTM E423 - 2010, Classification for Rating Sound Insulation.
 - .10 ASTM E1050 - 2012, Standard Test Method for Impedance and Absorption of Acoustical Materials Using a Tube, Two Microphones and a Digital Frequency Analysis System.
- .2 Canadian Standards Association:
 - .1 CSA B111, Wire Nails, Spikes and Staples.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 The Underwriters Laboratories of Canada (ULC) Standards Committee:
 - .1 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies
 - .2 CAN/ULC S114, Determination of Non-Combustibility in Building Materials.
 - .3 CAN/ULC S115, Standard Method of Test of Firestop Systems.
 - .4 CAN/ULC S702, Standard for Thermal Insulation Mineral Fibre for Buildings, Includes Amendment 1.
- .5 Underwriters' Laboratories (UL).
 - .1 UL 181, Factory-Made Air Ducts and Connectors.

1.4 SUBMITTALS

- .1 Provide documents and items in accordance with Section 01 33 00.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and technical data sheets for blanket insulation and board insulation including product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit digital copies of WHMIS MSDS in accordance with Section 01 35 29 and 01 35 43. Indicate VOCs during application and curing.
- .3 Installation Instructions:
 - .1 Submit manufacturer's written installation instructions.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 together with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, in dry location that is well-ventilated.
 - .2 Store insulation in water proof material or sufficiently wrapped to meet manufacturer's recommendations. Do not expose batts to moisture in storage.
 - .3 Protect materials from compression while in storage.
 - .4 Replace defective or damaged materials with new.

Part 2 Products

2.1 INSULATION - GENERAL

- .1 Alternate brands of insulation may be used if the physical properties of the alternate match the physical properties of the insulation specified.
- .2 Install all insulation materials in strict accordance with good building practice and manufacturer's recommendations in order to ensure that products perform to their best possible insulating capacity.

2.2 INTERIOR WALL STUD ACOUSTIC INSULATION

- .1 Non-combustible, lightweight, semi-rigid stone wool batt insulation to CAN/ULC-S702 and ASTM C665 - Type 1.
- .2 ASTM C553 - Type 7 compliant.
- .3 Provide fire resistance to CAN/ULC-S114 and a sound control to ASTM E423.
- .4 Insulation thickness and width to fill stud cavities and be purpose made for steel studs or wood studs as applicable in field.
- .5 Use lower density mineral fiber batts within exterior walls and behind interior, acoustic panels.
- .6 Fire performance:
 - .1 Non-combustibility: To CAN/ULC S114.
 - .2 Surface Burning Characteristics: To CAN/ULC S102.
 - .3 Flame spread: 0.
 - .4 Smoke developed: 0
 - .5 Smoulder resistance: 0.09% to CAN/ULC S129.
- .6 Acoustical Performance:
 - .7 Airborne sound transmission loss: To ASTM E90.
 - .8 Rating sound insulation: To ASTM E413.

- .9 Sound absorption co-efficient: To ASTM E423.
- .10 Impedance and absorption of acoustic materials: To ASTM E1050.
- .11 Air erosion velocity: 5.08 m/s maximum to UL 181.
- .12 Thermal resistance: To ASTM C518.
- .13 Corrosive resistance: To ASTM C665, Corrosive to steel - Pass.
- .14 Stainless steel stress corrosion: To ASTM C795.
- .15 Density: To ASTM C167, 45 kg/m³.
- .16 Size: 410mm x 1219mm or 616mm x 1219mm or as required according to spacing of framing members.
- .17 Thickness: 89mm and 102mm and 152mm selected to fill stud space.
- .18 Acceptable Material:
 - .1 Steel or Wood stud walls:
 - .2 ROCKWOOL AFB;
 - .3 Johns Manville MinWool Sound Attenuation Fire Batts (SAFB),
 - .4 Paroc eXtra;

2.3 EXTERIOR WALL THERMAL INSULATION BETWEEN WOOD STUDS OR BEHIND ACOUSTIC PANELS MOUNTED ON WALLS OR CEILINGS AS AN INTERIOR FINISH

- .1 5.5 inch thickness, designed for wood studs forming part of the exterior wall assembly.
- .2 Acceptable Materials:
 - .1 Rockwool Comfortbatt.
 - .2 Johns Mansville TempControl Mineral Wool Canada,

2.4 ACCESSORIES

- .1 Insulation clips:
 - .1 Impale type, perforated 50 mm x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.
 - .2 Nails: galvanized steel, length to suit insulation plus 25 mm, to CSA B111.
 - .3 Staples: 12 mm minimum leg.
 - .4 Tape: as recommended by manufacturer.
 - .5 Acoustical sealant in accordance with Section 07 92 00 - Joint Sealants.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for board insulation application in accordance with manufacturer's written instructions.
- .2 Inform Consultant and Contractor of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation following correction of deleterious conditions and following receipt of Contractor's written authorization.

3.2 INSTALLATION - GENERAL

- .1 Install insulation after building substrate materials are dry.
- .2 Install blanket insulation to maintain continuity of thermal protection to building elements and spaces and to meet or exceed ASTM C1320.
- .3 Where stud intersections produce voids that are inaccessible after completion of framing, fill concealed voids with batts prior to completing framing.

- .4 Friction-fit insulation between studs or floor joist header or truss and wall juncture or where noted on drawings after cover material has been installed on one side of the cavity (gypsum board for interior partitions or exterior panel sheathing for exterior walls).
- .5 When unfaced insulation is used, and in applications with metal studs and without a cover material or, where the stud depth is larger than the insulation thickness, use wire or metal straps to hold insulation in place. Flanges may be taped to the face of metal stud prior to applying the interior finish.
- .6 Provide supplementary support to hold the product in place until finish surface is applied when insulation is installed in heights over 2400 mm.
- .7 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other penetrations or protrusions.
- .8 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .9 Offset both vertical and horizontal joints in multiple layer applications.
- .10 Do not enclose insulation until it has been inspected and approved by Building Official.
- .11 Do not compress insulation to fit into spaces.
- .12 Keep insulation minimum 75 mm from recessed light fixtures unless fixtures are designed to have insulation in contact with the housing.
- .13 Specified insulation may be placed in contact with sidewalls of CAN/ULC-S604 Type A chimneys and Type B vents, provided maximum vent temperature is within insulation manufacturer's published tolerance for heat in such circumstances.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11.
 - .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 11.
- .3 Waste Management: separate waste materials for reuse or recycling in accordance with Section 01 74 19.
- .4 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 27 10 Weather Barrier, Air Barrier and Transition Membrane
- .3 Section 07 92 00 Joint Sealants
- .4 Section 08 11 00 Steel Doors and Frames
- .5 Section 08 11 16 Aluminum Doors and Frames
- .6 Section 08 44 13 Glazed Curtainwall
- .7 Section 08 50 00 Aluminum Windows
- .8 Section 09 21 16 Gypsum Board Assemblies – thermal barrier for roof-mounted ductwork enclosure panels.

1.2 SUMMARY

- .1 Spray application of polyurethane foam to provide insulation, air barrier and vapour barrier, including surface preparation.
- .2 Application of foamed-in-place spray insulation to the following surfaces:
 - .1 Apply foam as sealer for doors, windows and service penetrations that do not carry hot gases such as uninsulated metal B vents or kitchen exhaust ducts or flues.
- .3 Coordinate insulation requirements with Electrical and Mechanical Divisions to ensure appropriate application of foam for penetrations.
- .4 All sprayed in place foam products used for the Project shall be formulated with blowing agents meeting GWP (Global Warming Potential) threshold of 150 or lower in force and effect as of January 2021.
- .5 All sprayed in place foam products used for the Project shall be tested in accordance with CAN/ULC S770-09 and technical data submitted shall report the results received for this test.

1.3 REFERENCES

- .1 Canadian Construction Materials Centre (CCMC) Evaluation Report.
 - .1 CCMC Technical Guide for Air Barrier Systems for Exterior Walls of Low-Rise Buildings.
 - .2 CCMC 14068-R Demilec Soya HFO.
 - .3 CCMC 14078-L Spray Polyurethane Foam Insulation HEATLOK SOYA HFO/POLARFOAM SOYA HFO
 - .4 Walltite CM01-CCMC 14100-I Spray Polyurethane Foam Insulation/Air Barrier
 - .5 Insulthane Extreme CCMC - 13697-L.
- .2 Canadian Urethane Foam Contractors' Association:
 - .1 Manual for Installers of Sprayed Polyurethane Foam Thermal Insulation.
 - .2 CUFCA Quality Assurance Program.
- .3 Underwriters' Laboratory of Canada (ULC):
 - .1 CAN/ULC S101, Standard Methods of Fire Tests of Building Construction and Materials.
 - .2 CAN/ULC S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .3 CAN/ULC S127 Standard Corner Wall Method of Test for Flammability Characteristics of Non-Melting Building Materials.
 - .4 CAN/ULC S705.1-15, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.
 - .5 CAN/ULC S705.2, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Application.
 - .6 CAN/ULC S770-09 Standard Test Method for Determination of Long-term Thermal Resistance of Closed-Cell Thermal Insulating Foams.

- .7 CAN/ULC S774 Standard Laboratory Guide for the Determination of Volatile Organic Compound Emissions from polyurethane Foam.

- .4 Occupational Health and Safety Act.

- .5 Workplace Hazardous Materials Information System (WHMIS) and MDS.

1.4 SUBMITTALS

- .1 Provide documents and items in accordance with Section 01 33 00.

- .2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and technical data sheets for polyurethane foam sprayed insulation and include product characteristics, performance criteria, physical size, finish and limitations.

- .2 Submit digital copies of WHMIS MSDS in accordance with Section 01 35 29.

- .3 Manufacturer's Instructions:

- .1 Submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures and health and safety information.

1.5 QUALITY ASSURANCE

- .1 Manufacturer's Qualifications: Company specializing in manufacturing the products specified in this section with minimum 15 years documented experience.

- .2 Health and Safety Requirements and worker protection:

- .1 Protect workers in compliance with AHJ's and as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:

- .2 Workers must wear eye protection, gloves, protective clothing and respirators when applying foam insulation.

- .3 Workers must not eat, drink or smoke while applying foam insulation.

- .4 Delimit area of spray using polyethylene sheet as necessary.

- .5 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Materials shall be delivered in manufacturer's original sealed containers or holding tanks, clearly labelled with manufacturer's name, product identification, safety information, net weight of contents and expiration date.

- .2 Material is to be stored in a safe manner and where the temperatures are within the limits specified by the material manufacturer (refer to manufacturer's MSDS).

- .3 Remove empty containers from site daily in accordance with CAN/ULC-S705.2.

1.7 SITE CONDITIONS

- .1 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

- .2 DO NOT apply foamed-in-place insulation to wet wood materials. Check moisture level for all materials before proceeding and ensure that wood to which foam must adhere achieves a moisture meter reading of 12% or lower.

- .3 The product shall not contain any CFC, HCFC or any ozone depletion substance.

- .4 The product shall have a HFO blowing agent with a global warming potential of 1, only (GWP).

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 19.

- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

- .4 Fold metal banding, flatten and place in designated area for recycling.

- .5 Divert metal drums from landfill to metal recycling facility and to CAN/ULC-S705.2.

Part 2 Products

2.1 EQUIPMENT

- .1 Equipment shall be as recommended in CAN/ULC-S705.2 and approved by the foam manufacturer for type of application.

2.2 MATERIALS

- .1 Foamed-in-place polyurethane insulation applied as air and vapour barrier system and thermal insulation.
- .2 Insulation: spray applied rigid cellular polyurethane to CAN/ULC-S705.1, closed cell, medium density at 29kg/m³ or higher; meeting or exceeding 42ng/Pa.s.m² vapour permeance for 2" (50mm) thick sample tested according to ASTM E96.
- .3 Comply with CAN/ULC S705.2 and the equipment manufacturer's recommendations for specific type of application and in accordance with CAN/ULC S705.1-15 Standard for Thermal Insulation Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.
- .4 The product shall be evaluated by the CCMC. Provide reports.
- .5 Acceptable Materials:
 - .1 'Walltite CM01 (HFO)' by BASF
 - .2 Heatlok Soya HFO/Airmétic HFO by the Demilec Inc.
 - .3 Polarfoam PF-7300-00 Soya HFO by the Demilec Inc.
 - .4 Insulthane Extreme
 - .5 Carlisle SealTite One – Closed Cell Foam.
- .6 Primers
 - .1 Install primers in accordance with the manufacturer recommendations and the CAN / ULC-S705.2 standard.
 - .2 For oily metal surface like Z-Bar, steel deck roof or curtain wall pan, aluminum tube, and PVC, before spraying polyurethane foam apply ADBOND 8388-1 adhesive primer, color: red.

Part 3 Execution:

3.1 GENERAL

- .1 Execute the work of this section when the temperature of the air and substrate are within the limits dictated on manufacturer's technical data sheet.
- .2 Apply sprayed insulation only when the relative humidity is lower than 80%.
- .3 When the application temperature for metal material is below 5 degrees C, consult with and follow manufacturer's recommendations.
- .4 Do not apply foam at exterior locations if wind is excessive.
- .5 Verify transition membranes required for air and vapour barrier continuity are in place prior to application of foamed plastics.
- .6 Report conditions deleterious to foam insulation performance to contractor and consultant.
- .7 Do not apply foam to any materials that are wet to the touch. When in doubt, measure moisture of substrate elements to verify that conditions are within manufacturer's application tolerances.
- .8 Do not apply foams to wet wood materials. Check moisture level of wood to which foam must adhere before proceeding and use a moisture meter to confirm acceptable moisture level of 12% or lower.
- .9 Commencement of insulation application indicates acceptance of project conditions as appropriate to the optimum performance of foam insulation.
- .10 This section shall perform follow-up inspection of foam application 48 hours or more after application to correct defects resulting from shrinkage or loss of adhesion.

3.2 EXAMINATION

- .1 Inspect to ensure that substrates are suitable to accept the work as outlined in this section and that they will meet or exceed the standard CAN/ULC-S705.2-98.

- .2 Surfaces to be covered with foamed-in-place insulation shall be free of moisture, frost, oil, rust and any other foreign material able to have a negative affect on the adhesion of the product. When there is doubt about a surface, apply a primer.
- .3 Ensure substrates are completely cured: concrete, mortar, fillers, membranes, primers, coatings or other surfaces, taking into account climatic conditions.
- .4 Verify the adhesion of membranes and coatings to different substrates are good, taking in account the climatic conditions for the application of membranes, coatings and spray foam.
- .5 If the thickness of application is greater than 50 mm (2"), the membrane detail around opening must be installed in accordance with foam manufacturer's typical details (for Demilec, drawings are available at www.demilec.ca or contact your representative) and as follows:
 - .1 Option1: use mechanical fastener to secure self-adhesive membranes around openings only. Use galvanized steel angle: 13 mm x 25 mm x 0.42 mm in thickness (gypsum corner bead) fixed at 400 mm C/C).
 - .2 Option 2: provide no mechanical fastening, pre-membraned plywood.
 - .3 All oily metal surface like Z-Bar, steel deck roof or curtain wall pan, aluminium tube, and PVC, shall be primed as referenced in CAN / ULC S705.2 art: A 1.7. If required, all spray applied membrane shall be installed before "Z" bars.
- .6 If the temperature is lower than 0°C, use mechanical fasteners wooden blocking for self-adhesive membranes fixed at 24" o/c.
- .7 Verify the moisture content of the different materials and do not apply foam to materials that are outside of tolerance parameters for the foam.
- .8 Follow the recommendations of the manufacturer for all different conditions in the scope of work for spray-applied foam.
- .9 Report in writing any defects in surfaces or conditions which may adversely affect the performance of products installed under this section to the consultant prior to commencement of work.
- .10 Commencement of work outlined in this section shall be deemed as acceptance of existing work and conditions.

3.3 PREPARATION

- .1 Allocate sufficient time to handle and prepare products in strict accordance with manufacturer's recommendations including mixing, capacity of equipment, thickness of layered application, cooling requirements, disposal of waste materials, storage, etc.
- .2 Review and retain on the work site, manufacturer's written instructions and technical data sheets.
- .3 Mask or otherwise protect adjacent surfaces and equipment from over spray or dusting.
- .4 Prepare all oily surfaces with primer, and wipe galvanized metals thoroughly following manufacturer's recommendations.

3.4 APPLICATION

- .1 Apply insulation to CAN/ULC S705.2 and manufacturer's written instructions.
 - .1 Allow each layer to skin completely before installing subsequent layer.
- .2 Apply only when surfaces and environmental conditions are within limits prescribed by materials manufacturer. Refer to technical data sheets.
- .3 Apply foamed-in-place insulation to form a continuous air and vapour barrier.
- .4 Do not expose foam to open flames, cutting and welding torches, electric heaters, high intensity lamps, burning tobacco, or other sources of intense heat in accordance with CAN/ULC-S705.2.
- .5 Do not apply closer than 75mm (3") to chimneys, recessed pot light or other source of heat or as specified by Provincial codes. Not to be used inside electrical outlets or junction boxes.
- .6 Warning signs must be posted and be clearly visible in sprayed areas. Rigid polyurethane cellular plastic must not be exposed to flames.

3.5 FIRE PROTECTION

- .1 Open flame or welding is not permitted to be in contact with the spray polyurethane foam in place. Use protection as required in CAN / ULC S705.2.
- .2 All plastic insulation must be protected from interior occupancy space by an approved thermal barrier to meet the requirements of Ontario Building Code.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11.
 - .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 11.
- .3 Waste Management: separate waste materials for reuse or recycling in accordance with Section 01 74 19.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 00 00 Cast-in-Place Concrete
- .2 Section 06 10 00 Rough Carpentry
- .3 Section 07 27 10 Weather Resistive Air Retarder, Air Barrier and Transition Membrane
- .4 Section 07 92 00 Joint Sealants

Part 2 REFERENCES

- .1 CAN/CGSB-51.34-M, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.
- .2 ASTM E1745 Standard Specification for Plastic Water Vapour Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
- .3 ASTM E154 Standard Test Methods for Water Vapour Retarders Used in Contact with Earth Under Concrete Slabs.
- .4 ASTM E96 Standard Test Methods for Water Vapour Transmission of Materials.
- .5 ASTM E1643 Standard Practice for Installation of Water Vapour Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- .6 ASTM F1249 Standard Test Method for Water Vapour Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

2.2 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Submit proof of manufacturer's CCMC Listing and listing number to Consultant.
- .3 Submit proof of manufacturer's ISO 9001, 9002 or 9003 registration and compliance to Consultant.
- .4 Submit proof of manufacturer's ISO 14001 registration and compliance to Consultant.
- .5 Submit proof of manufacturer's participation certificate for Environmental Choice Program to Consultant.
- .6 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures, etc.

2.3 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00.
- .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00.
- .3 Submit product data sheets for sheet vapour retarders. Including product characteristics, performance criteria and limitations.

2.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 19, and with the Waste Reduction Work plan
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .4 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
- .5 Fold up metal banding, flatten and place in designated area for recycling.
- .6 Use the least toxic sealants and adhesives necessary to comply with requirements of this section.
- .7 Close and seal, tightly, partly used sealant and adhesive containers and store protected in well ventilated, fire-safe area at moderate temperature.
- .8 Place used hazardous sealant tubes and adhesive containers in areas designated for hazardous materials.
- .9 Collect, package and store polyethylene cut offs and waste material for recycling in accordance with Waste Management Plan.

2.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations.
 - .2 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan, Waste Reduction Workplan related to Work of this section.

Part 3 Products

3.1 SHEET VAPOUR RETARDER – BELOW GRADE

- .1 0.381 mm (15 mil) thickness; polyolefin-based resin/chemical technology sheet.
- .2 Meet or exceed the following:
 - .1 ASTM E 1745-11, Class A, B & C.
 - .2 Maximum 0.01 perms vapour permeance according to ASTM E 1745.
 - .3 Puncture Resistance: ASTM D 1709 Method B Grams: >3200.
 - .4 Tensile Strength ASTM E 154 Section 9: lb. force/Inch =72; kN/m = 12.61.
 - .5 Water Vapor Permeance After Wetting Out, Drying out and after long-term soaking ASTM E-154 Section 8 and ASTM E-96 Procedure B, Perms: 0.0052
 - .6 Water Vapor Permeance Resistance to Plastic Flow and Elevated Temperature ASTM E-154 Section 11 ASTM E-96 Procedure B, Perms: 0.0057
 - .7 Water Vapor Permeance Effect Low Temperature and Flexibility to ASTM E-154, Section 12 and ASTM E-96, Procedure B, Perms: 0.0052
 - .8 Water Vapor Permeance Resistance to Deterioration From Organisms and Substances in Contacting Soil to ASTM E-154, Section 13 and ASTM E-96 Procedure B, Perms: 0.0052.
 - .9 Radon Transmittance (m/s) k124/02/95: 8.7×10^{-9}
 - .10 Radon Coefficient (m²/s): 3.3×10^{-12} .
- .3 Acceptable product: WR Meadows Perminator 15mil thick underslab vapour barrier.
- .4 Joint Tape: WR Meadows Perminator Tape.
- .5 MEL-ROL LM or Pointing Mastic: small penetrations through main sheet material including, but not limited to, stakes, small pipe, conduit and reinforcing steel.

3.2 SHEET VAPOUR RETARDER – ABOVE GRADE

- .1 Polyethylene film: to CAN/CGSB-51.34, 0.15 mm thick 6 mil (6/1000 of an inch).
 - .1 Minimum weight of materials: not less than 0.0915 kg/square metre (2.7 oz./square yard).
 - .2 Vapour transmission using Method A, ASTM E96, not to exceed 23 perms.
 - .3 Abrasion and tear resistance to ASTM D1117
 - .4 Completed assembly water penetration resistance to result in zero leakage.
- .2 Pipe Boots and Junction box wrap:
 - .1 Construct pipe boots and wrap for junction boxes from vapour barrier material and pressure sensitive tape per manufacturer's instructions.

3.3 ACCOUSTICAL SEALANT

- .1 Refer to Section 07 92 00 Joint Sealants.

3.4 ACCESSORIES

- .1 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric device boxes.

Part 4 Execution

4.1 EXAMINATION - GENERAL

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other sections or Contracts are acceptable for vapour retarder application in accordance with manufacturer's written instructions.
- .2 For underslab vapour retarder, verify that insulation boards are installed flat, fitted tightly to one another and all protrusions and that there are no broken boards.
- .3 Inform Owner and Consultant about unacceptable conditions immediately upon discovery.
- .4 Proceed with installation following correction of unacceptable conditions and subsequent receipt of Owner's written consent to proceed.

4.2 SEQUENCE CRITERIA

- .1 Exposure to UV for products of this section not to exceed manufacturer's recommended limits. Cover membranes as quickly as possible in accordance with construction schedule.

4.3 INSTALLATION – UNDERSLAB VAPOUR RETARDER

- .1 Ensure services are installed and inspected prior to installation of retarder.
- .2 Unroll 61 m roll over horizontal area for extent of concrete slab and cut to size.
- .3 Retarder sheet must completely cover the horizontal area and lap vertically up all intersection vertical walls and mechanical or electrical or other structural protrusions, minimum 150 mm.
- .4 All joints between sheets, both side and end laps, shall be overlapped 150 mm and taped using 100 mm wide specified joint tape.
- .5 All joints between sheet material and vertical wall junctions, block-outs, service or structural penetrations shall be over-lapped with additional, cut lengths of sheet material and all joints taped with sheet material joint tape for a distance of 150 mm above finished floor slab. Where feasible, extend sheet material up vertical wall surfaces without seams.
- .6 Refer to Collar Installation method described within manufacturer's installation instruction for taping and sealing cylindrical penetrations through sheet membrane:
 - .1 Cut a slit around pipes, ductwork, rebar, and wire penetrations to place the initial layer of sheet material.
 - .2 Cut a separate strip of sheet material to form a collar around the penetrating object. The length of the collar material shall be 1.5 times the object's circumference.
 - .3 With a roofer's knife or scissors, cut "fingers" half the width of the film. Wrap around and tape the collar onto the penetrating object and completely tape fingers to the primary sheet layer.
- .7 Repair of damaged sheet material:
 - .1 Cut a separate piece of sheet material large enough to cover damaged area including an overlapping region of at least 150mm beyond the outer boundary of the damaged area in all directions.
 - .2 Tape additional sheet to existing sheet - clean all adhesion areas of dust, dirt, and moisture. Apply tape to seam between patch and main sheet.
- .8 Small Penetrations and Steel Dowel or Reinforcing Steel Penetrations:
 - .1 MEL-ROL LM or Pointing Mastic may be used for stakes, small pipe, and rebar penetrations.
 - .2 Cut sheet material sufficiently to permit penetration by the object.
 - .3 Liberally apply MEL-ROL LM or Pointing Mastic around the penetration and ensure sufficient overlap to preserve integrity of the sheet membrane.
 - .4 MEL-ROL LM can be applied by brush, roller, or sprayer.
 - .5 Pointing Mastic can be applied by caulking gun or trowel.
- .9 Substrates to which tape is applied shall be free from dust, dirt, oils, and moisture to permit maximum adhesion of the pressure-sensitive tape.
- .10 Vapour Barrier Lap Joint Seals:
 - .1 Seal lap joints of sheet vapour barrier as follows:

- .1 Attach first sheet to substrate on continuous sealant beads on each truss and top plate of perimeter walls.
- .2 Apply continuous bead of sealant over solid backing at joint.
- .3 Lap adjoining sheet minimum 100mm and press into sealant bead.
- .4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.
- .11 Electrical Boxes:
 - .1 Seal electrical device boxes that penetrate vapour barrier as follows:
 - .1 Install moulded box vapour barrier.
 - .2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover. Alternatively, use sealing tape to join box vapour retarder flange to main sheet vapour retarder.

4.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11.
 - .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 11.
- .3 Waste Management: separate waste materials for reuse or recycling in accordance with Section 01 74 19.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 00 Cast-in-Place Concrete.
- .2 Section 03 48 00 Plant Precast Architectural Concrete Specialties.
- .3 Section 04 05 10 Masonry Procedures.
- .4 Section 04 08 00 Masonry Reinforcing and Connectors.
- .5 Section 04 09 00 Masonry Accessories.
- .6 Section 04 22 00 Concrete Unit Masonry.
- .7 Section 04 43 23 Quarried Stone Veneer Cladding.
- .8 Section 05 00 00 Metal Fabrications.
- .9 Section 06 10 00 Rough Carpentry.
- .10 Section 07 13 26 Self-Adhered Waterproofing Membrane.
- .11 Section 07 21 13 Board Insulation.
- .12 Section 07 21 16 Batt Insulation
- .13 Section 07 21 29 Sprayed-In-Place Polyurethane Insulation.
- .14 Section 07 62 00 Sheet Metal Flashing and Trim.
- .15 Section 07 92 00 Joint Sealants.
- .16 Section 08 11 00 Steel Doors and Frames.
- .17 Section 08 44 13 Glazed Curtainwall
- .18 Section 08 50 00 Aluminum Windows.
- .19 Section 09 11 00 Steel Stud Framing
- .20 Section 09 21 16 Gypsum Board Assemblies.
- .21 Section 31 00 00 Earthwork.

1.2 DEFINITIONS

- .1 Weather Barrier is a combination of materials and accessories that perform the following functions:
 - .1 Act as a weather resistive barrier in order to prevent the accumulation of water within the exterior wall assembly.
 - .2 Act as a continuous air retarder in order to minimize the air leakage into or out of the building envelope.
 - .3 Act as a vapour-permeable membrane providing sufficient water vapour transmission to enable drying of the interior of the wall assembly.

1.3 SUMMARY – CONTROL OF WATER VAPOUR AND AIR MOVEMENT IN BUILDING ASSEMBLIES

- .1 This Section specifies materials and installation methods that provide components of the primary means through which air and vapour transmission through the building envelope are controlled. The assemblies, when completed, also separate the interior environment from unconditioned or exterior space.
- .2 The performance criteria associated with air and vapour transmission through the building envelope are established by the Ontario Building Code (OBC).
- .3 The materials specified herein shall be applied or installed such that each is continuous throughout its extent and, together with other materials, establishes a contiguous installation that resists the free flow of air and water vapour through the components of the building envelope. Materials used for water vapour control shall be made contiguous with the materials that retard the flow of air.

- .4 Manufacturer's instructions shall be utilized to obtain direction regarding the following characteristics of each material:
 - .1 Compatibility of each product with other products.
 - .2 Limitations associated with application including surface conditions and temperature.
 - .3 Data associated with the intended performance in service and
 - .4 descriptions of materials and methods that must be employed to achieve the performance targets for the product in service.
- .5 The role of each material differs as follows:
 - .1 Air retarder sheets shall reduce the flow of air and provide a drainage plane that permits water to flow across the material without penetrating it. Sheets must be arranged in a shingle pattern: the bottom edge of higher sheets must be lapped over the top edge of lower sheets. Tapes must be used to join adjacent sheets and applied without gaps or fish-mouth defects. These materials are positioned on the exterior side of wall studs.
 - .2 Vapour retarders shall be any material (existing or new) that achieves the resistance to vapour transmission stipulated for vapour barriers within the OBC. The materials may be appropriate sheet plastic, appropriate tapes, the transition membranes specified herein, sprayed-in-place closed-cell foam insulation specified herein or sealants, all of which perform. These materials are generally positioned on the interior side of wall studs.
 - .3 Transition strips, sprayed-in-place foam insulation and joint sealants provide resistance vapour transmission and water penetration. Transition membranes are also flashings.
- .6 Air barrier system specifications which have the following general applications and assemblies:
 - .1 Exterior walls: Sprayed-in-place polyurethane insulation applied to interior side of exterior concrete unit masonry walls and to the interior face of panel sheathing applied to wood stud framing used for exterior wall assemblies together with self-adhesive air barrier continuity or transition strips installed over joints between differing materials and where shown on drawings, including, but not limited to continuity wrap at exterior door and window and service penetration openings in the exterior wall assembly.
 - .2 Foam insulation boards applied to interior side of foundation wall.
 - .3 Roof Assembly: panels of vapour barrier with selvage edges connected to concrete masonry and wood stud wall framing which are joined to the interior, sprayed-in-place foam insulation and weather resistive air retarder sheets and transition membrane.
 - .4 Interface between interior and exterior through openings: transition membranes and sprayed-in-place polyurethane foam applied to ensure air tight and water proof seals around framed window, door and service penetrations, device penetrations or equipment openings and transition membranes applied over changes in materials.
 - .5 Transition membranes applied to changes in assemblies: membranes applied over joints in materials to ensure air tight seal between differing structural systems such as the structural steel frame junction with foundation walls and concrete floor slabs, or different planes of construction or across differing materials.
 - .6 Underslab vapour retarder connected to interior sprayed-in-place foam applied to interior side of foundation wall.
- .7 The use of sprayed-in-place foam in all cases as part of the air barrier system wherever it is applied and it shall be applied in accordance with manufacturer's recommendations to achieve an air tight assembly.

1.4 SUMMARY - ISOLATION OF MATERIALS:

- .1 Transition membrane and tapes specified in this section may be used to isolate dissimilar metals or to separate wood material from concrete.

1.5 SUMMARY – RESISTANCE TO WATER PENETRATION:

- .1 Apply transition membranes over changes in assemblies that result in changes to the drainage plane established at a higher elevation.
- .2 Apply transition membranes over framing around openings in exterior walls to protect the framing around such openings from the effects of water penetration.
- .3 Apply transition membranes behind metal flashings as a second line of defence and lap air retarder sheets over the upper edges of the transition membrane.
- .4 Apply transition membranes over joints between dissimilar framing materials and assemblies (such as wood and steel structure) to ensure an air-tight and water proof seal between different structural systems.
- .5 Apply transition membranes across seams created by assembly of building materials including layered wood plates, spacers and studs when the resulting seams between the framing members establish a route for air and water vapour transmission from interior to exterior through the building envelope.
- .6 Apply sprayed-in-place foam between surface of transition membrane and installed door or window frame in all cases following installation of exterior sealant over foam rope.

1.6 PERFORMANCE REQUIREMENTS

- .1 Weather resistive air retarder:
 - .1 Install to provide a secondary liquid water drainage plane flashed to discharge any incidental condensation or water penetration.
- .2 Air Barrier:
 - .1 It must be continuous, with all joints made airtight.
 - .2 It shall have an air permeability not to exceed 0.004 cfm/ft² under a pressure differential of 0.3 in. water (1.57 psf.) (equal to 0.02 L/s/m² @ 75 Pa.) when tested in accordance with ASTM E 2178-01.
 - .3 It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
 - .4 It shall be durable or maintainable. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep.
 - .5 Air barrier shall form an air-tight connection between:
 - .1 Foundation and exterior walls.
 - .2 Exterior walls and windows or doors.
 - .3 Differing wall systems that abut or conjoin.
 - .4 Juncture of Exterior Wall Air Barrier and Air Barrier in Roof Assembly.
 - .5 Walls, floor and roof across construction, control and expansion joints.
 - .6 Walls, floors and roof to utility, pipe and duct penetrations.
 - .7 All penetrations of the air barrier and paths of air infiltration or exfiltration shall be made airtight.

1.7 REFERENCES

- .1 Ontario Building Code 2024, latest edition; Environmental Separation
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 167-96 - Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
 - .2 ASTM C 836-95 - Standard Specification for Cold Liquid Applied Waterproofing Membranes with a Separate Wearing Course
 - .3 ASTM D 412-87 - Standard Test Methods for Rubber Properties in Tension
 - .4 ASTM D 570 - Test Method for Water Absorption of Plastics
 - .5 ASTM D 1970-94 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
 - .6 ASTM D 2000-98 - Classification System for Rubber Products in Automotive Applications
 - .7 ASTM D 2939-94 - Standard Test Methods for Emulsified Bitumens Used as Protective Coatings
 - .8 ASTM D 3767-92 - Standard Practice for Rubber - Measurements of Dimensions
 - .9 ASTM E 96-95 - Test Methods for Water Vapor Transmission of Materials
 - .10 ASTM E 2178-01 - Standard Test Method for Air Permeance of Building Materials
 - .11 ASTM E 2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- .3 Canadian Construction Materials Centre (CCMC):
 - .1 Technical Guide Air Barriers Materials
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.32-M 77, Sheathing, Membrane, Breather Type.
 - .2 CAN/CGSB 51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction
- .5 Sealant and Waterproofer's Institute:
 - .1 Sealant and Caulking Guide Specification.
- .6 Underwriter's Laboratory of Canada (ULC):
 - .1 CAN/ULC S102.2-03, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies
 - .2 CAN/ULC-S741-08, Standard for Air Barrier Materials - Specification
 - .3 CAN/ULC-S742-11, Standard for Air Barrier Assemblies - Specification

1.8 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations for self-adhesive flashing and transition membrane products.
 - .2 Submit WHMIS MSDS - Material Safety Data Sheets.

1.9 QUALITY ASSURANCE

- .1 Manufacturer: Air and vapor barrier materials shall be manufactured and marketed by a firm with a minimum of 20 years' experience in the production and sales of waterproofing products. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified.

- .2 Materials: Self-adhered air and vapor barrier material shall be 36 mils (.90mm) of self-adhering SBS rubberized asphalt laminated to a 4 mil (.10mm) cross-laminated high-density polyethylene film.
- .3 Mock-Up
 - .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct typical exterior wall panel, 3000 mm long by 3000 mm feet wide, incorporating window and frame, and sill, insulation, building corner condition, including materials interface and seals.
 - .3 Locate where directed by consultant.
 - .4 Mock-up may remain as part of the Work if acceptable to Consultant.
 - .5 Allow 48 hours for inspection of mock-up by Consultant before proceeding with air retarder Work.

1.10 PRE- INSTALLATION MEETING

- .1 Convene one work week prior to commencing Work of this section, and prior to start of mock-up.

1.11 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01610 - Basic Product Requirements.
- .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .3 Deliver materials and products in labeled packages, storing self-adhered membrane packages in upright position (on end of roll). Protect from damage due to exposure to sunlight, weather, temperature outside of manufacturer's published limits for storage of the material and construction operations.
- .4 Remove damaged material from the site and dispose of in accordance with applicable regulations.
- .5 Do not freeze material prior to application.
- .6 Sequence deliveries to avoid delays while keeping on-site storage at a minimum.

1.12 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal and return pallets to suppliers for re-use.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.

1.13 AMBIENT CONDITIONS

- .1 Install solvent curing sealants and vapour release adhesive materials in open spaces with ventilation.
- .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities and manufacturer's requirements for use of materials within this Section.
- .3 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.14 SEQUENCE

- .1 Sequence work in accordance with Contractor's critical path and to establish a progressively more air and water tight construction as the work proceeds.
- .2 Sequence work to permit installation of materials in conjunction with related materials and seals.
- .3 Install sheet weather resistive air retarder in construction sequence to minimize exposure of sheet materials to sunlight to a period on no more than manufacturer's limitations on exposure to UV radiation.

- .4 Apply air and vapor barrier within the weather conditions and the range of ambient and substrate temperatures specified by air and vapour barrier manufacturer(s).
- .5 Do not apply to a wet substrate.
- .6 Proceed with installation when the substrate construction and preparation work is complete and when conditions are appropriate for installation of the air and vapor barrier membranes.
- .7 Review all drawings and specification and coordinate transition membrane installation requirements with Contractor.

1.15 WARRANTY

- .1 For sealant and sheet air barrier materials the 12 months warranty period prescribed in CCDC Contract is extended to 24 months commencing on date of substantial performance of the contract.
- .2 Warranty: include coverage of installed [sealant] [sheet materials] which:
 - .1 Fail to achieve air tight and watertight seal.
 - .2 Exhibit loss of adhesion or cohesion.
 - .3 Do not cure.

Part 2 Products

2.1 SHEET WEATHER RESISTIVE AIR RETARDER TO MEET OR EXCEED:

- .1 Performance Criteria:
 - .1 Product must function as an air barrier as defined by OBC.
 - .2 Product must provide bulk water resistance and act as a secondary drainage plane behind exterior cladding to prevent water entering behind exterior cladding from entering into the wall cavity.
 - .3 Must offer water vapour permeability that permits water vapour entering the wall cavity from interior or exterior sources to leave the wall assembly (evaporate).
 - .4 Must be continuous through application of appropriate tape to result in air-tight joints.
 - .5 Capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
 - .6 Durability: the air retarder shall be joined in a continuous, flexible way using means that permit the relative movement of parts of the building due to thermal and moisture variations and shrinkage over time.
 - .7 Air barrier shall form an air-tight connection between:
 - .1 Exterior walls and transition membranes around window and door openings.
 - .2 Differing wall systems that abut or join including all flashings.
- .2 Permeable, weather resistive membrane, weight 2.15 grams/square metre (1.8 oz/yd²)
- .3 Properties: Air Penetration resistance: Type 1, ASTM E1677
 - .1 Air permeability: not to exceed 0.004 cfm/ft² under a pressure differential of 0.3 in. water (1.57 psf.) (equal to 0.02 L/s/m² @ 75 Pa.) when tested in accordance with ASTM E 2178-01. Test result for ASTM E1677: Type 1.
 - .2 Water Vapour Permeance: ASTM E96-05 Method A (g/m² -24 hrs) = 400 (56 perms). Method B: (g/m² -24 hrs) = 370 (54 perms).
 - .3 Water Penetration Resistance: according to ATTCC = 127 (250 cm).
 - .4 Tear Resistance: to ASTM D1117 = 8/6 pounds.
 - .5 Surface Burning: Class A; Flame Spread: 15, Smoke Developed Index: 15, Class A.

- .6 UV Exposure: maximum 120 days.
- .4 Weather Resistive Sheet Air Retarder to meet or exceed:
 - .1 CCMC evaluation no. 10098.
 - .2 CMHC Evaluation Report 13013-R.
 - .3 Spun bonded polyolefin vapour permeable air retarder membrane. All parts of air retarder system to be supplied by same manufacturer.
- .5 Acceptable material:
 - .1 Tyvek sheet weather resistive air retarder membrane by DuPont.
 - .2 Styrofoam Weathermate Plus by Dow Chemical

2.2 WATER RESISTIVE AIR RETARDING SHEET (AIR RETARDER), JOINT TAPE AND FASTENERS:

- .1 Air retarder joint tape to meet or exceed CMHC evaluation no. 11955, 10418, 11362.
- .2 Material: Flash spun-bonded, high density polyethylene fibers which bonded together by heat and pressure, without use of binders or fillers and formed into a durable, sheet structure. Incorporate additives into the polyethylene to provide ultraviolet light resistance.
- .3 Acceptable Materials:
 - .1 Tuck Tape – red sheathing tape to meet CMHC report No. 11955.
 - .2 3m red sheathing tape to meet CMHC report no. 11955.
- .4 Fasteners:
 - .1 hot-dipped galvanized screws or nails complete with 1" dia. plastic washers.
 - .2 Select length to penetrate OSB sheathing into stud or strapping.

2.3 AIR BARRIER MEMBRANE, THROUGH WALL FLASHING, TRANSITION AND CONTINUITY WRAP:

- .1 For each type of material required for the work of this section, provide primary materials and materials compatible with the air and vapor barrier.
- .2 Description:
 - .1 A self-adhered air and vapor barrier material comprised of 36 mils (0.90mm) of self-adhering SBS rubberized asphalt laminated to a 4 mil (0.10mm) cross-laminated high-density polyethylene film with a siliconized release liner.
- .3 Performance Requirements:

Property	Test Method	Typical Value
Membrane Air Permeance: Air Leakage @ 75Pa Differential Pressure	ASTM E 2178-01 CCMC 07273	Less than 0.00001 L/s/m ²
Water Vapor Permeance	ASTM E 96B	0.05 perms
Assembly Performance: Provide a continuous air barrier assembly	ASTM E 2357	0.002 cfm/sq ft No noticeable component failures
Elongation (Membrane)	ASTM D 412 Die C	250%
Tensile Strength (Membrane)	ASTM D 412 Die C	500 psi
Tensile Strength (Film)	ASTM D 412 Die C	5,000 psi
Puncture Resistance – Membrane	ASTM E 154	30 lbs minimum
Pliability, 180°F – 1" mandrel @ -25°F, -32°C	ASTM D 1970	Pass
Moisture Absorption	ASTM D 570	.1%
Thickness	--	40 mils

- .1 Weight: 1.45 kg/m² (0.30lb/ft²)
- .4 Acceptable Materials:
 - .1 ExoAir 110 and 110LT (Low-Temperature) by Tremco

- .2 Blueskin SA by Henry Company.
- .3 Soprastick 1100T self-adhering flashing by Soprema
- .4 Sealtight self-adhering membrane by WR Meadows.
- .5 Dupont Tyvek FlexWrap NF.

2.4 AIR BARRIER, THROUGH WALL FLASHING AND TRANSITION MEMBRANE PRIMERS:

- .1 Supply and Apply primers for all transition membranes in all situations.
- .2 Select primers for substrate and environmental conditions during application.
 - .1 Henry Company Blueskin Primer and Blueskin Spray Prep
 - .2 Soprema Flastocol Stick or Flastocol Stick H₂O
 - .3 ExoAir Primer as manufactured by Tremco
 - .4 WR Meadows Sealtight self-adhering membrane
 - .5 DuPont Adhesive Primer

2.5 AIR BARRIER MEMBRANE MASTIC:

- .1 Liquid mastic for sealing around brick ties, penetrations and lap and T-joints.

2.6 SEALANTS

- .1 Sealants in accordance with Section 07 92 00 - Joint Sealants.

2.7 SPRAYED-IN-PLACE FOAM INSULATION:

- .1 Closed cell, low expansion foam purpose-made for space between framed opening and frame of doors and windows.
- .2 Select closed cell, type suitable for size of joints for other penetrations that are not flues including mechanical and electrical services.

Part 3 Execution

3.1 GENERAL AND MANUFACTURER'S INSTRUCTIONS

- .1 Comply with manufacturer's written recommendations and specifications, including product technical bulletins, handling, storage and installation instructions, and Technical Data Sheets.
- .2 Perform Work in accordance with this section, manufacturer's instructions and Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification requirements applicable to material installation.

3.2 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept the Work of this section.
- .2 Ensure all surfaces are clean, dry, sound, smooth, continuous and comply with air retarder or transition membrane manufacturer's requirements.
- .3 Report any unsatisfactory conditions to the Consultant in writing.
- .4 Do not start work until deficiencies have been corrected.
- .5 Commencement of Work implies acceptance of conditions.
- .6 The installer shall examine substrates, construction area, environmental conditions, use and access conditions, etc. for compliance with manufacturer's requirements and construction sequence.
- .7 Notify the contractor in writing of circumstances detrimental to the proper completion of the work. Do not proceed with installation until unsatisfactory conditions have been corrected.
- .8 For Air Barrier, Through Wall Flashing and Transition Membranes, ensure that:
 - .1 All substrate must be visibly dry and free of moisture.

- .2 Surfaces receiving materials specified herein are sound, dry, even, and free of oil, grease, dirt, dust, saw dust or coatings that will react to new materials or other contaminants.
- .3 For applications to exterior wall sheathing panels, ensure that the panels are sufficiently stabilized and that corners and edges are fastened securely to substrate or framing using appropriate screws or hot-dipped galvanized nails.
- .4 Apply two coats of primer to OSB surfaces that will receive transition membranes in all case. Permit drying time between coats.
- .5 Review flashing installations and apply water resistive barrier and transition membrane materials to permit water drainage from high elevation to lower and enact installation sequence that will result in a shingle pattern of installation with appropriate overlaps of the materials.
- .6 Ensure that the location of solid nailing points (studs, strapping, blocking) are known to permit mechanical attachment of the top edge of all transition membranes used as flashing material.
- .7 Ensure that termination bar used for concrete balcony is available on site prior to commencing transition membrane flashing.

3.3 PREPARATION

- .1 For application of transition membrane or sprayed-in place foam insulation to concrete and steel:
 - .1 Clean, prepare and treat substrates according to manufacturers' written instructions. Surfaces to be coated must be clean, smooth, firm, free of dust, mud, loose mortar, wires, fins or any other substance that might prevent placement and bonding of membrane.
 - .2 Mask surrounding surfaces, door or window frames and exposed elements to prevent accidental coating by primers, foam and mastics.
 - .3 Remove contaminants such as grease, oil and wax from exposed surfaces. Use repair materials and methods that are acceptable to manufacturer of the self-adhered membrane.
 - .4 Ensure all substrates are free of surface moisture prior to application of joint tapes
 - .5 Prime areas to be detailed and allow full curing before application of membranes.
 - .6 For self-adhering membranes: Ensure exterior concrete, concrete masonry, plywood and OSB sheathing panels, and sawn lumber receiving membranes receive an adequate amount of primer to achieve required bond to substrate. Apply two coats of primer, minimum, to exterior plywood, and OSB sheathing panels and sawn lumber and allow first coat to cure completely prior to subsequent applications.
 - .7 Ensure metal closures are free of sharp edges and burrs.

3.4 INSTALLATION

- .1 General:
 - .1 Ensure that temperature and substrate conditions are appropriate for the installation tolerances established by the manufacturer.
 - .2 Install all sheet materials in accordance with manufacturer's instructions using a shingle type pattern of over lapping sheet designed to shed water downward without entering gaps at upper edges of lower sheets.
 - .3 Apply all products within recommended application temperature ranges and timing. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- .2 Transition Membrane and Through Wall Flashing Membrane:
 - .1 Apply air barrier continuity wrap to prepared surfaces continuously and lap joints minimum of 100 mm and end laps a minimum of 128 mm; stagger all end laps. Batten open edges of

transition membrane using strapping and blocking that are part of the framing work anticipated, where feasible to secure self-adhering membrane permanently.

- .2 Apply membranes with 100 mm overlap onto or under as the case requires, for each door and window all around opening – head, jamb and sill and for all jambs or door frames for doors set into exterior walls such that lower sheets are over lapped by higher sheets in a shingle pattern.
- .3 Roll membranes firmly against substrate in all instances.
- .4 Self-adhesive air barrier membrane shall be installed to substrate of polyurethane foam prior to application of foam.
- .5 Transition membrane shall be free of gaps or fish-mouths, applied to prepared surfaces. Air barrier membranes installed with gaps will be rejected.
- .6 Apply transition and through-wall flashing membranes before air retarder sheet or after air retarder sheets sequenced so that the membrane assemblies create a shingle effect from top of the building to the bottom.
- .7 Install transition membranes at all beams, columns, joints and all windows, doors and penetrations as indicated in detail drawings.
- .8 Use transition membranes to create sealed, uniform, air barrier installation over floor and wall intersection and roof and wall intersection and over all changes in substrates.
- .9 Apply transition and through-wall flashing membranes in appropriate lengths and in such a manner as to ensure continuity of the entire air barrier assembly.
- .10 Use pre-cut, easily handled lengths for each location. Remove release paper, position membranes carefully before placing them against the surface. Use a roller to apply pressure to the entire surface to remove all air pockets and assure positive contact to the substrate. Apply mastic at all penetrations, lap joints not oriented to shed water, and T-joints.
- .11 Apply mastic at penetrations, lap joints not oriented to shed water, and T-joints.
- .12 Prior to completion of the air barrier project work or at the end of each work day, apply termination mastic to the top edge seam. Tool mastic to ensure it is worked into the surface.
- .13 Coordinate installation of the air barrier system with the roofing trade to ensure continuity and compatibility with the roofing system at this critical transition area.
- .14 Connect the air barrier membrane to adjacent parts of the building envelope such as the roof membrane air barrier, below-grade wall, window and curtain wall systems, and other parts of the building envelope.
- .15 Inspect the membranes before covering and repair any punctures or damaged areas. Make repairs with patching materials and mastics as appropriate and recommended by membrane manufacturer, extending repair material a minimum of 100mm beyond the puncture or damage.

3.5 WATER RESISTIVE AIR RETARDER SHEETS OVER WALL ASSEMBLY:

- .1 Apply air retarder sheet with joints lapped at least 100 mm (4") and sealed with air retarder joint tape.
- .2 Connect air retarder to window, door and eave line membrane waterproofing using transition membrane applied over primed surfaces and lapping air retarder sheet to shed water.
- .3 Connect air retarder sheets over transition membrane over transition membranes applied to head of window and over top edge of self-adhered transition membrane used as a flashing set at bottom of siding installation or above window opening flashings.
- .4 Tape end of air retarder sheet to sheathing face at end of each day's work while work is in progress.
- .5 Cover exposed exterior surface of sheathing with weather barrier securely fastened to framing immediately after sheathing is installed.

- .6 Maintain continuity of air and water barrier assemblies.
- .7 Start weather barrier installation at a building corner, leaving 12 inches (300 mm) of weather barrier extended beyond corner to overlap.
- .8 Install weather barrier horizontally starting at lower portion of wall surface.
- .9 Provide minimum 6 inches (150 mm) overlap at horizontal- and vertical-wrap seams in a shingle manner to maintain continuous downward drainage plane and air and water barrier.
- .10 Seams: Seal seams with building wrap tape per manufacturer's recommended installation instructions.
- .11 Shiplap horizontal seams in weather barrier to facilitate proper drainage.
- .12 Fasteners: Use weather barrier manufacturer's recommended fasteners to secure weather barrier and install fasteners according weather barrier manufacturer's installation guidelines.
- .13 Do not use temporary fasteners to permanently attach weather barrier.
- .14 Do not place fasteners with gasket washers where weather barrier flashing will be installed.
- .15 Install fasteners with gasket washers through flashing where recommended by manufacturer.

3.6 SPRAYED-IN-PLACE FOAM INSULATION:

- .1 Apply foam rope and exterior sealant to joints between windows and exterior door frames and adjacent transition membrane previously applied to framing assembly prior to applying foam within joints.
- .2 Allow sealant to cure sufficiently to avoid distortion of joint due to expansion of foam.
- .3 Brace all vinyl windows to resist deflection due to expanding foam.
- .4 Apply masking tapes to prevent foam from making contact with exposed faces of window and door components.
- .5 Cover surfaces and glass as necessary to prevent over-spray from making contact with finished surfaces.
- .6 Apply foam in accordance with manufacturer's instruction using a minimum of two applications. Permit initial application to cure prior to providing second application.

3.7 CLEANING AND PROTECTION OF WORK

- .1 Remove any masking materials after installation.
- .2 Clean spillage and soiling on adjacent construction that will be exposed in the finished work using cleaning agents and procedures recommended by manufacturer of the affected construction.
- .3 Protect membranes to avoid damage from other trades, and construction materials during subsequent operations.
- .4 Insulation and finishes or protection products may be installed after all membranes have cured.
- .5 Schedule work so that the air and vapor barrier system is covered as soon as possible after installation. If the air and vapor barrier system cannot be covered within the 30 days following installation, apply temporary UV protection such as dark plastic sheet or tarpaulins.
- .6 Protect finished Work in accordance with Section 01610 - Basic Product Requirements.
- .7 Do not permit adjacent work to damage work of this section.
- .8 Ensure finished Work is protected from climatic conditions.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 21 13 Board Insulation
- .3 Section 07 21 19 Foamed-In-Place Insulation – Polyurethane
- .4 Section 07 27 10 Air Retarder, Air Barriers, Transition Membrane Assemblies
- .5 Section 07 62 00 Sheet Metal Flashing and Trim
- .6 Section 07 92 00 Joint Sealants
- .7 Section 08 1100 Metal Doors and Frames
- .8 Section 08 31 00 Access Doors
- .9 Section 08 50 00 Windows
- .10 Section 09 21 16 Gypsum Board Assemblies
- .11 Section 09 91 23 Painting and Finishing
- .12 Mechanical and Electrical Divisions.

1.2 SECTION INCLUDES

- .1 Western Red Cedar wood siding, trim boards and mouldings: milled products, architectural mouldings and trims, corner boards, fascia, rake, belt line trims, cladding on exterior wood framing beams and posts, frieze boards all consisting of factory finished wood as specified herein and noted on drawings.
- .2 Metal drip flashings shown on drawings to protect exposed edges of wood products.
- .3 Sealants associated with wood siding and trims supplied and installed where shown on drawings.
- .4 Wood soffit supply and installation.

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM D5116, Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
 - .2 ASTM D 1761-Mechanical Fasteners in Wood.
 - .3 ASTM E 84 - Surface Burning Characteristics of Building Materials
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .3 CSA International
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
 - .2 CAN/CSA-Z809-08, Sustainable Forest Management.
- .4 Environmental Choice Program (ECP)
 - .1 CCD-045-95, Sealants and Caulking Compounds.
- .5 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .6 National Lumber Grading Authority (NLGA)
 - .1 NLGA Standard Grading Rules for Canadian Lumber 2010.
- .7 Sustainable Forestry Initiative (SFI)
 - .1 SFI- 2010-2014 Standard.
- .8 Wood Siding Installation Guide:
 - .1 Installation Guide – Maibec em + Siding.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Product Data:
 - .1 Submit supplier's instructions, printed product literature and data sheets for wood siding and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit digital copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Samples:
 - .1 Submit duplicate 610 mm x width of board size of siding profile specified, all trim boards shown or specified.
 - .2 Wood Certification: submit manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.

1.5 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 EXTRA MATERIALS

- .1 Provide 2% additional material of each specified profile or shape as maintenance materials.
- .2 Cut off sections 1220 mm and longer and not suitable for the work shall be retained by the Owner in addition to maintenance materials.
- .3 Locate and store maintenance materials on site as directed by Owner.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements. Include with material, manufacturer's written instructions.
- .2 All lumber, trims and claddings shall be inspected by the Contractor at the site and upon receipt from shipper. Any damaged or unsuitable materials shall be rejected by the Contractor.
- .3 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .4 Storage and Handling Requirements:
 - .1 Store materials off ground, covered with waterproof wrapping and in accordance with manufacturer's recommendations. Support all materials to prevent warping and distortion. Do not leave materials uncovered when not in use.
 - .2 Store and protect wood siding and trim from nicks, scratches, and blemishes and distortion including warping.
 - .3 Replace defective or damaged materials with new.
- .5 Store all cedar products in weather tight containers or trailers or within the building. Do not store outdoors and prevent precipitation from reaching stored products.
- .6 Keep all siding and trim products free of dust, gypsum board compound, mortar or other materials associated with other processes at the site.
- .7 Do not store cedar products on bare concrete or in wet areas. Maintain protective coverings at all times.
- .8 Do not install cedar products when precipitation would result in wetting of products during installation.

1.8 PROJECT CONDITIONS

- .1 Install materials when environmental conditions (precipitation, temperature, humidity) are within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- .2 Do not install cedar products until roofing is complete and waterproof and fascia metals are installed.
- .3 Review all conditions for true, straight, plumb and smooth junctures with soffit materials.

- .4 Do not commence cedar installation if site conditions are unacceptable. Report defects found to Contractor and Consultant.
- .5 Provide all required access aids for construction including ladders, scaffold and associated safety equipment.

1.9 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, box board corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused wood materials, except pressure treated materials, from landfill to recycling, re-use or composting facility approved by Consultant.
- .5 Develop Construction Waste Management Plan related to Work of this Section.
- .6 Packaging Waste Management: remove for reuse and return pallets, crates, padding. Recycle packaging materials where facilities exist.

1.10 COORDINATION

- .1 Coordinate Work with other operations and installation of finish materials below soffit and to avoid damage to installed materials.
- .2 Coordinate installation with Contractor to avoid conflicts on the site with other trades including delivery of materials, installation of other cladding products, roofing, metal flashings.

1.11 WARRANTY

- .1 Warranted to the original Owner to be free of manufacturing defects and defects to the finish arising from use and exposure for a period of 15 years for all factory finished products and a further 15 years provided that the Owner performs maintenance required as a condition of the warranty.
- .2 Provide one year warranty for all installation labour together with product warranty.
- .3 Submit warranty for inclusion in closeout materials.

Part 2 Products

2.1 MATERIALS

- .1 Lumber siding and soffit: to NLGA Standard Grading Rules for Canadian Lumber and as follows:
- .2 Exterior Cedar Soffit, Siding Cladding and Trim:
 - .1 Material:
 - .1 WRCLA Western Red Cedar.
 - .2 Grade: passing NLGA 101A, "C or Better" "R List #2 Clear/4 clear and better"; 7/4" thick, 8" width; straight grain and uniform texture.
 - .3 Shape: Tongue and groove edge.
 - .4 Size: 2"x 8" (38 mm x 184 mm) nominal size.
 - .5 Kiln dried.
 - .6 Fastener: concealed stainless steel, ring shank nails.
 - .7 Boards certified and labelled Forestry Council of Canada
 - .8 Trims milled to profiles shown from solid cedar lumber grade and quality equal to soffit panels.
 - .1 Acceptable Source:
 - .2 Harvested and milled by Fraserview, 6630 144th Street, Surrey, British Columbia, Canada V3W 5R5, <https://www.fraserviewcedar.com/>
 - .3 Product "Fraserview Export Clear".

- .9 Trim materials provided by same manufacturer as siding with the same grade, mill-finished, smooth texture, surfaced on all exposed edges and faces, dimensions shown on drawings. All trims are 38 mm (1.5") thickness unless noted otherwise.
- .2 CAN/CSA-Z809 or FSC or SFI certified.
- .3 Exposed trim, corner boards, window and door trims supplied by siding manufacturer with factory finish equal to siding panels, colour selected by architect.
- .3 Strapping and Furring:
 - .1 Wood pine select or better, 1 x 4 (19 mm x 89 mm) SFP number 1 or 2; S4S; S-Dry, 19% maximum moisture content when installed; 15% moisture content, maximum, in service.
 - .2 Metal - Products specified on drawings and wall type schedule
- .4 Air Retarder - exterior wall sheathing paper: to CAN/CGSB-51.32 single ply spun-bonded olefin specified within section 07 27 10 Air Retarder, Air Barrier and Transition Membranes.
- .5 Siding and Associated Trim Fasteners: nails to CSA B111, pre-finished heads, stainless steel recommended by manufacturer of siding and trim; ring thread type with finishing head.
- .6 Strapping Fastener: hot-dipped galvanized.
- .7 Sealants: refer to 07 92 00.

Part 3 Execution

3.1 GENERAL REQUIREMENTS FOR PERFORMANCE OF THE INSTALLATION

- .1 MANAGING WATER and ALLOWING DRYING - The following requirements must be respected to properly manage water:
 - .1 Water must be able to drain away freely between the siding and water-resistive barrier.
 - .2 Install flashing over all openings, flat surfaces and wherever moisture drainage is needed.
 - .3 Use weather-seal tape/membrane around windows, doors and all other openings to ensure a tight seal with the water-resistive barrier. This will protect the wall from water infiltration.
 - .4 Allow no horizontal furring strips or surfaces at the bottom of walls in order to prevent free-drainage of water from the space behind the siding.
 - .5 Permit the siding and soffit spaces to ventilate freely and continuously.

3.2 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept the Work of this section.
- .2 Ensure all surfaces are clean, dry, sound, smooth and continuous and that previous installations comply with specified requirements including position of blocking, nailing strips, air barrier and transition membrane and manufacturer's requirements for products and installation specified herein.
- .3 The installer shall examine substrates, construction area, environmental conditions, use and access conditions, etc. for compliance with manufacturer's requirements and propriety of construction sequence completed or contemplated.
- .4 Notify the contractor and Consultant in writing of circumstances detrimental to the proper completion of the work. Do not proceed with installation until unsatisfactory conditions have been corrected.
- .5 Do not start work until deficiencies have been corrected and Consultant's written approval to proceed is received by the Contractor.
- .6 Commencement of Work implies acceptance of conditions and responsibility for entire installation.
- .7 For Air Retarder, ensure that:
 - .1 Surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants.
 - .2 Wood sheathing panels are appropriately fastened (refer to Section 06 10 00) and sufficiently stabilized at corners and edges using appropriate fasteners.
 - .3 Transition membranes are installed over framing junctures where shown on drawings.
 - .4 Base course air barrier membrane is applied to primed panel sheathing and primed concrete foundation wall.

- .5 Transition and continuity air barrier membranes associated with doors, windows and any other opening through exterior walls are applied to head and jamb appropriately. Sill membranes must be prepared to lap over air retarder membranes.
- .6 Air barrier transition membranes are delivered to the site and personnel are prepared to install these in appropriate sequence with air retarder for all openings.
- .7 Substrate is visibly dry and free of moisture.
- .8 Notify Architect in writing of anticipated problems using air barrier over substrate.

3.3 SUPPLIER'S AND MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Review wood siding installation instructions provided within Maibec's Installation Guide – Maibec em + Siding and follow the instructions with adaptations to the conditions at the site.

3.4 INSTALLATION – AIR RETARDER:

- .1 Install one course of air retarder horizontally on the wall commencing at the bottom of OSB sheathing using nails equipped with plastic washers. Use minimum number nails required to retain air retarder in place temporarily while work is in progress.
- .2 Install second course of air retarder material commencing at underside of soffit (lapped and taped using red construction tape specified within Section 07 27 10 onto vapour barrier or transition membrane tab if applicable) and extending to over-lap initial course minimum 500mm. Tape top course of air retarder sheet to bottom course with continuous tape joint.
- .3 Over lap end joint of air retarder 500 mm taping initial application to wood sheathing and subsequent application to previous air retarder sheet using red construction tape specified within Section 07 27 10.
- .4 Install sill transition and continuity membrane to lap over air retarder membrane as secondary water proofing.
- .5 Tape air retarder using continuous run of tape for all joints where solid blocking is employed or air retarder terminates at openings, corners and where it meets flashing material.
- .6 Install air retarder membrane in sequence with rigid board and strapping associated with siding such that no more than 3000 mm length of exterior wall is left with air retarder membrane exposed to wind and weather following any day's work.

3.5 WOOD SOFFIT:

- .1 Examine conditions and existing framing for true and level surfaces free of protrusions that would impair the soffit installation. Apply blocking and strapping to create firm, sound fastener locations in all instances.
- .2 Carefully layout installation for soffit and associated trims prior to commencement of soffit installation. Pay close attention to patterns shown. Ensure that patterns will be symmetrically and aligned from bay-to-bay where installed between dropped false beams.
- .3 Apply strapping to underside of joist or rafter frame materials or hand-frame using lumber to establish nailing points for soffit boards with maximum spacing of 400 mm on centre. Apply strapping to establish continuous support for ventilation strip, trims and joints.
- .4 Fasten strapping using hot-dipped galvanized nails spaced maximum 400mm on centre.
- .5 Fasten wood soffit boards to strapping using stainless steel wire nails with finishing heads.
- .6 Carefully layout installation prior to commencement of soffit installation where patterns are shown. Ensure that patterns will be symmetrically and aligned from bay-to-bay where installed between dropped false beams. Use continuous lengths for soffits constrained by trim details such as those associated with front entrance covered by roof terrace.
- .7 Apply in patterns shown on drawings.
- .8 Use stainless wire nails for pneumatic nailing, concealed in T and G joints.

- .9 Stagger all joints between courses.
- .10 Cut butt and mitre joints to fit tightly; use 45 degree kerf joints for joints created in the length of soffit boards.
- .11 Apply trims to conceal joints where indicated on drawings.
- .12 Scarf joints for runs of trim in high roof soffit.
- .13 Provide pre-finished wood trim shown on drawings continuous for outer perimeter of wood soffits at wall, dropped beam, fascia or adjoining vertical faces for all cases.
- .14 Conceal all fasteners.

3.6 STRAPPING AND WOOD SIDING:

- .1 Install vertical wood strapping (furring) over each framing stud location, using hot-dipped galvanized ardox nails.
- .2 Fasten horizontal strapping minimum 400 mm on centre into vertical strapping and studs ensuring minimum 31 mm fastener penetration or more.
- .3 For vertical siding installation, stagger strapping vertically to permit air circulation and drying in a continuous path of ventilation between fascia at top of assembly and underside of soffit. Nail straps to each stud crossed by the strap. Terminate straps on stud locations.
- .4 Apply additional strapping continuously around openings through exterior walls, at corners and in locations where stud spacing varies from 400 mm on centre.
- .5 Ensure that installed strapping will support all siding and trim appropriately and in accordance with manufacturer's instructions and that strapping secures rigid insulating sheathing adequately to the building.
- .6 Fasten wood siding in straight, aligned lengths to strapping using stainless steel fasteners spaced according to manufacturer's installation instructions. Stagger joints in length of boards not less than 1220mm and distribute evenly over wall faces. For vertical installations, no joints in boards are permitted. Cut butt joints at 45 degrees and for vertical siding installation, slope to outside. Seal cut surfaces using manufacturer-supplied exterior opaque stain.
- .7 Siding Trims:
 - .1 All horizontal siding trims and belt courses with exposed top side edges in service shall be protected by pre-finished metal flashing applied to strapping and purpose bent to create a drip profile as shown on drawings. This includes siding trim over doors, window, mechanical or electrical service penetrations through the exterior walls and the top side of all belt course or rake board trims.
 - .2 Mechanical, electrical service openings, window and door opening trims shall have continuous metal flashings formed with drip profiles as shown on drawings and installed without joints across their length. Wood trims associated with these openings shall be a single piece for all head, jamb and sill trims without exception.
 - .3 Horizontal belt line, entablature or rake trims shall have continuous pre-finished metal flashings formed to a drip profile in 3600mm continuous lengths, overlapped 100mm where adjoining subsequent flashing, sealed between flashings with double-sided butyl tape. These trim boards shall be installed in 3600mm lengths using 45 degree kerf joints, sealed in each case. For all kerf joints, adhere adjoining boards using exterior grade construction adhesive applied to faces of kerf prior to installation. Wipe all excess adhesive from exposed faces of boards so adhered immediately following installation.
 - .4 Install smooth exterior corner trims for equal thickness when viewed from either side of corner such that edge thickness forms part of the width of the face exposed at the corner. No joints permitted in length of corner trims.
 - .5 Install interior corner trims for equal exposure on each wall surface. No joints permitted in length of interior corner trims.
 - .6 Apply manufacturer's exterior opaque stain finish on site to exposed cut ends of trims in every case including underside of vertical trims (end grain), prior to installing trims.

3.7 INTERIOR CEILING PANELS – CEDAR SOFFIT MATERIAL AND TRIMS

- .1 Reject damaged boards immediately. Replace with new.
- .2 Centre installation in room and balance arrangement of boards from centre to edges, symmetrically.
- .3 Fit all edges neatly and scribed to surfaces where deviations in wall exceed 3mm.
- .4 Apply milled end trims shown on drawings to conceal end joints.
- .5 Do not install materials such that expansion and contraction due to temperature and humidity cannot occur.
- .6 Review lighting layout and incorporate into ceiling pattern as work progresses.
- .7 Review location of mechanical diffusers and incorporate trimmed openings for these as work progresses.
- .8 Cut trims to effect installation shown on drawings.
- .9 Use shop-milled special trims shown using board thicknesses shown.
- .10 Stagger all joints minimum 1500 mm and use kerf joint with adhesive.
- .11 Wipe all excess adhesive from wood surfaces as soon as it is evidently exposed to view.
 - .1 Wood will remain in natural state, unfinished. Remove excessively rough surface burr, pencil marks and adhesive. Do not install boards with factory or grade markings exposed to view.

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .2 Remove soil, hand marks and other dirt from siding, trims and flashings as these are installed.
- .3 Leave Work area clean at end of each day.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .5 Waste Management: separate waste materials for chipping and compost in accordance with Section 01 74 21 – Construction Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.9 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by wood siding installation.

END OF SECTION

PART 1 General:

1.1 GENERAL REQUIREMENTS

- .1 Basis of Design:
 - .1 The Basis of Design for this specification Section is Carlisle Sure-Seal Kleen EPDM – Fully adhered Roofing System, Design “A” – with EPDM of 90 mil. thickness.
 - .2 All parts of the roofing system shall be adhered.
- .2 **All parts of the roofing membrane's surface shall be sloped to achieve drainage.**
- .3 Apply EPDM Roofing System together with compatible air and vapour barrier membranes, rigid insulation, protection board and other parts of the specified roofing system following adhered installation of 12.7 mm fiberglass faced, paperless gypsum board on sheet steel roof deck.
- .4 Review and accept the sealing of all joints between sheet steel deck and other fixed structure that, if left unsealed, could permit air and water vapour to enter into the roofing assembly.
- .5 **25-year Manufacturer's warranty is required for materials and installation. This Section shall ensure that warranty conditions can be met with all parts of the installation. Warranties shall be equivalent to the Carlisle Golden Seal Total Roofing System Warranty.**
- .6 This Section shall engage manufacturer's representatives to conduct field inspections and these representatives shall provide written assurance that the roof is installed to meet or exceed the manufacturer's instructions for installation of the roofing system and that, when completed and commission, the roofing system will comply with the manufacturer's requirements for the 20-year warranty period.
- .7 The work includes roofing applied over all flat roof sections including top of stairwell.
- .8 Provide membrane walkway pads to reach each roof top equipment for extent of walkways illustrated.
- .9 Canopy roofing over unconditioned spaces shall be fully adhered EPDM identical to the main roof and fully adhered to sloped fiberboard which is adhered to paperless gypsum board applied over steel roofing deck. Install scupper and downspout connection.

1.2 RELATED WORK

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 21 13 Board Insulation
- .3 Section 07 27 10 Weather Barrier, Air Barrier and Transition Membrane
- .4 Section 07 62 00 Sheet Metal Flashings and Trim
- .5 Section 07 92 00 Joint Sealants
- .6 Mechanical drawings and specifications – roof drains and associated piping; natural gas piping, roof penetrations and rooftop equipment curbs and placement of stands
- .7 Electrical Drawings and Specifications – electrical service penetrations through roofing membrane.

1.3 SECTION INCLUDES SUPPLY AND INSTALLATION OF THE FOLLOWING:

- .1 Supply and install using adhesive a 12.7 mm layer of paperless, fiberglass faced gypsum board membrane.
- .2 Supply and install using adhesive and self-adhering products transition membranes and sealant applied within joints and gaps between sheet steel roof deck and mechanical and electrical penetrations including roof curbs.
- .3 Supply and Install with adhesive air barrier and vapour barrier product over the prepared gypsum board surface.
- .4 Join to parapet waterproofing system, the air and vapour barrier.
- .5 Make waterproofed and seal using self adhering membranes and caulking all roof top natural gas line supports mounted on roof, together with all associated connectors fixed to sheet steel deck or other structural elements.

- .6 Make waterproof and seal using adhered membranes and caulking electrical service and refrigerant line penetration flashing through roofing system, flashings associated with roof-mounted HVAC equipment and curbs, roof water overflow scuppers and associated sheet metal flashings. Parapet cap flashings.
- .7 Supply and install with adhesive tapered roof Insulation associated with EPDM roofing.
- .8 Supply and install with adhesive protection board required by manufacturer's warranty.
- .9 Supply and install using adhesive non-reinforced membrane roofing (EPDM and associated accessories) complete with membrane flashings, terminations, joinery and interfaces with service penetrations and drains.
- .10 Supply and install using tapes and self-adhering membranes or fully-adhered membranes to make complete continuous waterproofing between parapets, mechanical curbs, flashings of all types, and the main part of the roof membrane.
- .11 Supply and install using adhesive and tapes underlayments to metal parapet copings and counter flashings including service penetrations and scuppers and supports for piping and conduits.
- .12 Provide a total roofing and waterproofing system warranty together with all inspections conducted by the manufacturer's representatives and all other processes required to complete the prerequisite documentation, work and tasks that together ensure the achievement of the 25-year warranty.

1.4 QUALIFICATIONS AND PARTICIPATION IN THE CONTRACT:

- .1 The roofing contractor shall be fully knowledgeable of all requirements of the contract documents and shall make themselves aware of all job-site conditions that will affect their work prior to submitting a Bid or commencing installation at the Place of the Work.
- .2 The roofing contractor shall confirm all given information and notify the Contractor and the Consultant, prior to bid submission, of any conflicts that will affect their cost proposal or their construction schedule.
- .3 Any Sub-Contractor who intends to submit a bid using a roofing system other than the approved manufacturer must submit to the Contractor and the Consultant, acceptable product literature describing the alternative system, for pre-qualification 10 business days prior to the bid closing date.

1.5 MANUFACTURERS

- .1 Acceptable Manufacturer:
 - .1 Carlisle Syntec Systems.

1.6 PRECEDENCE

- .1 This specification may be amended by written addenda, only. In the case where no addenda amend this specification during the Bid period, this Section shall constitute the contract with respect the roofing application.
- .2 Shop drawing submission and submission of roofing system data that does not conform to specified roofing system does not cause an amendment to the specified installation unless written agreement for such an amendment is provided by the Consultant as part of an Addendum or a Supplementary Instruction.

1.7 FUNDAMENTAL ROOFING PRODUCT SELECTION CRITERIA

- .1 No roofing assembly shall be proposed or implemented that does not incorporate the following features regardless of requested substitutions, solicited alternatives or changes made to the roofing system following the Bid Period.
- .2 Wind Uplift Performance:
 - .1 Roof system is designed to withstand wind uplift forces as calculated using the current revision of ASCE-7 and to suit requirements of specified warranty and wind speed resistance, minimum.
- .3 Fire Resistance Performance:
 - .1 Roof system will achieve a UL Class A rating when tested in accordance with UL-790.

- .4 Thermal Performance: Roof system will incorporate two continuous layers of 3.5" thick polyisocyanurate rigid board insulation in addition to rigid board insulation cut and shaped and tapered to achieve slope to drains. In addition to this, a compatible protection board shall be adhered to the insulation panels.
- .5 Drainage: Provide a roof system with positive drainage within a controlled outlet roof drain system such that all water dissipates and ponds on the roof for duration of 48-hours or fewer following a precipitation event. All parts of the roof must be sloped.
- .6 Tapered edge strips, crickets or saddles are required where sloped roofing insulation abuts equipment curbs and other vertical faces and these conditions must be anticipated by this Section when designing the sloped insulation and these must be installed wherever periodic ponding of water may occur. When the slope of the taper exceeds 50mm (2") to 305mm horizontal (1 foot) additional membrane securement at the base of the tapered edge strip, cricket or saddle shall be installed.
- .7 Gaps in the sheet steel deck caused by joints between decking and openings, parapets, curbs and penetrations shall be sealed in every instance, prior to application of the air and vapour barrier assembly to prevent infiltration of interior air (warm and humid) entering into the roofing assembly which may cause contamination resulting from condensation. This is specifically important when polyurethane adhesive is used to attach the roof insulation. NOTE: If this sealing work is not complete and thorough, collected moisture could weaken insulation boards and facers resulting in a blow-off or increase the probability of mold growth. This shall be prevented.
- .8 Moisture generated due to the construction process will adversely impact various components within the roofing assembly and therefore must be addressed through the establishment of construction sequence and selection of appropriate materials. Refer to membrane manufacturer's supplements associated with moisture generated during the construction process.
- .9 All supplied products selected by this Section for the roofing systems shall be provided by a single manufacturer unless the provision of an alternative portion of the assembly is expressly permitted within the membrane manufacturer's published literature and warranty provisions.
- .10 Building Codes:
 - .1 Roof system will meet the requirements of all federal, provincial and local code bodies having jurisdiction.
- .11 Roofing assembly will be designed and constructed to achieve a specified manufacturer's warranty and resist specified wind speed.
- .12 This roofing system is designed as a Class "A" Roof Covering system in accordance with ULC S107-M.
- .13 Refer to drawings for required thermal resistance of assembly.
- .14 Comply with Factory Mutual Loss Prevention Data Sheet 1-49 for perimeter fasteners.
- .15 Roofing Contractor shall be responsible for quality control and quality assurance as recommended by CRCA and NRCA.

1.8 REFERENCE STANDARDS

- .1 American Society of Civil Engineers (ASCE) - ASCE 7 - Minimum Design Loads for Buildings and Other Structures, Current Revision.
- .1 American National Standards Institute (ANSI):
 - .1 ANSI/SPRI WD-1 "Wind Design Standard for Roofing Assemblies".
 - .2 ANSI/SPRI RP-4 "Wind Design Standard For Ballasted Single-ply Roofing Systems".
 - .3 ANSI/ASHRAE/IESNA Standard 90.1 (2007): Energy Standard for Buildings Except Low-Rise Residential Buildings
- .2 American Society for Testing Materials (ASTM):
 - .1 ASTM C 33, Specification for Concrete Aggregates.
 - .2 ASTM C 208 - Standard Specification for Cellulosic Fiber Insulating Board.
 - .3 ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
 - .4 ASTM C 726 – Mineral Fibre Roof Insulation Board

- .5 ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- .6 ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
- .7 ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .8 ASTM D 448, Standard Classification of Sizes of Aggregate for Road and Bridge Construction.
- .9 ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
- .10 ASTM D 751 Coated Fabrics
- .11 ASTM D 816 - Standard Test Methods for Rubber Cements.
- .12 ASTM C 1177/C1177M – Standard Specification for Mat Glass Gypsum Substrate for Use as Sheathing
- .13 ASTM D 4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
- .14 ASTM D 4637 - Standard Specification for EPDM Sheet Used In Single-Ply Roof Membrane.
- .15 ASTM D 5034 Breaking Strength and Elongation of Textile Fabrics
- .16 ASTM E 96 - Standard Test Methods for Water Vapour Transmission of Materials.
- .3 Canadian Roofing Contractors Association:
 - .1 Technical Bulletins associated with wind uplift, loose-laid and ballasted systems.
 - .2 Technical Bulletins associated with quality control.
 - .3 All Advisory Bulletins.
- .4 Canadian Standards Association (CSA):
 - .1 CSA A123.21 Standard test method for the dynamic wind uplift resistance of membrane-roofing systems.
- .5 Factory Mutual (FM Global):
 - .1 Factory Mutual Standard 4470 - Approval Standard for Class 1 Roof Covers and Loss Prevention Data Sheets 1-28, 1-29.
- .6 National Roofing Contractors Association (NRCA – USA):
 - .1 NRCA Roofing and Waterproofing Manual, Fifth Edition.
 - .2 NRCA quality-control guideline.
- .7 Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA):
 - .1 Architectural Sheet Metal Manual.
- .8 Underwriters Laboratories (UL):
 - .1 TGFU R1306 - "Roofing Systems and Materials Guide".
 - .2 UL-790 - Standard Test Method for Fire Tests of Roof Coverings.
- .9 Underwriters Laboratory of Canada (ULC):
 - .1 CAN/ULC S 102M Standard Test Method for Fire Testing

1.9 QUALITY ASSURANCE

- .1 The Roofing Contract shall adhere to NRCA quality-control guidelines.
- .2 The roofing contractor shall be fully knowledgeable of all requirements of the contract documents and shall make themselves aware of all job site conditions that would affect their work and the cost thereof.
- .3 Submit evidence of installer's status as an authorized roofing applicator or a similar authorization and training associated with the EPDM manufacturer applicable in the case of an accepted alternative membrane system.
- .4 Submit proof of 5 years of experience with installation of EPDM roofing systems upon request together with names and contact information for projects previously executed.
- .5 Compliance with Ontario Building Code is the minimum standard for the roofing system. This specification exceeds the requirements of the Ontario Building Code and this Section shall govern unless

it can be demonstrated to the Consultant that a provision herein does not achieve compliance to the Ontario Building Code.

- .6 Make continuous reference to membrane manufacturer's roofing systems information and Approval Guides, Factory Mutual (FM) Approval Guides or Underwriters Laboratories (UL) Fire Resistance or Roofing Materials and Systems Directories to verify compliance with this specification and Ontario Building Code.
- .7 This Section shall review all Bid Documents, attend the site, review access conditions and coordinate anticipated installation conditions with the Contractor prior to submission of the Bid. Submission of a Bid shall mean that the Bidder accepts all site conditions and documentation provided and no additional cost will be awarded by the Owner to this Section for accommodations on site nor shall additional charges be accepted by the Owner associated with changes to materials or methods that could reasonably have been anticipated during the tender period.
- .8 All supplied products selected by this Section for the roofing systems shall be provided by a single manufacturer unless the provision of an alternative portion of the assembly is expressly permitted within the membrane manufacturer's published literature and warranty provisions.
- .9 Contractor is responsible for reporting unacceptable conditions or any requirement to amend the work of this section prior to Bid closing.
- .10 A technical representative of the membrane manufacturer is required to attend the site and submit written reports including a final report that accepts the roofing installation as compliant with the manufacturer's written specifications and requirements for the warranty applicable.
- .11 Comply with Factory Mutual Loss Prevention Data Sheet 1-49 for perimeter fasteners.
- .12 Comply with requirements necessary to achieve resistance to wind speed specified and receive the specified warranty from the manufacturer.
- .13 Manufacturer shall have 20-years-experience with fabrication of all parts of the roofing system and a single manufacturer shall provide all parts of the waterproofing membrane system including adhesives, membrane, perimeter fasteners and termination bars and roofing accessories.
- .14 There shall be a supervisor employed by the roofing installer and an expert in the installation of the roofing system, present on the job site at all times while work is in progress.

1.10 WARRANTY:

- .1 Comply with Factory Mutual Loss Prevention Data Sheet 1-49 for perimeter fasteners.
- .2 25-year warranty required.
- .3 Provide final warranty and manufacturer's technical representative report at project completion.
- .4 Warranty Requirements:
 - .1 Provide to Owner, membrane manufacturer's 25-year warranty (equivalent to Carlisle Total System Warranty) covering both labor and material with no dollar limitation. The maximum wind speed limit for coverage shall be peak gusts of 160 kph (100 mph) measured at 30 feet (10 meters) above ground level.
 - .2 Coverage shall be extended to provide compensation for repair work necessary due to impact of hail stones up to 51mm (2-inch) diameter hail stones.
 - .3 Coverage to be extended to include accidental punctures in accordance with terms stated in the Warranty document.
 - .4 Coverage to be extended to include roof edge metal water tightness in accordance with terms stated in the Warranty document.
 - .5 Period for coverage: commences following Substantial Performance of the Contract.
 - .6 Pro-rated System Warranties shall not be accepted.
 - .7 Evidence of the manufacturer's warranty reserve shall be included as part of the project submittals for the approval by specifier.

1.11 SUBMITTALS

- .1 Prior to Commencing Work:

- .1 Submit a letter of certification from the manufacturer which certifies the roofing contractor is authorized to install the manufacturer's roofing system and lists foremen who have received training from the manufacturer along with the dates training was received.
- .2 Sample of Warranty with coverage for wind damage prior to commencement of roofing.
- .3 Certification of the manufacturer's warranty reserve.
- .4 Verify with the manufacturer of membrane system the compatibility of all products with substrates and one another.
- .5 Shop drawings:
 - .1 Submit all shop drawings to membrane manufacturer by this Section who must be an Authorized Roofing Applicator along with a completely executed Notice of Award and Request for Warranty form for review and approval. Manufacturer must review and approve shop drawings prior to submission of same to the Consultant or the Contractor.
 - .2 Shop drawings must include:
 - .1 Outline of roof and size
 - .2 Plan of the roof showing conformance to structural wind forces.
 - .3 Deck type (for multiple deck types)
 - .4 Location and type of all penetrations
 - .5 Perimeter and penetration details
 - .6 Key plan (on multiple roof areas) with roof heights indicated
 - .7 Sheet width and number of perimeter sheets for Reinforced Mechanically Fastened systems
 - .8 Fastener type, length and maximum spacing as applicable.
 - .9 Roof slopes and drain locations, details of sumps.
 - .10 All HVAC and electrical equipment and penetration locations and their nature.
- .6 Shop drawings must be Detail Drawings:
 - .1 Submit approved plan, section, elevation or isometric drawings which detail the appropriate methods for all flashing conditions found on the project.
 - .2 Coordinate shop drawings reviewed by Consultant with locations and conditions found on the Contract Drawings.
- .7 Data Sheets:
 - .1 Provide manufacturer's data sheets describing each product to be used, including preparation instructions and recommendations, storage and handling requirements and recommendations, installation methods.
- .8 Pullout test:
 - .1 Provide the pull-out test results. Notify Contractor when the results are below the requirements identified in the manufacturer's Design Guides and technical bulletins and references related to "Withdrawal Resistance Criteria".
- .9 Closeout Submittals:
 - .1 Project Manual submittals including maintenance materials, WMIS data.
 - .2 Manufacturer's technical representative report at project completion.
- .10 Warranty:
 - .1 Provide manufacturer's final warranty.
 - .2 When field conditions necessitate modifications to the Shop Drawings and submissions approved by the membrane manufacturer, a copy of the shop drawing outlining all modifications must be submitted to roofing membrane manufacturer for revision and approval prior to final inspection at the Place of the Work and prior to warranty issuance.
- .11 As-Built Drawings:
 - .1 This Section shall supply membrane manufacturer and Consultant with an As-Built drawing for the Project completed prior to final approval by membrane manufacturer and issuance of warranty by the membrane manufacturer.

- .2 The As-Built drawings shall:
 - .1 Conform to membrane manufacturer's most current published specifications and details applicable at the time of Bid.
 - .2 They must be submitted along with a completely executed Notice of Completion acceptable to the membrane manufacturer.
 - .3 They must include the items identified above.
- .12 After Project completion, a Notice of Completion must be submitted to the membrane manufacturer to schedule the necessary inspection and this notice is a prerequisite to acceptance of the project by the membrane manufacturer's issuance of the Warranty.

1.12 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to site in sealed containers or with manufacturer's original labels intact and packaging intact, as appropriate for packaging. Do not remove packaging or wrappings until ready for use.
- .2 Protect adhesives and liquid additives from freezing or overheating in accordance with manufacturer's instructions.
- .3 Store all materials requiring curing after installation in dry storage with temperatures between 16 degrees C and 27 degrees C.
- .4 Do not store adhesives or materials containing a solvent with containers open.
- .5 Keep all materials and insulation in particular, dry and protected from the elements. Store materials on skids or on racking or within storage containers elevated above ground level and covered by tarps. Manufacturer's wraps provide insufficient waterproofing.
- .6 Store insulation in area protected from exposure to wind or UV radiation and apply weights to insulation panels awaiting use.
- .7 Do not utilize damaged materials.
- .8 Store and dispose of hazardous materials and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.
- .9 When loading materials onto the roof, the Roofing Applicator must comply with the requirements of the Contractor to prevent overloading and possible disturbance to the building structure.
- .10 Job site storage temperatures in excess of 90° F (32° C) may affect shelf life of curable materials (i.e., uncured flashing, adhesives, sealants, primers, tapes and pressure-sensitive flashing and accessories).
- .11 When the temperature is expected to fall below 40° F (5° C), outside storage boxes should be provided on the roof for temporary storage of liquid adhesives, sealants, primers, tapes and pressure-sensitive flashing and accessories. Containers must be rotated to maintain their temperature above 40° F (5° C).
- .12 Note: Prolonged exposure of pressure-sensitive flashing and tapes to temperatures below 40° F (5° C) will cause the pre-applied adhesive tape to lose tack and in extreme cases, not bond to the substrate. Refer to manufacturer's technical literature and bulletins for application procedures in colder temperatures.
- .13 Do not store adhesive containers with opened lids due to the loss of solvent, which will occur from flash off.

1.13 ENVIRONMENTAL REQUIREMENTS AT THE PLACE OF THE WORK:

- .1 Proceed with roofing work when weather conditions are in compliance with the manufacturer's recommended limitations, only and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations. Requirements and recommendations are amended by this section when work or constraints or requirements are more stringent herein than found within the manufacturer's written instructions.
- .2 Do not install products under environmental conditions outside manufacturer's absolute limits.
- .3 Refer to Manufacturer's Roofing System specifications for General Job Site Considerations and ensure that all parts of the site and the weather and physical conditions found on site will comply with this specification.
- .4 Do not install adhesives in an unventilated environment.

- .5 Do not install materials over saturated roof decking.
- .6 Heat materials as required in accordance with manufacturer's instructions prior to installation during cold weather.
- .7 Do not install roofing materials during heavy rain periods and not during any time when moisture would be trapped below the membrane.
- .8 Contaminants such as grease, fats and oils shall not be allowed to come in direct contact with the roofing membrane.
- .9 Apply temporary closures to prevent moisture infiltration between applications of roofing occurring over more than 1 day.
- .10 Begin the installation on the highest roof level to avoid or minimize construction traffic on completed roof sections.
- .11 Refer to manufacturer's technical manual for additional, specific conditions necessary at the Place of the Work.

1.14 SAFETY REQUIREMENTS, CAUTIONS AND WARNINGS

- .1 Material Safety Data Sheets (MSDS) must be on location at all times during the transportation, storage and application of materials.
- .2 When loading materials onto the roof, roofing applicator must comply with the requirements of the Contractor in the first instance to prevent overloading and possible disturbance to the building structure. Refer to the Consultant when there is doubt about any aspect of the structure's ability to support construction or permanent loads.
- .3 When positioning membrane sheets, exercise care to locate all field splices away from low spots and out of drain sumps. All field splices shall be installed using a shingle pattern to prevent bucking of water.
- .4 Proceed with roofing work only when weather conditions are in compliance with the manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations.
- .5 Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage.
- .6 Provide protection, such as ¾-inch thick plywood, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.
- .7 The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.
- .8 New roofing shall be complete and weathertight at the end of the work day.

1.15 WORK SEQUENCE

- .1 Schedule and execute work to prevent leaks and excessive traffic on completed roof sections. Care shall be exercised to provide protection for the interior of the building and to ensure water does not flow beneath any completed sections of the membrane system.
- .2 Do not disrupt activities in occupied spaces.

PART 2 Products

2.1 MANUFACTURERS

- .3 Acceptable Manufacturer:
 - .1 Carlisle Syntec Systems.

2.2 SPECIFIED PRODUCTS

- .1 All specified products and the system must be modified or enhanced as necessary to achieve the specified warranty with the wind speed resistance specified above. No provision of this specification is intended to reduce the warranty period or reduce the resistance to specified wind speed.
- .2 The Basis of Design for this specification Section is Carlisle Syntec EPDM – Fully Adhered Roofing System as follows:

- .1 A UL Class "A" listed with a maximum slope restriction of 2" per foot with the following assembly and characteristics:
 - .1 **Membrane:**
 - .1 Sure-Seal Kleen non-reinforced, 90-mil. thick, black, membrane sheet provided in widths of 3 m (10') wide.
 - .1 The membrane is fully adhered to an acceptable protection board substrate using a spray-applied, or extruded or splatter-applied, two-component, low rise, Flexible FAST Adhesive. Adjoining sheets of membrane are spliced together using 152mm (6") wide Factory-Applied SecurTAPE in conjunction with EPDM Primer.
 - .2 EPDM joint tape: 6" Factory-Applied Tape (FAT). (Splice tape shall be a butyl/EPDM based polymer with a minimum thickness of 25-mil.) The membrane shall conform to the minimum physical properties of ASTM D4637. When a 10-foot wide membrane is to be used, the membrane shall be manufactured in a single panel with no factory splices to reduce splice intersections.
 - .3 **HP-250 EPDM Primer:** A solvent-based primer used to prepare the surface of EPDM membrane for application of Splice Tape or Pressure-Sensitive products. Available in 1 or 3-gallon pails and as CAV-PRIME Pressurized Cylinders.
 - .4 **90-8-30A Bonding Adhesive:** A high-strength, yellow colored, synthetic rubber adhesive used for bonding Sure-Seal/Sure-White EPDM membranes to various surfaces. Available in 5-gallon pails.
 - .2 **Cover Board:**
 - .1 **SecurShield HD Plus** - a rigid insulation panel composed of a high-density (109 psi max), closed-cell polyisocyanurate foam core laminated to premium-performance coated-glass fiber-mat facer for use as a cover board or recover board. Available 1/2" thick 4' x 8' panel weight 11 lbs with an R-value of 2.5.
 - .1 Fully adhere over insulation boards.
 - .3 **Insulation Boards:**
 - .1 Adhere tapered, 20-PSI InsulBase Polyisocyanurate board insulation an additional two (2) continuous layers of 89 mm (3.5-inch) thick, 20-PSI InsulBase Polyisocyanurate board insulation fully-adhered to the entire roof area on top of a continuous, self-sealing air and vapour barrier:
 - .1 **Carlisle SecurShield Polyisocyanurate**— A foam core insulation board covered on both sides with a moisture resistant coated glass fiber mat facer meeting ASTM C 1289-06, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4' x 8' standard size with a thickness from 1 to 4 inches. 4' x 4' tapered panels are also available.
 - .1 **Flexible FAST Adhesive:** An elongating impact resistant two component insulating urethane adhesive used to attach insulation. Packaging formats include 50 and 15 gallon drums as well as Dual Tanks, Dual Cartridges and 5 gallon Jug formats.
 - .2 Adhesive to provide 150% elongation in conjunction with membrane – ASTM D412
 - .3 MDI content of Part A material less than 25%
 - .4 **Air and Vapour Barrier:**
 - .1 A vapour barrier membrane known as VapAir Seal 725TR Air and Vapor Barrier which is self-adhered and applied continuously, with lapped seams, over the entire gypsum board surface.
 - .1 CCW 702 Primer and 702LV Primer (Low VOC): A single component, solvent based, high-tack primer used to provide maximum adhesion between Carlisle VApAir Seal 725TR Air and Vapor Barrier and an approved substrate. Applied by spray or long nap roller with a

coverage of approximately 75 square feet per gallon on porous surfaces (i.e., DensDeck Prime gypsum board). Available in 5-gallon containers.

.5 Gypsum Board over Sheet Steel Decking:

- .1 Supply and install using adhesive to sheet steel decking a paperless gypsum board product.
 - .1 **DensDeck Prime** – gypsum core that incorporates glass-mat facings on the top and bottom side. The top surface is pre-primed and provides excellent bond strength for adhered membrane for use as a cover board. Provide in 1/2" thickness using 4' x 4' or 4' x 8' size boards to best advantage.

2.3 SCOPE AND APPLICATION

- .1 Roofing Section shall supply and install all other roofing system elements required to complete the installation and achieve the warranty specified.
- .2 All materials shall be accepted by roofing system manufacturer as compatible or manufactured by the approved manufacturer.
- .3 Complete installation of maintenance walkways.

2.4 DETAILS - RIGID INSULATION FOR ROOFING

- .1 Polyisocyanurate foam core panels with fiber top and bottom facings coated and laminated to the foam core on each panel appropriate to ASTM Type II.
- .2 Manufacturer shall be a member of PIMA.
- .3 Apply a continuous and consistent thickness of 7" (175mm) insulation over the entire roof except for 1" (25mm) depression at drain sump. Apply an additional layer or layers of insulation boards in a tapered shape over the minimum 175mm thickness. Design the tapered boards and arrange them to establish a continuous and consistent slope to roof drains without flat or level areas that cause ponding of water.
 - .1 The minimum 7" (175mm) thickness for the insulation is to be obtained through application of 2-layers of insulation boards with a 3.5" (65mm) thickness for each. The 2-layers of flat insulation boards shall be applied with their joints staggered vertically and horizontally between the layers.
 - .2 Board length and width dimensions and shape and location of tapered sections selected to best advantage of this Section but to permit consistent and continuous drainage of the roof surface without flat or ponded areas.
 - .3 Flat and tapered insulation foam shall be manufactured using a HCFC-free blowing agent that does not contribute to the depletion of the ozone (ODP-free).
 - .4 The insulation panels shall not contain formaldehyde.
- .4 Apply boards using adhesive to air and vapour barrier applied over gypsum board panels.
- .5 Insulation panels shall comply with the following standards:
 - .1 Dimensional Stability: ASTM D 2126
 - .2 ASTM D 3273 mould resistant = 10.

2.5 INSULATION ADHESIVES:

- .1 Recommended by membrane manufacturer or
- .2 One-Step: A two-component, polyurethane construction grade, low-rise expanding adhesive designed for bonding insulation to various substrates using a portable applicator or use materials noted above.

2.6 COVER BOARD:

- .1 Adhere over sloped insulation.
 - .1 Board Thickness: 1/2 inch (13 mm).

2.7 MEMBRANE

- .1 Membrane shall conform to physical properties listed below as a minimum.
- .2 Sure-Seal Kleen Black, Non-Reinforced Membrane: Cured, non-reinforced EPDM membrane meeting the requirements of ASTM D 4637 Type I.
 - .1 Attachment Method: Fully adhered.
 - .2 Colour: Black.

- .3 Membrane Thickness: 90 mil, nominal.
- .4 Sheet Dimensions:
 - .1 Width: 10 feet (3.05 m) maximum.
 - .2 Length: 100 feet (30.5 m) maximum.
- .5 Performance:
 - .1 Tensile Strength: 1685 psi (11.6 MPa) minimum.
 - .2 Tear Resistance: 200 lbf/in (35 kN/m) minimum.
 - .3 Elongation: 480 percent.

2.8 ROOF MAINTENANCE WALKWAYS:

- .1 Protective surfacing for roof traffic shall be Sure-White (white) Pressure-Sensitive Walkway Pads (with Factory-Applied Tape on the underside of the walkway) adhered to the membrane surface in conjunction with Sure-Seal Primer.

2.9 MEMBRANE TERMINATIONS AND FLASHING:

- .1 Sure-Seal Pressure Black -Sensitive Pipe Seals with Factory-Applied TAPE on the deck flange.
- .2 Sure-Seal Pressure-Sensitive Pourable Sealer Pocket: Pre-fabricated Pourable Sealer Pocket consisting of a 2 inch (51 mm) wide plastic support strip with Pressure-Sensitive, Factory-Applied, adhesive backed uncured Elastoform Flashing.
- .3 Sure-Seal Pressure-Sensitive (PS) Inside/Outside Corner: A 175mm (7-inch) by 250mm (9-inch) precut 60-mil thick Elastoform Flashing with a 30-mil Factory-Applied TAPE.
- .4 Sure-Seal Pressure-Sensitive (PS) Curb Flashing - A 60-mil thick, 20 inch (508 mm) wide cured EPDM membrane with 5 inch (126 mm) wide Factory-Applied Pressure-Sensitive TAPE along one edge to be used to flash roof top equipment curbs, walls extended from roof decks, etc.
- .5 Sure-Seal Pressure-Sensitive Overlayment Strip: A nominal 40-mil black, semi-cured EPDM membrane laminated to a nominal 35-mil cured, Factory-Applied TAPE for flashing gravel stops, metal edgings and Seam Fastening Plates.
- .6 Sure-Seal Pressure-Sensitive Cured Cover Strip: Sure-White 60-mil cured EPDM membrane laminated to a nominal 35-mil cured Factory-Applied TAPE.
- .7 Sure-Seal Pressure-Sensitive "T" Joint Covers: A factory cut uncured 60-mil thick EPDM flashing laminated to a nominal 35-mil Factory-Applied TAPE, used to overlay field splice intersections and to cover field splices at angle changes. 152mmx152mm (6-inch by 6-inch) for Sure-White applications.
- .8 Sure-Seal Pressure-Sensitive Elastoform Flashing: 60-mil thick uncured EPDM Flashing laminated to a 30-mil Factory-Applied Pressure-Sensitive TAPE used in conjunction with Sure-Seal Primer.
- .9 Sure-Seal Pressure-Sensitive RUSS (Reinforced Universal Securement Strip): 6 inch (152 mm)
 - .1 RUSS: A nominal 6 inch (152 mm) wide, 45-mil thick reinforced EPDM membrane with a nominal 3 inch (76 mm) wide 30-mil thick cured synthetic rubber pressure-sensitive adhesive laminated to one edge. This product provides perimeter securement, and additional membrane securement at angle changes for Adhered, and Mechanically Fastened Roofing Systems.
- .10 All metal edging termination bars, seam covers and reinforcements shall be tested and meet ANSI/SPRI ES-1 standards and comply with International Building Code and warranty requirements of this specification including wind gust resistance.
- .11 Wall Termination: Termination Bar with sealant applied along the caulk lip to meet or exceed warranty requirements.
- .12 Curb and Wall Flashings: Anchor with appropriate base tie-in detail using seam reinforcement recommended by membrane manufacturer.
- .13 Reinforced Perimeter Fastening Strip (RPF) and Batten Strip or 2" Metal Seam Plates. Flashing material: minimum 1-ply 0.060" EPDM, SA Flashing to meet or exceed 30-year warranty requirements.
- .14 Corners: Corner Flashing to meet or exceed warranty requirements.
- .15 Roof Edges and Parapets: Bar Systems to meet or exceed warranty requirements.

- .16 Penetration: EPDM Penetration Pocket or field-fabricated using EPDM flashing to meet or exceed warranty requirements.

2.10 CLEANERS, PRIMERS, ADHESIVES AND SEALANTS

- .1 Carlisle Weathered Membrane Cleaner: Clear, solvent-based cleaner used to loosen and remove contaminants from the surface of exposed EPDM membrane prior to applying EPDM Primer.
- .2 Sure-Seal SecurTAPE: A 3 inch (76 mm) or 6 inch wide (152 mm) wide by 100 foot (30.5 M) long, white colored splice tape used with Sure-White Systems.
- .3 Sure-Seal HP-250 Primer: A solvent-based primer used to prepare the surface of EPDM membrane for application of Splice Tape or Pressure-Sensitive products.
- .4 Low VOC EPDM and TPO Primer - A low VOC (volatile organic compound) primer (less than 250 grams/liter) for use with SecurTAPE or Pressure-Sensitive products.
- .5 Sure-Seal Splicing Cement: A high-strength, butyl-based contact cement which is used for splicing adjoining sections of EPDM membrane (cured or uncured).
 - .1 Sure-Seal Splicing Cement: White splicing cement used with Sure-White (white-on-black) Adhered Roofing Systems.
- .6 Sure-White Lap Sealant: A heavy-bodied material (trowel or gun-consistency) used to seal the exposed edges of a membrane splice.
 - .1 White sealant for use with Sure-White (white-on-black) Roofing Systems.
- .7 90-8-30A Bonding Adhesive: A high-strength, yellow colored, synthetic rubber adhesive used for bonding Sure-Seal/Sure-White EPDM membranes to various surfaces.
- .8 EPDM x-23 Low-VOC Bonding Adhesive: A Low-VOC (volatile organic compound) bonding adhesive (less than 250 grams/liter) used for bonding Sure-Seal/Sure-White EPDM membranes to various surfaces.
- .9 Low-VOC Bonding Adhesive: A Low-VOC (volatile organic compound) bonding adhesive (less than 250 grams/liter) used for bonding Sure-White EPDM membranes to various surfaces.
- .10 Flexible FAST Adhesive: A spray or extruded applied, two-component, polyurethane, low-rise expanding foam adhesive used to securely bond FleeceBACK membranes to a variety of substrates.
- .11 Flexible FAST Dual Cartridge Adhesive: A two-component, polyurethane construction grade, low-rise expanding adhesive used to securely bond FleeceBACK membranes to a variety of substrates. The adhesive is extrusion applied 4 inch (102 mm), 6 inch (152 mm) or 12 inch (305 mm) on center (depending on project conditions) using a portable applicator.
- .12 Flexible FAST Dual Tank Adhesive: A spray applied, two-component, polyurethane construction grade, low-rise expanding adhesive used to securely bond FleeceBACK membranes to a variety of substrates.
- .13 Flexible FAST 5-gallon Jug Adhesive: A two-component, polyurethane construction grade, low-rise expanding adhesive designed for bonding insulation to various substrates, packaged for use with low pressure urethane equipment.
- .14 Aqua Base 120 Bonding Adhesive: a semi pressure-sensitive water based adhesive. Used as a one-sided, wet lay-in adhesive with Sure-Seal, or Sure-White FleeceBACK 100 or 115 mil membranes or as a two-sided contact adhesive with non-fleece backed Sure-White EPDM membranes.
- .15 **Water Cut-Off Mastic:** A one-component, low viscosity, self-wetting, Butyl blend mastic used to achieve a compression seal between the EPDM membrane or flashing and appropriate substrates. Available in tubes.
- .16 Two-Part Pourable Sealer: A black, two-component, solvent-free, polyurethane based product used for tie-ins and as a sealant around hard-to-flash membrane penetrating objects such as clusters of pipes and for a daily seal when the completion of flashings and terminations cannot be completed by the end of each work day. Can also be used for attaching lightning rod bases and ground cable clips to the membrane surface.
- .17 Sure-Seal One-Part Pourable Sealer: A one-component, moisture curing, elastomeric polyether sealant used as a sealant around hard-to-flash penetrations such as clusters of pipes, and is available in white or black.

- .18 Universal Single-Ply Sealant: A 100 percent solids, solvent free, one-part, polyether sealant that provides a weather tight sealant to a variety of building substrates; used as a termination bar sealant. Available in white only.
- .19 CCW 702 Primer and 702LV Primer (Low VOC) - A single component, solvent based, high-tack primer used to provide maximum adhesion between Carlisle 725TR Air and Vapor Barrier and an approved substrate. Applied by spray or long nap roller with a coverage rating ranging from approximately 300 to 350 square feet per gallon on smooth finishes (i.e., concrete) to 75 square feet per gallon on porous surfaces (i.e., Dens-Deck Prime gypsum board). Available in 5-gallon containers. CCW 702LV Primer contains less than 250g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.
- .20 CCW 702 WB - a high-tack, water-based contact adhesive for promoting adhesion of Carlisle air/vapor barrier membranes and an approved substrate (i.e., concrete, Dens-Deck Prime and Securock). Applied by roller, brush or spray with an application rate of approximately 200 sq. ft. per gallon. Available in 5-gallon containers. CCW 702 WB Primer contains 57g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.
- .21 CAV-GRIP III Low-VOC Aerosol Contact Adhesive/Primer: a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: Priming unexposed asphalt prior to applying Flexible FAST Adhesive, adhering Sure-Seal EPDM, horizontally, for the field of the roof, and for adhering Sure-Seal FleeceBACK and Sure-Seal EPDM membrane to vertical walls. Coverage rate is approximately 2,000-2,500 sq. ft. per 40 lb cylinder and 4,000-5,000 sq. ft. per 85 lb cylinder as a primer, in a single-sided application and 750 sq. ft. per 40 lb cylinder and 1,500 sq. ft. per 85 lb cylinder as an adhesive for vertical walls, in a double-sided application; 1,000 sq. ft. per 40 lb cylinder and 2,000 sq. ft. per 85 lb cylinder as an adhesive, horizontally, for the field of the roof, in a double-sided application.

2.11 EDGINGS AND TERMINATIONS

- .1 Installed on parapet wall: Sure-Seal Termination Bar, 1-inch (13 mm) wide, 0.098 inch (2.5 mm) thick extruded aluminum bar pre-punched 6 inches (152 mm) on center with sealant ledge to support Lap Sealant.

2.12 ROOF DRAINS

- .1 This section must verify that the roof drain selected will meet roofing manufacturer requirement to achieve specified warranty. Should the drain selected fail to meet warranty requirements, the roofing contractor must notify the architect in writing immediately and the drains shall not be ordered without written instruction.
- .2 This Section shall be responsible to install all roof drains provided by Mechanical Sections. Mechanical contractor shall provide piping connection below roof deck pre-cast concrete planks.
- .3 Sprayed-in-place Foam Insulation: apply to cavity between drain body and base for depth of roof deck, minimum. Foam shall be closed cell, 2lb density and form an air barrier and vapour barrier seal.

2.13 FLASHING ACCESSORIES

- .1 Flashing Accessories are to be supplied and installed by the roofing contractor to ensure that they meet roofing manufacturer requirements to achieve specified warranty.
- .2 Flashing accessories are required for all roof penetrations specified on mechanical and electrical documents.
- .3 Co-ordinate with mechanical and electrical trades to determine exact quantity of flashing accessories required.
- .4 Scupperbox:
 - .1 Pre-finished sheet steel, black colour

PART 3 Execution**3.1 EXAMINATION**

- .1 The roof deck shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of roofing system or found to be incompatible with the specified installation.
- .2 Remove or otherwise amend defects including, but not limited to, removal or amendment of the following conditions: fins, sharp edges, foreign materials, oil and grease, ice and snow, high spots or depressions, loose deck panel edges, differences in height of deck panels at junctures.
- .3 Review deck surfaces for defects or any condition that would be deleterious or detrimental to the roofing system installation. Report findings to Contractor and Consultant.
- .4 Contaminants such as grease, fats and oils shall not be allowed to come in direct contact with the roofing membrane. An overlay of epichlorohydrin membrane must be adhered around surfaces or items which have the potential to emit solvents, grease or oil.
- .5 Do not begin installation until substrates have been properly prepared.
- .6 Commencement of roofing signifies acceptance of all conditions at the Place of the Work as appropriate for the installation of the roofing system.

3.2 VERIFY APPROPRIATE SEAL TO PREVENT VAPOUR TRANSMISSION FROM INSIDE THE BUILDING INTO ROOFING ASSEMBLY – PERIMETER JOINTS, VOIDS, SERVICE PENETRATIONS AND GAPS SEALED BY THIS SECTION:

- .1 Verify that sealant, self-adhering membranes and fillers have been applied to all joints, gaps and voids between and around sheet steel roof deck. Check sealant for failure of bond or inappropriate application.
- .2 Notify Contractor and Consultant of any sealant condition that is detrimental to the roofing application including, but not limited to, the following situations:
 - .1 Sealant used is incompatible with roofing system products. If it is not known which sealant had been applied, obtain the technical data sheets for the sealant used from the Contractor.
 - .2 Sealant is missing from any void, gap or joint that ought to be sealed.
 - .3 Sealant is applied inappropriately or insufficiently.
 - .4 Sprayed-in-place foam had been installed in a joint subject to movement.
 - .5 Sealant will not prevent air and moisture to enter the roof assembly.
- .3 This Section shall report all deficiencies in the sealant application to the Contractor and the Consultant and roofing system work shall not proceed in areas with situations incompatible with an efficacious roofing system installation and performance in service.
- .4 This Section shall receive written acknowledgement from the Contractor that deficiencies have been rectified prior to commencing roofing system installation over areas with defects.
- .5 Commencement of roofing system application means that this Sections has inspected the existing conditions and accepts these as appropriate for the installation.

3.3 PREPARATION

- .1 Schedule and execute work with close cooperation with Contractor to prevent traffic by other Sections or Trades over completed roof sections. Provide protection for the interior of the building.
- .2 Ensure that water does not flow beneath any completed sections of the membrane system.
- .3 Ensure that all work over head or necessary for the appropriate installation of the roofing system is completed.
- .4 Do not commence with installation unless all site conditions are found in accordance with manufacturer's written instructions and this Section.
- .5 Before beginning work, the roofing contractor must secure approval from the Contractor for the following:
 - .1 Areas permitted for personnel parking.
 - .2 Access to the site.

- .3 Areas permitted for storage of materials and debris.
- .4 Areas permitted for the location of cranes, hoists and chutes for loading and unloading materials to and from the roof.
- .6 Protect all permanent stairways or other completed elements with plywood sheets for walking surfaces or with reasonable and weather resistant means for all other elements. Use Aspenite or plywood for the protection of doors and windows. Protect aluminum doors with card stock when doors must be used during installation.
- .7 Clean all deck surfaces thoroughly using brooms. Vacuum where appropriate and along all edge conditions or at drain locations. Remove dirt, soil, sand and gravel, salts, saw dust and other materials entirely from deck prior to commencement of installation.

3.4 JOB SITE PROTECTION

- .1 The roofing contractor shall adequately protect building, paved areas, service drives, lawn, shrubs, trees, etc. from damage while performing the required work. Provide canvas, boards and sheet metal (properly secured) as necessary for protection and remove protection material at completion. The contractor shall repair or be responsible for costs to repair all property damaged during the roofing application.
- .2 Do not overload any portion of the building, either by use of or placement of equipment, storage of debris, or storage of materials.
- .3 Protect against fire and flame spread. Maintain proper and adequate fire extinguishers.
- .4 Take precautions to prevent drains from clogging during the roofing application. Remove debris at the completion of each day's work and clean drains, if required. At completion, test drains to ensure the system is free running and drains are watertight. Remove strainers and plug drains in areas where work is in progress. Install flags or other telltales on plugs. Remove plugs each night and screen drain.
- .5 Store moisture susceptible materials above ground and protect with waterproof coverings.
- .6 Remove all traces of piled bulk materials and return the job site to its original condition upon completion of the work.
- .7 Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage.
- .8 New roofing shall be complete and weather tight at the end of the work day.
- .9 When the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.

3.5 SAFETY

- .1 The roofing contractor shall be responsible for safety and conformance with all applicable legislation governing workplace safety for all work specified within this Section or associated with the scope of work undertaken by the roofing installer. All personnel shall be instructed daily to be mindful of the full-time requirement to maintain a safe environment for the facility's occupants including staff, visitors, customers and the occurrence of the general public on or near the site.

3.6 ROOF DRAINS:

- .1 Receive all roof drains from mechanical sections; install roof drains.
- .2 Coordinate final and exact locations for drains with Contractor and mechanical trade.

3.7 GYPSUM BOARD:

- .1 Apply using adhesive to metal deck.

3.8 AIR AND VAPOUR BARRIER – OVER GYPSUM BOARD

- .1 **Primer:** Surfaces to receive membrane vapour barrier must be clean and dry. Prime with primer supplied by vapour barrier manufacturer and select product to suit application. Apply Primer by spray, brush or with a long nap roller at the applicable coverage rate specified by manufacturer. Prime only areas to be waterproofed the same day. Re-prime if area becomes dirty.

- .2 **Application:** Apply air and vapour barrier from low to high point, in a shingle fashion, so that laps will shed water. Overlap all edges at least 65mm (2-1/2"). End laps shall be staggered. Place membrane carefully so as to avoid wrinkles and fish-mouth deformation. Immediately after installation, roll with a 100-150-pound weighted steel roller.

3.9 INSULATION INSTALLATION:

- .1 Ensure surface of air and vapor barrier is dry prior to installing insulation.
- .2 Place insulation over the surface and fasten or adhere to the roof deck in accordance with the supplier's roofing design. Fit boards tightly with no gaps greater than 6mm. Stagger all joints occurring between boards such that no joint aligns to joints between lower boards.

3.10 FLAT AND SLOPED INSULATION BOARDS

- .1 Receive and unpack boards and review installation instructions and shop drawings. Reject damaged boards and obtain replacements. Ensure all personnel are familiar with installation sequence and pattern. Co-ordinate roof drain locations with board pattern.
- .2 Lay boards over prepared minimum layers of insulation and adhere using adhesive in accordance with manufacturer's instruction and with particular care for the following:
- .3 Review MSDS for safety information prior to use.
- .4 Foam boards and foam adhesives are combustible and may be considered a fire hazard. Do not leave foam boards or foam adhesive unprotected or exposed. Shield these from heat, flame and sparks. Do not smoke during installation.
- .5 Use with ventilation equipment and NIOSH or MSHA approved respirators for organic vapours with pre-filters and solvent resistant cartridges. Ensure all persons handling material are fully trained in safe use of product.
- .6 Avoid contact with eyes. Use safety glasses.
- .7 Avoid contact with skin. Use special protection for handling directly.
- .8 Do not store in temperatures exceeding 32 degrees C or lower than 13 degrees C and protect from freezing at all times. Restore to room temperature when product cools below 13 degrees C. Do not allow product to freeze. Keep out of reach of children.
- .9 Do not install wet, damaged or warped insulation boards.
- .10 Install insulation or membrane underlayment in multiple layers over the substrate with boards butted tightly together with no joints or gaps greater than 1/4 inch (6 mm). Stagger joints both horizontally and vertically.
- .11 Secure insulation to the substrate with the required insulation adhesive in accordance with the manufacturer's current application guidelines.
- .12 Apply adhesive using appropriate cartridge, 1:1 applicator to achieve 12.7mm (1/2") to 19mm (3/4") wide bead all around perimeter of panels and maximum 150 mm (6") on centre in the field of the panel or more closely spaced to suit manufacturer's requirements or as otherwise directed to achieve specified wind gust resistance and specified warranty. Allow foam adhesive to rise minimum 1/2" (12.5mm) or as directed and prior to a tack free state, set panels in adhesive.
- .13 Walk and roll panels using 150lb roller immediately following setting.
- .14 Adhere multiple layers of insulation system as recommended by manufacturer and to achieve wind gust ratings specified and to satisfy specifications for roofing system. Ensure that smallest sloped insulation dimension is applied at lowest elevation and layered and shaped to generate roof slopes.
- .15 Stagger joints in one direction unless joints are to be taped. Install insulation boards snug. Gaps between board joints shall not exceed 1/4 inch (6 mm). Fill all gaps in excess of 1/4 inch (6 mm) with same insulation material
- .16 Slope all roof areas no less than 1.0% over sections nearest to flat and such that maximum slope will not exceed 2%.
- .17 Miter and fill the edges of the insulation boards at ridges, valleys and other changes in plane to prevent open joints or irregular surfaces. Avoid breaking or crushing of the insulation at the corners.

- .18 Do not install any more insulation than will be completely waterproofed each day.
- .19 Apply cover board over sloped insulation panels.

3.11 INSULATION ATTACHMENT

- .1 Securely attach insulation to the roof deck for Adhered Roofing Systems. Attachment must have been successfully tested to meet or exceed the calculated uplift pressure required by the International Building Code (ASCE-7) or ANSI/SPRI WD-1.
- .2 Enhance the perimeter and corner areas in accordance with the International Building Code (ASCE-7) or ANSI/SPRI WD-1.
- .3 Install insulation layers, maximum 4 feet by 4 feet (1220 mm by 1220 mm), applied with adhesive, coverage rate as necessary to achieve the specified attachment and uplift rating. Press each board firmly into place after adhesive develops strings when touched, typically 1-1/2 to 2 minutes after adhesive was applied, and roll with a weighted roller. Add temporary weight and use relief cuts to ensure boards are well adhered. Stagger the joints of additional layers by a minimum of 6 inches (152 mm).

3.12 PROTECTION BOARD (COVER BOARD)

- .1 Apply using adhesive over sloped insulation

3.13 MEMBRANE INSTALLATION

- .1 Unroll and position membrane without stretching. Allow the membrane to relax for approximately 1/2 hour before bonding. Fold the sheet back onto itself so half the underside of the membrane is exposed.
- .2 Review cover board installation carefully for defects, appropriate laminations, contiguous, smooth surfaces, failure of adhesives or other defects deleterious to membrane.
- .3 Refer to membrane MSDS for cautions and warnings.
- .4 Layout membrane sheets without stretching.
- .5 Refer to membrane manufacturer's instructions for detailed installation requirements associated with specified warranty and performance.
- .6 Install sheets in accordance with manufacturer's written instructions and using installation sequence and methods consistent with warranty and wind gust limitations specified.
- .7 Apply the Bonding Adhesive in accordance with the manufacturer's published instructions, to both the underside of the membrane and the substrate. Allow the adhesive to dry until it is tacky but will not string or stick to a dry finger touch.
- .8 Roll the coated membrane into the coated substrate while avoiding wrinkles. Brush down the bonded half of the membrane sheet with a soft bristle push broom to achieve maximum contact.
- .9 Fold back the unbonded half of the membrane sheet and repeat the bonding procedure.
- .10 Install adjoining membrane sheets in the same manner, overlapping edges appropriately to provide for the minimum splice width. It is recommended that all splices be shingled to avoid bucking of water.
- .11 Fasten membrane at perimeter in accordance with manufacturer's instruction to parapet, minimum or spaced to suit warranty and wind speed gust requirements.
- .12 Fasten termination bar continuously along top edge of parapet flashing using termination bar and ensure that fasteners are at least 200mm (8") above membrane level.

3.14 MEMBRANE SPLICING

- .1 Note: All splices must be executed in accordance with manufacturer's warranty requirements including a joint cover.
- .2 Position membrane sheet to allow for required splice overlap. Mark the bottom sheets with an indelible marker approximately 1/4" (6mm) to 1/2" (12.5mm) from the top sheet edge. The pre-marked line on the membrane edge can also be used as a guide for positioning splice tape.
- .3 When the membrane is contaminated with dirt, fold the top sheet back and clean the dry splice area (minimum 3" (75mm) wide) of both membrane sheets by scrubbing with clean natural fiber rags saturated with Sure-Seal Weathered Membrane Cleaner.

- .4 Apply EPDM Primer to splice area and permit to flash off.
- .5 Comply with manufacturer's written instructions in all instances. Note: Clean all surfaces of EPDM before adhering adjoining sheets of material.
- .6 When positioning membrane sheets, exercise care to locate all field splices away from low spots and such that they are never within drain sumps. All field splices must be lapped using a shingle pattern to prevent bucking of water.
- .7 Overlap adjacent sheets and mark a line 1/2 inch out from the top sheet.
- .8 Fold the top sheet back and clean the dry splice area (minimum 2 1/2 inches (64 mm wide) of both membrane sheets with Sure-Seal Primer as required by the membrane manufacturer.

3.15 PROTECTION DURING THE WORK

- .1 Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage.
- .2 Provide protection, such as 3/4-inch thick plywood, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.
- .3 New roofing shall be complete and weather tight at the end of the work day.
- .4 When the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.

3.16 MEMBRANE FLASHING

- .1 No penetration shall be made without adhesive or mechanical securing of the membrane to object penetrating the roofing membrane.
- .2 Water or flood level shall be considered as 8" (200mm) above high point of roofing membrane.
- .3 Secure membrane at perimeter of roof; around all penetrations for services or structure or architectural elements; at any change in angle exceeding 2" rise in one horizontal foot of run, all in accordance with manufacturer's details.
- .4 Apply reinforced strips at perimeter continuously. Use cured EPDM Flashing for smaller penetrations where warranted. Fasteners at 12" (305mm) on centre, maximum. Use fastener patterns required for specified warranty in all circumstances.
- .5 Terminate all flashings in accordance with manufacturer's instructions set at 8" (203mm) above roofing surface high point in consistent level line all around roofing. Bar will be mounted higher as a result over low points as a result.
- .6 Apply temporary ballast using approved, non-destructive means when required by installation sequence.
- .7 When the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.

3.17 DAILY SEAL

- .1 On phased roofing, when the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed.

3.18 WALKWAYS

- .1 Install walkways at all traffic concentration points (such as roof hatches, access doors, rooftop ladders, etc.) and all locations as identified on the specifier's drawing.
- .2 Adhere walkways pads to the EPDM membrane in accordance with the manufacturer's specifications.

3.19 PARAPET COPINGS AND FLASHINGS

- .1 Verify compatibility of all bituminous products with membrane and roofing system manufacturer before proceeding with self-sealing flashings.
- .2 In accordance with drawings, apply any self-sealing transition membrane or Blueskin SA over all parapet surfaces before applying roofing membrane and associated flashings.
- .3 Apply roofing membrane and roofing membrane flashings and terminations followed by additional waterproofing to overlap roofing materials shown on drawings to ensure weather tight installation.

- .4 Self-sealing properties for water proofing below metal copings on parapets are required to ensure water proofing of metal copings.
- .5 Review Section 07 62 00 for more requirements related to the work of this Section.

3.20 SERVICE PENETRATION FLASHINGS

- .1 Use roofing membrane manufacturer's approved flashings for roof drains, hold downs, pipe supports, electrical penetrations, b-vents and stack vents. Verify compatibility with all roofing penetration products including service cones, vent stack and roof drain flashings with integral gaskets or that use pitch pockets or similar means to ensure waterproofing.

3.21 CLEANING

- .1 Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed in accordance with all applicable legislation.
- .2 Remove all lifting and access aids, cut off materials and unused materials.

3.22 MANUFACTURER'S REVIEW

- .1 Prior to the manufacturer's technical inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.
- .2 Perform remedial work required by technical inspector immediately.
- .3 Receive written confirmation of acceptable installation by membrane manufacturer and technical report for submission with closeout materials.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 Provide labour, materials, equipment, and incidental services necessary to provide metal siding, flashing and trim.
- .2 Provide flashing, continuous clip-type fasteners, trim and accessories fabricated from exposed, coil-coated prefinished metal.
- .3 Supply and install soffit panels, flashings and trims.
- .4 Supply and install parapet flashings, scupper boxes and pre-finished sheet steel trims for parapet caps and copings and the entrance canopies complete with downspouts.
- .5 Supply and install pre-finished, pre-formed steel siding on roof side of parapets.

1.2 RELATED SECTIONS

- .1 Section 05 12 23 Structural Steel For Buildings
- .2 Section 05 50 00 Metal Fabrications
- .3 Section 06 10 00 Rough Carpentry
- .4 Section 07 27 10 Weather Barrier, Air Barrier, and Transition Membrane
- .5 Section 07 53 23 EPDM Fully Adhered Roofing System
- .6 Section 07 92 00 Joint Sealants
- .7 Section 09 22 16 Non-Structural Metal Framing

1.3 REFERENCES

- .1 The Aluminum Association Inc. (AAI)
 - .1 AAI-Aluminum Sheet Metal Work in Building Construction-2002.
 - .2 AAI DAF45-03, Designation System for Aluminum Finishes.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A167, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A240/A240M-07e1, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - .3 ASTM A606, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
 - .4 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .5 ASTM A792/A792M-06a, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .6 ASTM B32, Standard Specification for Solder Metal.
 - .7 ASTM D523, Standard Test Method for Specular Gloss.
 - .8 ASTM D822, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
 - .9 ASTM D226 - Standard Specification for Asphalt Saturated Organic Felt Used in Roofing and Waterproofing.
 - .10 ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.32-M, Sheathing, Membrane, Breather Type.
 - .2 CAN/CGSB-93.1-M, Sheet Aluminum Alloy, Prefinished, Residential.
- .4 Canadian Roofing Contractors Association (CRCA), Roofing Specifications Manual.
- .5 Canadian Standards Association:
 - .1 CSA W59, Welded Steel Construction (Metal Arc Welding).
 - .2 CSA B111, Wire Nails, Spikes and Staples.

- .6 SMACNA – Sheet Metal and Air-Conditioning Contractors' National Association –

- .1 Architectural Sheet Metal Manual.

- .7 Green Seal Environmental Standards

- .1 Standard GS-03-93, Anti-Corrosive Paints.

- .2 Standard GS-11-97, Architectural Paints.

- .3 Standard GS-36-00, Commercial Adhesives.

- .8 Health Canada:

- .1 Workplace Hazardous Materials Information System (WHMIS)

1.4 SUBMITTALS

- .1 Provide information in accordance with Section 01 33 00.

- .2 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

- .3 Product Data:

- .1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and technical data sheet and include product characteristics, performance criteria, physical size, finish and limitations.

- .2 Provide profiles of all siding and soffit panels and trims including their location and the lengths.

- .4 Samples:

- .1 Submit duplicate 50 mm x 50 mm samples of each sheet metal material, including soffit, demonstrating finish and colour.

1.5 QUALITY ASSURANCE

- .1 Flashing and sheet metal shall meet or exceed SMACNA Architectural Sheet Metal Manual Requirements and CRCA FL Series details and materials in all cases.

- .2 Except as specifically noted for a metal thickness that would exceed the standard referenced, all metal base thicknesses shall comply with SMACNA Architectural Sheet Metal Manual Requirements for the particular situation.

- .3 Pre-Installation Meetings: convene pre-installation meeting during one of the regularly scheduled site meetings approximately 2 weeks prior to beginning installation of work of this section in order to:

- .1 Verify project requirements.

- .2 Review installation and substrate conditions.

- .3 Co-ordination with other building sub-trades.

- .4 Review manufacturer's installation instructions and warranty requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 60 00.

- .2 Waste Management and Disposal:

- .1 Separate metal waste materials for recycling in accordance with Section 01 74 19.

- .3 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

- .4 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

- .5 Place materials defined as hazardous or toxic in designated containers.

- .6 Ensure emptied containers are sealed and stored safely for disposal away from children.

- .7 Divert unused metal materials from landfill to metal recycling facility.

- .8 Unused paint and sealant material must be disposed at an official hazardous material collections site.

- .9 Unused paint and sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

- .10 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products**2.1 MATERIALS - SHEET STEEL, PRE-FINISHED IN ALL APPLICATIONS:**

- .1 **Sheet Steel, Pre-Finished, Galvalume Plus** – coil stock for custom-bending of flashings not exposed to view in service.
- .2 **Siding with Galvalume Plus finish:**
 - .1 **7/8" Corrugated 24 ga.** base metal thickness, apply where not exposed to view in service fixed to framing with exposed fastener, stainless steel hex head, screw (fully threaded), EPDM gasket.
 - .2 **Galvalume Finish - Siding and Coil Stock for Related Flashings:**
 - .1 Finish: Aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, with AZM150 (AZ50) coating chemically bonded to steel and prepared for service with unpainted finish, 0.914 mm (0.036") minimum base metal thickness and as follows:
 - .1 AZM150 coating - all steel siding with "natural" colour Galvalume finish having the following characteristics: 55% aluminum and 45% zinc comprise the coating; applied by hot-dipped process, chemically bonded to steel, applied to both sides of panel so coated. Fine spangle, bright surface results. Clear organic resin coating applied over coated steel. Thermal curing process; known commercially as Galvalume Plus.
 - .3 Same finish used on coil stock, field-bent and purpose-made and metal flashings, fascia cover, copings and flashings not exposed to view.
 - .4 Use in natural silver colour where not exposed to view from any location.
 - .3 **Painted Pre-Finished Steel Sheet Flashing and Trims**
 - .1 Paint Pre-Finished Steel Siding Baycoat Perspectra Plus: Exposed to view above masonry veneer and below windows except curtain wall windows: Agway Metals 24 ga. 7-175 sheet steel industrial/commercial cladding.
 - .1 Finish:
 - .1 Galvalume Plus Coating below paint: Aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, with AZM150 (AZ50) coating chemically bonded to steel and prepared for service with painted finish, 0.914 mm (0.036") minimum base metal thickness and as follows:
 - .1 AZM150 coating – applied to all steel siding providing Galvalume finish below finish paint system. Coating has the following characteristics: 55% aluminum and 45% zinc comprise the coating; applied by hot-dipped process, chemically bonded to steel, applied to both sides of panel so coated. Coated with a clear organic resin coating applied over coated steel. Thermal curing process.
 - .2 Finished Coating - Paint:
 - .1 **Baycoat Perspectra Plus Series coating, QC 28262- Black**, or alternative selected by architect, factory-applied.
 - .2 Refer to Drawings for location for sheet steel Painted product:
 - .1 Generally above stone veneer masonry, continuous around the building and below each window except curtain wall systems.
 - .2 Painted Finish for coil stock used to form continuous parapet coping or cap flashing and fascia along faces of overhangs.
 - .3 Coil stock with this applied to flashings above doors and windows.
 - .4 **Soffit Panels: Location noted on drawings** - Pre-Finished Steel with Galvalume Plus Finish and Paint Coating:
 - .1 Agway Profile HF-12NF, 0.024" (0.610mm) base steel thickness, Galvaneal coating and Baycoat Metallic series paint QC 11080, Bright Silver metallic. Application is illustrated on drawings.
 - .2 Fastener for Horizontally mounted HF-12NF Fascia Panels, concealed in Agway HF-12NF material, colour QC 11080, Bright Silver metallic with pan head fastener, metal to metal, steel, galvanized.

- .3 Trims associated with horizontally mounted fascia panels, drip trims, J-Trims, and other shapes derived from Agway profiles and listed on drawings, colour-matched in all cases, to QC 11080, Bright Silver metallic.
- .4 Trims and copings not listed are custom fabrications pre-bent in shop and delivered to site in sections. Same material and gauge as fascia stock.
 - .1 Matched in all cases, galvanized pan head fastener, metal to metal.

2.2 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB 37.5.
- .3 Underlay for metal flashing: Transition Membrane as indicated on drawings and specified within Section 07 27 10.
- .4 Sealants: to section 07 92 00.
- .5 Cleats: of same material, and temper as flashing material, minimum 2" wide. Thickness same as flashing being secured.
- .6 Fasteners: of same material as flashing material, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing and galvanized screws, as appropriate for application, concealed.
- .7 Washers: of same material as flashing material, 1 mm thick with rubber packings.
- .8 Touch-up paint: as recommended by pre-finished material manufacturer.
- .9 Sealants: refer to section 07 92 00.
- .10 Fasteners: of same material as flashing material, to CSA B111, ring thread, flat head nails with heads galvalume to match steel or wood screws with galvalume finish. Use aluminum nails with heads coloured to match base colour for aluminum flashing application.
- .11 Seal for over lapped flashing joints: butyl tape, double sided.
- .12 F-Channel: 1 inch by 1-1/2 inch by 1-1/4 inch.
- .13 J-Channel: 7/8 inch by 7/16 inch by 1-3/8 inch.
- .14 Wide Face J-Channel: 7/16 inch by 1-1/4 inch by 2 inch.
- .15 Mitre Molding: 7/16 inch by 1-1/2 inch
- .16 Fascia Corner: 10-5/8 inch by 2 inch.
- .17 Colour: match siding colour.

2.3 FABRICATION OF COPINGS AND FLASHINGS – GENERAL

- .1 Flashings may be field fabricated or purpose made for installation shown.
- .2 For continuous lengths of steel copings and flashings, perform work according to SMACNA Architectural Sheet Metal Manual and in accordance with applicable SMACNA or CRCA 'FL' series details to suit shapes illustrated on drawings.
- .3 Fascia cladding to have lapped joints with 100mm overlap SMACNA joint J1. Apply seal between lapped sheets using double-sided butyl tape. For horizontal joints between sheets, overlap upper sheet minimum 75mm (3") over lower sheets similar to SMACNA Manual detail B2; drip edge continuous for each sheet.
- .4 Hem exposed edges on underside 12 mm.
- .5 Mitre and seal corners with sealant.
- .6 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .7 Apply isolation coatings or separate with self-adhesive membrane where steel products will be in contact with aluminum products. Isolate dissimilar metals in all circumstances.
- .8 Select shapes, joint designs, fasteners and assembly methods to accept expansion and contraction of materials for climate conditions at the site during all seasons and in accordance with SMACNA manual.
- .9 Caulk or seal lapped joints in metal work whether noted or not to have sealants applied. Sealant or tape materials shall be applied continuously without gaps for full length of any joint in any plane.

- .10 Make allowance for expansion at joints.
- .11 Conceal fasteners.

2.4 STEEL FLASHINGS AND CLADDING:

- .1 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .2 Flashings may be field fabricated or purpose made for installation shown.
- .3 Conceal fasteners except on siding panels not exposed to view.
- .4 Fascia cladding to have lapped joints with 100mm overlap SMACNA joint J1. Apply seal between lapped sheets using double-sided butyl tape. For horizontal joints between sheets, overlap upper sheet minimum 3" over lower sheets similar to SMACNA Manual detail B2; drip edge continuous for each sheet.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

- .1 Install sheet metal work in accordance with SMACNA and CRCA FL series details.
- .2 Use concealed fastenings except where shown on drawings or approved before installation.
- .3 Provide asphalt impregnated building paper underlay under flashing material. Secure in place and lap joints minimum 100 mm where transition membrane is not used.
- .4 Ensure dissimilar metals are isolated to prevent galvanic action using bituminous back-painting, gaskets or similar divorcing material; glazing tapes, air barrier and transition strip peel-and-stick membranes specified within Section 07 27 10.
- .5 Install metals to allow for expansion and contraction. Do not fasten metal sheets tightly but hang sheets to avoid oil-canning.
- .6 Oil-canning constitutes an installation that shall require replacement under warranty.
- .7 Set metal flashings to drain away from permanent structure (walls, windows, doors, trims, fascia and penetrations through walls and roof). Carefully craft drip trims to shed water away from vertical surfaces and provide appropriate counter flashings to ensure water-tightness in all conditions.
- .8 Provide minimum 10 degree slope away from structure and toward drip edge of flashing. Do not permit other materials or installations to flatten this slope.
- .9 Counter-flash bituminous flashings. Flash joints using S-lock forming tight fit over hook strips.
- .10 Lock end joints and caulk with sealant. Provide sealed end dams for window sills and window and door head flashings.
- .11 Install metal drip flashings where indicated. Top of drip form to slope min. 10 degrees away from building face.

3.3 SOFFIT, SIDING AND FASCIA

- .1 Keep hands clean or wear gloves to avoid soiling soffit panels and J-trims during installation. Use 100% biodegradable water-borne formulation cleaners if aluminum is oily or soiled.
- .2 Orient panels as illustrated on drawings.
- .3 Install in accordance with manufacturer's written instructions.
- .4 Cut soffit panels 1/4" shorter than overall distance from wall to outside edge of fascia.
- .5 Fasten 50mm x 50mm wood nailing strip to mortar joint on brick veneer using concrete nails.
- .6 Use chalkline guides to maintain level installation and align nail wood blocking to eaves.
- .7 Before installing fascia, nail sill trim directly to fascia board every 914mm (36")
- .8 Mitre end corners and trims to match existing.
- .9 Soffit and Siding Fasteners: hot-dipped galvanized after fabrication, colour to match panels if exposed to view.

- .10 Fabricate scupper materials exposed to view, pre-finished to match balance of coping (black selected from standard range).

3.4 SHEET STEEL – GALVALUME PLUS FINISH – NOT EXPOSED TO VIEW:

- .1 Applied to roof side of parapets, Agway Metals 7/8" corrugated sheet steel, 24ga base metal thickness, Galvalume Plus finish, mechanically fastened.
- .2 Supply flashings, trims and accessories also finished with Galvalume Plus finish.

3.5 TOUCH-UP PAINT

- .1 Ensure that weather conditions are appropriate and meet manufacturer's recommendations for application of any touch-up paint.
- .2 Ensure that preparation work is completed prior to applying touch-up including cleaning of galvanized metals, removal of grease and oil, sanding, primer application, etc.
- .3 Perform touch-up painting using paint for aluminum and zinc rich coatings for Galvalume coated steel as soon as conditions permit.
- .4 Touch-up field cuts immediately.

3.6 CLEANING

- .1 Clean components in accordance with manufacturer's recommendations.
- .2 Perform cleaning in accordance with Section 01 74 11.
- .3 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .4 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION

PART 1 General

1.1 RELATED SECTIONS

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 92 00 Joint Sealants
- .3 Section 09 25 00 Gypsum Board Assemblies
- .4 Section 09 11 00 Steel Stud Wall Framing
- .5 Section 09 12 00 Steel Framing Ceiling and Bulkhead
- .6 Mechanical and Electrical Divisions

1.2 SUMMARY

- .1 Review documents, drawings, schedules and Shop Drawings to establish parameters and extent of fire stopping work.
 - .1 Precise nature of each fire stop application is not defined within Contract or Bid Documents. Any of the systems specified may be used provided that the product and situation fire stopped will achieve the fire resistance rating for the assembly.
 - .2 Select the fire stop system for each circumstance requiring fire stopping. All aspects of fire stopping Work, materials, labour and supply of products required for the Work of this contract for all assemblies that have fire resistance ratings are the responsibility of this Section; no contractual division of labour or responsibility will limit the scope of work defined within this section.
 - .3 Coordinate work of this section in detail with mechanical and electrical trades and the general contractor to establish detailed scope of work, schedule and sequence of operations and responsibility.
 - .4 Provide services directly to the General Contractor or through sub-contract with service contractors.
 - .5 This Section is responsible to clearly identify the scope of work and establish the detailed scope of work incorporated in the price offered to perform the work. This Section shall divide the scope appropriately among sub-contractors and the general contractor if responsibility is so divided.
 - .6 Notify Contractor of scope of work and detail any exclusions when price is submitted.
 - .7 All services penetrating a partition, floor assembly, wall or partition assembly, ceiling assembly or roof assembly that is noted as having a fire resistance rating shall be fire stopped according to manufacturer's instructions for the fire stop product being utilized and the rating, assembly conditions and nature of the void to be fire stopped.
 - .8 Partitions or walls, unless they are formed as monolithic concrete at junctures between horizontal and vertical surfaces shall be fire stopped continuously and the fire stop shall be positioned to join masonry or gypsum board surfaces to roof, floor, intersecting wall or ceiling surfaces where joints occur in any assembly that has or is required to have, a fire resistance rating.

1.3 REFERENCES

- .1 American Society for Testing Materials (ASTM):
 - .1 ASTM D6904, "Standard Practice for Resistance to Wind Driven Rain for Exterior Coatings Applied on Masonry"
 - .2 ASTM C679, "Standard Test Method for Tack-Free Time of Elastomeric Sealants"
 - .3 ASTM E2174, "Standard Practice for On-site Inspection of Installed Fire Stops"
 - .4 ASTM E2307, "Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus".
- .2 Canadian Electrical Code
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

- .4 Nation Fire Protection Association (NFPA):
 - .1 NFPA 101 Life Safety Code.
- .5 Ontario Building Code
- .6 Underwriters Laboratories (UL) of Northbrook, IL annual listing:
 - .1 "FIRE RESISTANCE DIRECTORY, "Products Certified for Canada (ULc) Directory.
 - .2 UL 1784 Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives.
- .7 Underwriter's Laboratories of Canada (ULC):
 - .1 CAN/ULCS101, Standard Methods of Fire Tests of Building Construction and Materials
 - .2 CAN/ULCS102-M, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
 - .3 CAN/ULC-S115-M Standard Method of Fire Tests of Firestop Systems
 - .4 CAN/ULC-S124, "Test for the Evaluation of Protective Coverings for Foamed Plastic"

1.4 DEFINITIONS

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assemblies where penetration occurs by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.
- .4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of non-combustible construction or have "O" annular space in buildings of combustible construction.
 - .1 Words "tightly fitted" means the fire separation prevents passage of smoke and hot gases to unexposed side of fire separation, meeting requirements for pass in the Standard Test Method CAN//ULC-S115-M.

1.5 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Product Data: Submit manufacturer's product technical data for materials and prefabricated devices, providing descriptions sufficient for identification at job site and, for sealant products and intumescent fire stop rings and colours that are applied as proprietary systems.
- .3 Shop Drawings:
 - .1 Illustrate assembly penetrated, service materials that is fire stopped and limits applicable to product illustrated. Indicate ULc assembly rating.
 - .2 Submit Shop Drawings for the following applications:
 - .1 Service penetrations utilizing fire stop rings and collars.
 - .2 Service penetrations utilizing fire stop bands.
- .4 Provide manufacturer's printed instructions for installation.
- .5 Submit digital copies of WHMIS Material Safety Data Sheets as per Section 01 35 29.
- .6 Construction details illustrated shall accurately reflect actual job conditions.
- .7 Samples:
 - .1 Submit duplicate 300 x 300 mm samples showing actual fire stop material proposed for project.

1.6 QUALITY ASSURANCE

- .1 Provide submittals in accordance with Sections 01 33 00 and 01 45 00.
- .2 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.
 - .1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 UL 2079, "Tests for Fire Resistance of Building Joint Systems".
- .3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.7 DELIVERY, STORAGE, HANDLING AND PROTECTION

- .1 Deliver, store and handle materials in accordance with Section 01 61 00.
- .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer and ULC markings.
- .4 Storage and Protection:
 - .1 Store materials indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

PART 2 Products

2.1 MATERIALS

- .1 Alternate products to products listed in this technical section may be presented for review along with proof they meet the requirement of this section. Alternates must be presented a minimum of 5 days before tender closing.
- .2 Fire stopping and smoke seal systems: in accordance with CAN/ULC-S115-M and as follows:
 - .1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN/ULC-S115-M and not to exceed opening sizes for which they are intended.
- .3 Service penetration assemblies: systems tested to CAN/ULC-S115-M.
- .4 Service penetration fire stop components: certified by test laboratory to CAN/ULC-S115-M.
- .5 Fire-resistance rating of installed fire stopping assembly in accordance with OBC and NBC.
- .6 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.
- .7 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
- .8 Applicable Fire Resistance Ratings within the building shown on drawings and as follows:
 - .1 Roof Assembly: 60 minutes.
 - .2 Floor Assembly: 1-hour; unless fire separation is noted with alternative rating.
 - .3 Vertical shaft and stair walls: 60 minutes.
 - .4 Service Room partitions: 1-hour.
- .9 Fire stop system rating: match rating indicated above and refer to drawings for selected fire resistance ratings.

- .1 Notify Consultant immediately if discrepancies between this technical section and drawings are found.
- .10 Service penetration assemblies: certified by ULc in accordance with ULC-S115-M and listed in ULc Guide No.40 U19.
- .11 Service penetration firestop components: certified by ULc in accordance with ULC-S115-M and listed in ULc Guide No.40 U19.13 and ULc Guide No.40 U19.15 under the Label Service of ULc.
- .12 Fire-resistance rating of installed fire stopping assembly in accordance with OBC.
- .13 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to Authorities Having Jurisdiction.
- .14 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal, or rubberized silicone intumescent fire stop sealant or fire stop panels, blocks or plugs applied within limits of material and requirements for ratings.
- .15 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal or reviewed alternate.

2.2 FIRE STOP SEALANTS, PUTTIES, PASTES AND MASTICS

- .1 Single component, acrylic or silicone, intumescent, water soluble.
- .2 Reviewed Products:
 - .1 AD Fire Protection FireBarrier;
 - .2 DAP Blockade;
 - .3 Self-seal GG-266; by NUCO Inc.
 - .4 Hilti CFS-S Sil GG, Hilti CP 606, FS-One Max, CP 618, CFS-P PA, CP 617, CP 619T.
- .3 Acoustic Fire Stop Sealant:
 - .1 STI Firestop Smoke N' Sound Acoustical Sealant
 - .2 PFC Corofil Acoustic Intumescent Sealant
 - .3 USG Firecode Smoke-Sound Sealant
 - .4 Polyseam Intumescent and Acoustic Sealant

2.3 FIRE STOP BLOCKS, PLUGS AND BOARDS

- .1 Use for cable trays, large openings with multiple penetrations, groups of conductors with plastic sheathing.
- .2 Hilti CFS –BL, CFS-PL, CP-675T

2.4 FIRE STOP COLLAR

- .1 Complete with necessary flanges or restraints around intumescent material and fastener holes. Size and rating to suit application and, achieve pressure differential of 50 Pa between exposed and unexposed sides of concrete, drywall and wood floor and ceiling fire-rated assemblies.
- .2 Reviewed Product:
 - .1 Self-Seal Intumescent Silicone SSC Type by NUCO Inc.

2.5 FIRE STOP RINGS

- .1 SSR Intumescent Silicon Self-Seal by NUCO Inc.;

2.6 FIRE STOP BANDS AND WRAP STRIPS

- .1 Intumescent material enclosed within thin film material.
 - .1 Reviewed Products:
 - .2 Self-Seal FireBand; by NUCO
 - .3 Hilti SF Wrap Strip CP-648 product S or E.

2.7 FIRE STOP FOAM

- .1 Ideal products will be designed as smoke, sound and firestopping foam, be easy to handle, re-enterable/repairable, paintable with primer, quick cure and eliminate the need for mineral wool and caulk.
 - .1 Reviewed products:
 - .1 Hilti CP 660 Fire Foam
 - .2 3M Fire Barrier Rated Foam

2.8 FIRE STOP CABLE COLLAR

- .1 Reviewed products:
 - .1 Hilti CFS-CC

2.9 PRIMERS

- .1 to manufacturer's recommendation for specific material, substrate, and end use.

2.10 OTHER MATERIALS

- .1 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .2 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .3 Sealants for vertical joints: non-sagging.

PART 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 PREPARATION

- .1 Fire stop installations shall meet or exceed published ULc standards or similar standard acceptable within the jurisdiction of the Work. Notify consultant if any circumstance exists that would not be fire stopped according to ULc listed and tested assemblies.
- .2 Ensure that substrates and surfaces are clean, dry and frost free.
- .3 Examine sizes and conditions of voids to be filled to establish correct choice of product, thicknesses and installation of materials. Assess the surface adhesion properties for materials in contact with the fire stop, the joint size and the intended installation of subsequent materials to ensure that assembly, when completed, will maintain specified fire resistance rating
- .4 Notify contractor immediately of any circumstance that would result in an unsuccessful fire stop application or that would not be appropriately fire stopped using one of the means or products specified herein.
- .5 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .6 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .7 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces
- .8 Coordinate installation sequence with contractor to ensure that fire stopping of gypsum board, underside of structure or to floor is achieved while spaces are free of obstructions, and, schedule other assemblies after application of fire stop materials.
- .9 Ensure that service penetrations are completed in areas of the Work of this section.

- .10 Ensure that solid wood blocking or appropriate metal framing is installed within framed assemblies that require a fastened collar fire stop and that such framing is positioned to receive fasteners in accordance with requirements of rating and manufacturer's instructions.
- .11 Review situations with large voids or multiple service penetrations to ensure that intended services are installed and that the arrangement of services will result in appropriate fire resistance ratings for the assembly when fire stopping is applied.
- .12 Ensure that configuration of items being sealed or fire-stopped are assembled to ensure an appropriate result acceptable to manufacturer of fire stop materials and Authorities Having Jurisdiction.
- .13 Do not commence fire stopping for situations that would not result in acceptable conditions but rather notify architect and contractor of condition immediately.
- .14 Commencement of fire stopping activity implies acceptance of site conditions.

3.3 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with ULc certification and manufacturer's instructions. Where ratings are determined on the basis of UL rather than ULc, notify consultant immediately. All installations shall meet or exceed ULc requirements.
- .2 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.
- .3 Seal holes or voids made by penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation.
- .4 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .5 Tool or trowel exposed surfaces to neat finish.
- .6 Remove excess compound promptly as work progresses and upon completion.
- .7 For collar type fire stops provide solid nailing backing or metal framing around all sides connected to structure or framing. Refer to section 06 10 00.
- .8 For flexible or vibration resistant situations, use fire stop materials that tolerate vibrations anticipated.
- .9 For wide gaps and spaces, use fire stop material designed for the size of gaps.
- .10 For multiple penetrations in a single space, use fire stop blocks, panels, cable plugs and foams designed to fire stop the materials penetrating the rated assembly.
- .11 Foam:
 - .1 When dispensed quickly, consistency of foam is more liquid, flowing better between cables.
 - .2 Foam can be cut back to no less than the minimum specified installation depth on the applicable UL/ULc system design.
 - .3 Pieces of cured excess foam cuts may be laid in the next opening and fresh foam applied around them.
- .12 Apply intumescent sealant around service penetrations and at junction of gypsum board with floors, walls and ceilings or underside of structure for fire rated gypsum board assemblies, continuously and selected to fire stop void, gaps and situation found.
- .13 Protection of foamed plastics:
 - .1 Compliance requirement for OBC: for conditions exposed to interior space provide an acceptable thermal barrier coat to protect and completely cover foamed plastic products used in the work of this section.
 - .2 Acceptable thermal barrier meets the requirements of classification B when tested in conformance with CAN/ULC-S124, "Test for the Evaluation of Protective Coverings for Foamed Plastic".

3.4 SCHEDULE

- .1 Firestop and smoke seal required for:
 - .1 Penetrations through fire-resistance rated gypsum board partitions and walls.
 - .2 Top of fire-resistance rated gypsum board partitions where gypsum board meets underside of floor structure above or where services exit the partition to enter another space including floor or roof or service space or ceiling space.
 - .3 Intersection of fire-resistance rated gypsum board partitions where these intersections cannot be taped and joined continuously with adjacent intersecting gypsum board.
 - .4 Intersection of gypsum board partitions with a fire resistance rating and any other material of a different nature including concrete or masonry.
 - .5 Flexible joints between elements with a fire resistance rating and other element or elements with a fire resistance rating.
 - .6 Penetrations through fire-resistance rated roof assembly.
 - .7 Openings and sleeves installed for future use through fire separations.
 - .8 Fire stop mechanical and electrical devices, ducts, conduits and assemblies penetrating fire separations.
 - .9 Rigid ducts greater than 129 cm²: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation. This fire stop is an additional requirement, not a substitute for a fire damper.
 - .1 Fire stop conduits and conductors penetrating rated assemblies. Coordinate with electrical and mechanical sections to ensure conductor or conduit and pipe installation that results in an appropriate and acceptable fire stop in accordance with named codes and standards and Authorities Having Jurisdiction. Do not commence fire stopping work for situations that would not deliver an efficacious result.
- .2 Fire stop combustible service penetrations through fire rated assemblies without exception.

3.5 FIELD QUALITY CONTROL

- .1 Inspections: notify Owner and Consultant when ready for review of fire stopping and smoke seals prior to concealing or enclosing fire stopping materials and service penetration assemblies.

3.6 CLEANING

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

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide joint sealant work required to seal assemblies and components to building to separate exterior and interior; to withstand the elements and, to complete building envelope, air and vapour barriers.
- .2 Provide sealants associated with interior work including those required for glazing and to finish joints between dissimilar materials and those associated with painting.
- .3 Provide sealants associated with mechanical and electrical work through coordination with the Sub-Contractors engaged to supply and install those services.

1.2 RELATED SECTIONS

- .1 Section 03 00 00 Cast-In-Place Concrete
- .2 All Sections of Division 4
- .3 Section 06 10 00 Rough Carpentry
- .4 Section 06 41 00 Millwork, Fine Carpentry, Cabinetry and Plastic Laminate
- .5 Section 07 84 00 Fire Stops and Smoke Seals
- .6 Section 08 11 00 Steel Doors and Frames
- .7 Section 08 31 00 Access Doors Mechanical and Electrical
- .8 Section 08 80 00 Glass and Glazing
- .9 Section 09 25 00 Gypsum Board Assemblies
- .10 Section 09 91 23 Painting
- .11 Mechanical and Electrical Divisions.

1.3 REFERENCES

- .1 ASTM C919, Standard Practice for Use of Sealants in Acoustical Applications.
- .2 ASTM C510 - Standard Test Method for Staining and Color Change of Single - or Multicomponent Joint Sealants.
- .3 ASTM C719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
- .4 ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
- .5 ASTM C834 - Standard Specification for Latex Sealants.
- .6 ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- .7 ASTM C1193 - Standard Guide for Use of Joint Sealants.
- .8 ASTM C1247 - Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids.
- .9 ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants.
- .10 ASTM C1311 - Standard Specification for Solvent Release Sealants.
- .11 ASTM D2203 - Standard Test Method for Staining from Sealants.
- .12 Canadian General Standards Board (CGSB)
 - .1 CGSB 19-GP-5M- Sealing Compound, One-Component, Acrylic Base, Solvent Curing
 - .2 CAN/CGSB-19.13-M - Sealing Compound, One-Component, Elastomeric, Chemical Curing
 - .3 CAN/CGSB-19.17-M- Sealing Compound, One-Component Acrylic Emulsion Base
 - .4 CAN/CGSB-19.22-M - Mildew-Resistant Sealing Compound for Tubs and Tiles
 - .5 CAN/CGSB-19.24-M - Multicomponent, Chemical-Curing Sealing Compound

.13 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.4 DESCRIPTION

- .1 Provide joint sealants to establish air tight separations between the interior of the building and the exterior, including but not limited to: around doors and windows; between components of asphalt shingle roofing and flashing system and between components of metal flashing and trim system.
- .2 Provide sealants associated with glazing through glazing sub-trade.
- .3 Contractor shall provide items, articles, materials, operations, methods listed, mentioned or scheduled on the drawings and herein, including, labour, materials, equipment and incidentals necessary and required for the completion of caulking including scaffolding, ladders, lifts and other access aids.
- .4 General Joint Condition and associated sealant selection:
 - .1 General Material Standards and Type: Part 2 of this section.
 - .2 Joints Associated with exterior wall construction:
 - .1 Vertical joints which are bordered on one or both sides by a porous building material such as concrete, or masonry or a non-porous building material such as painted metal, anodized aluminum, mill finish aluminum, PVC or porcelain tile. Seal with Type "1" sealant.
 - .2 Vertical joints which are bordered on one or both sides by glass. Seal with Type "4" sealant.
 - .3 Horizontal expansion joints in sidewalks, concrete floors, driveways. Seal with Type "5" sealant.
 - .3 Interior Joints:
 - .1 Vertical expansion, control and air seal joints. Seal with Type "3" sealant.
 - .2 Trim and finish joints experiencing minimal movement. Seal with Type "8" sealant.
 - .3 Sanitary application between plumbing fixtures and floors or walls and sealants associated with sinks - seal with Type "6" sealant.
 - .4 Horizontal joints: Seal with Type "5" sealant.
 - .5 Gypsum wallboard Acoustical Sealant: Use Type "7" sealant.
 - .6 Gypsum wallboard Fire Resistant Acoustical Sealant
 - .7 Seal for all Washroom Partitions: below stud tracks Type "7", between bottom edge of gypsum board and floor assembly use Type "6", mould resistant silicone base equivalent to Tremsil 200.

1.5 SUBMITTALS

- .1 Provide documents and items in accordance with Section 01 33 00.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and technical data sheets for joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Manufacturer's product to describe:
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with one another.
 - .4 Identify separately, sealant and bond-breaker for EIFS.
 - .3 Submit digital copies of WHMIS MSDS in accordance with Section 01 35 29.
- .3 Samples:
 - .1 Submit samples of each type of material and colour. Provide cured samples of exposed sealants for each colour selected to match adjacent material.
 - .2 Submit samples of joint backing materials.
- .4 Manufacturer's Instructions:

- .1 Submit instructions to include installation instructions for each product used.

1.6 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this section.
- .5 Packaging Waste Management: remove for recycling packaging associated with joint sealants.

1.8 QUALITY ASSURANCE

- .1 Installation of sealant and caulking work shall be carried out by a recognized specialized applicator having skilled mechanics, thoroughly trained and competent in all phases of caulking work.
- .2 Review EIFS manufacturer's literature and details specific to this project together with installer of the work of Section 07 24 00 prior to ordering sealant materials and associated bond breaker for EIFS joints.
- .3 Provide colour samples for all sealants not painted.
- .4 Pre-Installation Meeting: Review work included under this section and determine complete understanding of requirements and responsibilities relative to work included, storage and handling of materials, materials to be used, installation of materials, sequence and quality control, Project staffing, restrictions on areas of work and other matters affecting construction, to permit compliance with intent of this section. Discuss also following items:
 - .1 Weather conditions under which any exterior work will be done;
 - .2 Anticipated frequency and extent of joint movement;
 - .3 Joint design:
 - .1 Cleaning of joint and removal of excess construction materials such as foam insulation to create appropriate joint size;
 - .2 Suitability of durometer hardness and other properties of material to be used;
 - .3 Recommendations of manufacturer for mixing of multi-component sealants;
 - .4 Number of beads to be used in sealing operation and priming operation if required.
 - .5 The use of bond breakers, primers and foam rope fills to limit surfaces to which sealant is required to adhere.
 - .6 Scope and extent of sealing required for fire resistance rated partitions. Coordinate with contractor providing Section 07 84 00 Fire Stopping work.
- .4 Report to consultant any sealant condition that might not be suitable for sealant specified or joint conditions that would be deleterious to the efficacy of the sealant.

1.9 SITE CONDITIONS

- .1 Ambient Conditions:
 - .1 DO NOT Proceed with installation of joint sealants when:
 - .1 Weather conditions are averse to efficacious installation and curing of sealants applied to the exterior of the building.

- .2 Any joint surface is damp, wet or frozen.
- .3 Air temperature and relative humidity in the area where the sealant work is to be undertaken and the temperature of the substrate to which the sealant is to be applied, are lower than the minimum level or higher than the maximum temperature and relative humidity conditions prescribed by joint sealant manufacturer for any situation.
- .4 If the temperature range suitable for efficacious application and curing of the sealant employed is not known, minimum and maximum temperature limits are as follows:
 - .1 Air and joint surface temperature must not be lower than 4.4 degrees Celsius or higher than 49 degrees Celsius for any instance of sealant application.
- .2 Ensure that project conditions will provide a temperature range within the manufacturer's specified limits for the sealant during application and for the 8-hour period next following application.
- .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .2 Joint-Width Conditions:
 - .1 Proceed with installation of joint sealants where joint width is within tolerance of the specific sealant employed and generally slightly wider than the minimum joint size recommended by the sealant manufacturer for the application intended or relative to the joint size shown on drawings. Do not apply sealants to joints that are narrower than the minimum joint width recommended by the manufacturer of the sealant employed.
 - .2 Exterior joints around openings (doors, windows, curtain wall, electrical device boxes, duct penetrations, vent pipe penetrations, louvers and grilles) shall be as follows:
 - .1 20 mm width, minimum for window, door, mechanical and electrical openings and devices abutting EIFS.
 - .2 A range of widths from 10mm, minimum up to 16 mm maximum, for other joints unless a larger size for the joint is shown on the drawings. Do not apply sealants to joint widths outside of this range. Report such incidences to the Contractor and the Owner and the Consultant in writing as soon as they are found and do not proceed unless written instructions to proceed are received from the Owner.
 - .3 Three-sided adhesion conditions for exterior joints and exterior joint sealants shall not be employed. This provision includes window sills and joints in EIFS. Such incidents will be rejected regardless of when they are discovered and the joints will be cleaned and re-sealed by this section using appropriate methods described herein or shown on drawings.
 - .4 Exterior joints sealed without use of reviewed bond breaker product or closed-cell foam rope or specified acceptable backing, shall not be employed. Such incidents will be rejected regardless of when they are discovered and the joints will be cleaned and re-sealed by this Section using appropriate methods described herein or shown on drawings.
 - .5 Exterior joints sealed with an insufficient depth of sealant (thickness) shall be rejected. Sufficient depth or thickness of sealant shall be determined by manufacturer of the sealant and derived from their written instructions. Insufficient depth shall be cause for rejection of the joint regardless of when it is discovered and the joints will be cleaned and re-sealed by this Section using appropriate methods described herein or shown on drawings.
- .3 Joint Substrate Conditions:
 - .1 Proceed with installation of joint sealants following elimination from joint surfaces and substrates, all contaminants capable of interfering with adhesion of the sealant employed.
 - .2 Examine substrate conditions and consult with manufacturer's published installation recommendations to determine whether a primer or other joint surface preparation method is required. Clean joint surfaces and apply recommended primer when such primers are recommended by sealant manufacturer.

1.10 ENVIRONMENTAL 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 (MSDS) acceptable to Health Canada.

1.11 WARRANTY

- .1 Warrant work of this section against defects and deficiencies in accordance with General Conditions of the Contract. Promptly correct to satisfaction of Owner's Designee and at no expense to Owner, any defects or deficiencies that become apparent within warranty period.
- .2 Defects include, but are not limited to cracking, crumbling, melting, shrinkage, sag, failure in adhesion, cohesion or reversion, air and moisture leakage, marbling or streaking due to improper mixing, discolouration due to dirt pick-up during curing and staining of adjacent materials.

Part 2 Products

2.1 GENERAL

- .1 HVAC Equipment and Ductwork:
 - .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant within forced-air system ductwork or within air handling units.
- .2 Materials containing toxic substances:
 - .1 When low-toxicity products are not commercially available, confine usage of products containing toxic substances to areas which off-gas to exterior; are contained behind air barriers or are applied several months before occupancy to maximize off-gas time.
- .3 Sealants Qualified by Use of Primer:
 - .1 Primers are to be type recommended by sealant manufacturer and used exactly as directed by sealant manufacturer, include brand name of priming product.
- .4 Joint backing and bond breakers:
 - .1 Select for compatibility with sealant selected for each joint and the properties of the backing shall be as recommended by the sealant manufacturer for successful application of sealant to the joint conditions found at project site.
- .5 Colours:
 - .1 Selected by Consultant from manufacturer's standard range to match colour of predominant materials to which sealant is applied. All sealant colours shall be approved by Owner and Consultant. Refer to submittals.
- .6 Formulation and Properties:
 - .1 Non-bleeding, non-migrating, and capable of supporting their own weight.
 - .2 Use self-levelling type for horizontal surfaces and non-sag type at vertical and soffit applications. Use one manufacturer's product consistently and throughout the entire installation, for each joint sealant Type specified.
 - .3 CAN/CGSB-19.13-M defines following:
 - .1 Substrate of major use:
 - .1 Class M - Metal
 - .2 Class C - Concrete or masonry
 - .3 Class G - Glass
 - .2 Rheological Properties:
 - .1 Class 1 - Self-levelling
 - .2 Class 2 - Non-sag
 - .3 Movement:
 - .1 Class 25 - $\pm 25\%$

- .2 Class 40 - $\pm 40\%$
- .4 Glazing Suitability:
 - .1 Class A - suitable for glazing; UV resistant.
 - .2 Class B - suitable for non-glazing application; not UV resistant.
- .5 Temperature:
 - .1 Class L - min application temp. -30 degrees C
 - .2 Class N - min application temp. 5 degrees C
- .4 CAN/CGSB-19.24-M defines following:
 - .1 Type 1 - Self-levelling
 - .2 Type 2 - Non-sag
 - .3 Class A - glazing application
 - .4 Class B - non-glazing application.
- .7 Applicable Minimum Standards:
 - .1 Silicones, one part: to CAN/CGSB-19.13.
 - .2 Acrylics, one part: to CGSB 19-GP-5M.
 - .3 Acrylic latex one part: to CAN/CGSB-19.17.
 - .4 Acoustical sealant: to ASTM C919.
 - .5 Butyl: to CGSB 19-GP-14M.
- .8 Sealant backing and bond breaking materials:
 - .1 Pre-formed, selected as compressible and non-compressible to suit joint.
 - .2 Compressible polyethylene, urethane, neoprene or vinyl foam:
 - .1 Extruded, closed-cell, "backer rod".
 - .2 Size: oversize 30% to 50 % relative to joint size.
 - .3 Non-Compressible, neoprene or butyl rubber:
 - .1 Round, solid rod, Shore "A" hardness 70.
 - .4 High density foam:
 - .1 Extruded, closed-cell, polyvinyl chloride (PVC) or extruded polyethylene, closed-cell, Shore "A" hardness 20, tensile strength 140 to 200 kPa,
 - .2 Extruded polyolefin foam, 32 kg/m³ density, or neoprene foam backer, size as recommended by manufacturer.
 - .5 Bond breaker tape: pressure sensitive polyethylene tape, which will not bond to the sealant. Place tape at back of joint.
 - .6 Acceptable Products:
 - .1 3M product no. 226 or 481.
 - .2 Valley Industries product no. 40.
 - .3 As recommended by sealant manufacturer.

2.2 SEALANT SELECTION

- .1 **Type 1:** Multi-component, polyepoxide urethane sealant. To meet specified requirements of CGSB specification CAN/CGSB-19.24-M90, Type 2, Class B. Use at all locations, except where another type is specified.
- .2 **Type 2:** associated with all EIFS joints - low modulus, multi-component, oligomeric polyurethane sealant meeting the specified requirements of CGSB specification CAN/CGSB-19.24-M90, Type 2, Class B. Use on all EIFS joints and at other locations as shown on the drawings.
- .3 **Type 3:** One-part moisture curing polyurethane sealant. Meeting the specified requirements of specification CAN/CGSB-19.13-M87, Classification MC-2-25-B-N.

- .4 **Type 4:** Medium modulus, moisture curing, one-part silicone sealant. Meeting the specified requirements of specification CAN/CGSB-19.13-M87, Classification MCG-2-25-A-L. Use in glass to glass, glass to metal and metal to metal window system joints.
- .5 **Type 5:** Multi-component or single component self levelling or slope grade polyurethane sealant. Meeting the specified requirements of ASTM C920, Type M, Grade P, Class 25, Use T, M, A and O. Use in exterior and interior horizontal traffic joints.
- .6 **Type 6:** Mildew resistant, one component neutral cure silicone sealant. Meeting the specified requirements of specification CGSB-19GP22M. Tremsil 200 or 600, White for washrooms and clear for stainless steel or plastic laminate, by Tremco Ltd. Use at the joint between plumbing fixtures or bathtubs and floors or walls and between vanity tops and sink and vanity top and wall.
- .7 **Type 7:** One component, non-skinning, non-hardening acoustical sealant. Meeting the specified requirements of specification CAN/CGSB-19.21-M87. Use at all vapour barrier joints and openings in gypsum board assemblies shown on the drawings or specified and below all sole plates or steel track on floor structure and above all top plates or top tracks in contact with underside of structure for partitions with STC ratings (according to specified assembly in NBC). Apply as perimeter seal between gypsum board edges and floor.
 - .1 Sheetrock Brand Acoustical Sealant by USG.
 - .2 Acoustical Sealant by Tremco Ltd.
 - .3 SilentFX Noise proofing Sealant by CertainTeed
 - .4 Acoustical Sealant for fire rated acoustical sealants associated with gypsum board partitions with Fire resistance rating:
 - .1 SpecSeal Fire Stop Products: Smoke 'N Sound Sealant.
 - .2 USG Firecode Smoke and Sound Sealant.
 - .3 Hilti CP 506 Smoke and Acoustic Sealant.
 - .4 Tremco TremStop Smoke and Acoustic Sealant
- .8 **Type 8:** One component, paintable acrylic latex sealant. Meeting the specified requirements of specification CGSB-19-GP-17M. Use in interior non-moving joints that may be painted.
- .9 **Joint Primer:** non-staining, suitable for substrate surfaces, compatible with joint forming materials and as recommended by sealant manufacturer.
- .10 **Cleaning material:**
 - .1 Verify cleaning materials acceptable to Owner prior to use.
 - .2 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.
 - .3 If acceptable, use non-corrosive, non-staining, solvent type, xylol, methyl-ethyl-ketone (MEK), toluol or
 - .4 Low VOC or similar product acceptable to the Owner and recommended by sealant manufacturer; compatible with material or finish manufacturers for surfaces adjacent to sealed areas.
- .11 **Cleaning material:**
 - .1 Verify cleaning materials acceptable within health care environment with Owner prior to use.
 - .2 If acceptable, use non-corrosive, non-staining, solvent type, xylol, methyl-ethyl-ketone (MEK), toluol or
 - .3 Low VOC or similar product acceptable to the Owner and recommended by sealant manufacturer and compatible with material or finish manufacturers for surfaces adjacent to sealed areas.

Part 3 Execution

3.1 EXAMINATION

- .1 Apply no sealant associated with EIFS that would require 3-sided adhesion. All EIFS joints, regardless of location, shall have bond-breaker reviewed by Consultant for use and shall be tooled concave and recessed from adjoining surfaces without exception.
- .2 Pay heed to drainage plane requirements and details and trims intended to permit water to pass out of the wall assembly.
- .3 Verify at the site that joints and surfaces have been provided and that joint conditions will not adversely affect execution, performance or quality of completed work; and that they can put into acceptable condition by means of preparation specified in this section.
- .4 Ascertain that sealers and coatings applied to sealant substrates are compatible with sealant used and that full bond of the sealant and substrate is attained.
- .5 Request samples of the sealed or coated substrate from their fabricators for testing of compatibility and adhesion, if necessary.
- .6 Verify that specified environmental conditions exist before commencing work.
- .7 Ensure that releasing agents, coatings, or other treatments have either not been applied to joint surfaces or that they are entirely removed.
- .8 Defective work resulting from application to unsatisfactory joint conditions will be considered the responsibility of those performing the work of this section.
- .9 Before any sealing work is commenced, test materials for indications of staining or poor adhesion.
- .10 Commencement of work implies acceptance of surfaces and conditions.
- .11 Examine joint sizes and where depth of joint exceeds required depth of sealant correct to achieve proper following width/depth ratio:

3.2 SURFACE PREPARATION

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants. Prepare surfaces in accordance with manufacturer's directions.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, oxidation, coatings, form release agents, sealers and other matter which may impair Work.
- .3 Clean porous surfaces such as concrete, masonry or stone by wire brushing, grinding or sandblasting as required to obtain clean and sound surfaces. Remove oils by sandblast cleaning. Remove laitance by grinding or mechanical abrading.
- .4 Clean ferrous metals of rust, mill scale and foreign materials by wire brushing, grinding or sanding.
- .5 Remove loose particles present or resulting from grinding, abrading or sandblast cleaning by thorough brushing.
- .6 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.
- .7 Ensure joint surfaces are dry and frost free.
- .8 Joint Preparation Details:
 - .1 Wipe non-porous surfaces such as metal and glass to be sealed, except pre-coated metals, with cellulose sponges or clean rags soaked with ethyl alcohol, ketone solvent, xylol or toluol and wipe dry with clean cloth.
 - .2 Where joints are to be sealed with silicone-based sealants clean joint with methyl-ethyl-ketone (MEK) or xylol. Do not allow solvent to air-dry without wiping.

- .3 Clean pre-coated metals with solutions or compounds which will not injure finish and which are compatible with joint primer and sealant.
- .4 Verify that all ferrous metal surfaces are painted before applying sealant.
- .9 Except for joints that will not experience movement, examine all joint sizes. Where depth of joint will exceed tolerance of sealant, correct joint depth to achieve appropriate width/depth ratio as follows:
 - .1 minimum width of joint shall be four times anticipated movement, but not less than 6 mm (1/4") wide;
 - .2 depth of sealant to be 6 mm (1/4") for joints 6 to 13 mm (1/4 to 1/2") in width.
 - .3 maximum sealant depth not to exceed half of joint width when measured through centre section of bead for joints between 13 mm (1/2") to 32 mm (1-1/4") in width.
 - .4 maximum joint size in single application - 50 mm (2") wide, 16 mm (5/8") depth.

3.3 PRIMING

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

3.4 BACKUP MATERIAL

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

3.5 MIXING

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

3.6 APPLICATION – GENERAL

- .1 Install joint backing material to achieve correct and uniform joint profile and to avoid three-sided adhesion for sealant.
- .2 Where joint design or depth of joint prevents use of joint backing material, apply bond breaker tape to prevent three-sided adhesion.
- .3 Do not stretch, twist, puncture or tear joint backing. Butt joint backing at intersections. Install bond breaker tape at back of joint where joint backing is not required or cannot be installed.
- .4 Where surfaces adjacent to joints are likely to become coated with sealant during application mask them prior to priming and sealing.
- .5 Do not exceed shelf life and pot life of materials, and installation times, as stated by manufacturers.
- .6 Be familiar with work life of sealant to be used. Do not mix multiple component materials until required for use.
- .7 Use materials as received from manufacturer, without additions, deletions and adulterations of materials.
- .8 Mix multiple component sealants and bulks sealants using mechanical mixer capable of mixing without mixing air into material, strictly in accordance with manufacturer's directions and recommendations. Continue mixing until material is homogeneously blended, uniform in colour and free from streaks of unmixed material. Install compound prior to start of hardening or curing cycle.
- .9 Seal joints in surfaces to be painted before surfaces are painted. Where surfaces to be sealed are prime painted in shop before sealing check to make sure prime paint is compatible with primer and sealant. If they are incompatible, inform consultant and change primer and sealant to compatible types approved by consultant.
- .10 Where irregular surface or sensitive joint border exists, apply masking tape at edge of joint to ensure joint neatness and protection.

- .11 Prime sides of joints as recommended by sealant manufacturer for type of surface being sealed prior to application of joint backing, bond breaker or sealant.
- .12 Sealant:
 - .1 Mix multiple component sealants and bulks sealants using mechanical mixer capable of mixing without mixing air into material, strictly in accordance with manufacturer's directions and recommendations. Continue mixing until material is homogeneously blended, uniform in colour and free from streaks of unmixed material. Install compound prior to start of hardening or curing cycle.
 - .2 Apply sealant in accordance with manufacturer's written instructions.
 - .3 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .4 Apply sealant in continuous beads.
 - .5 Apply sealant using gun with proper size nozzle.
 - .6 Use sufficient pressure to fill voids and joints solid.
 - .7 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .8 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .9 Remove excess compound promptly as work progresses and upon completion.
 - .10 Apply sealant using hand operated guns or pressure equipment fitted with suitable nozzle size and equipment approved by sealant manufacturer. Apply in accordance with manufacturer's directions and recommendations.
 - .11 Force sealant into joint and against sides of joints to obtain uniform adhesion. Use sufficient pressure to completely fill all voids in joint regardless of variation in joint widths and to proper joint depth as prepared. Ensure full firm contact with interfaces of joint. Superficial pointing with skin bead shall not be acceptable.
 - .12 Finish face of compound to form smooth, uniform beads. At recesses in angular surfaces, finish compound with flat face, flush with face of materials at each side. At recesses in flush surfaces, finish compound with concave face flush with face of materials at each side.
 - .13 Compound may be tooled, provided that such tooling does not damage seal or tear compound. Avoid pulling of sealant from sides.
 - .14 Tool surfaces as soon as possible after sealant application or before any skin formation has occurred, particularly when using silicone sealants.
- .13 Joint surfaces shall be straight, neatly finished, free from ridges, wrinkles, sags, dirt, stains, air pockets and embedded foreign matter or other defacement and be uniform in colour, free from marbling and/or colour streaking due to improper mixing or use of out of shelf life products.
- .14 Solvent curing sealants shall not be used indoors.
- .15 Joint designation in preceding paragraphs is representative of the general nature of the scope of work for this section and nothing in this text is intended to limit responsibility of this Section to seal all locations required to create and ensure continuous enclosure.
- .16 Curing:
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.

3.7 HORIZONTAL EXTERIOR TRAFFIC BEARING JOINTS

- .1 On horizontal traffic surfaces, support joint filler against vertical movement that might result from traffic loads, including foot traffic.

3.8 JOINTS THAT ARE SEALED AS PART OF FINISHING AND FREE OF MOVEMENT

- .1 Apply paintable type 8 latex sealant between door frames and adjacent wall surfaces prior to application of paint.

- .2 Apply silicone sealant Type "6" between countertops and abutting walls, plumbing fixtures and surfaces to which they are fastened.
- .3 Interior junction of window frames or glazed screens and gypsum board into which they are installed.
- .4 Around wall-mounted hand railing and associated trims prior to application of wall covering or paint to walls upon which the railings are mounted.
- .5 Junction of millwork permanently mounted and surfaces to which the millwork is mounted.

3.9 REPAIR

- .1 Remove any compounds not complying with requirements specified herein.
- .2 Exercise care in removal operations not to mar or damage finishes adjacent to joints. Repeat preparation, priming and installation of new material as specified to provide finished work complying with specified requirements, and acceptable to Owner's Designee. Do such repair work at no extra cost to Owner.

3.10 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11.
 - .1 Clean adjacent surfaces immediately.
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
 - .3 Remove masking tape after initial set of sealants.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.

3.11 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by joint sealants installation.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Supply of welded steel frames and metal doors for exterior and interior openings.
- .2 Coordinate with door opening construction and door frame and door hardware installation.

1.2 RELATED SECTIONS

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 92 00 Joint Sealants
- .3 Section 08 80 00 Glass and Glazing
- .4 Section 09 25 00 Gypsum Board Assemblies
- .5 Section 09 11 00 Steel Stud Wall Framing

1.3 REFERENCES

- .1 American National Standards Institute (ANSI):
 - .1 ANSI/SDI A250.3 Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames.
 - .2 ANSI/SDI A250.4 Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcing.
 - .3 ANSI/SDI A250.6 Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
 - .4 ANSI/SDI A250.8 SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 1998.
 - .5 ANSI/SDI A250.10 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
 - .6 ANSI/SDI A250.11 Recommended Erection Instructions for Steel Frames (Formerly SDI-105).
 - .7 ANSI/NAAMM HMMA 801, Glossary of Terms for Hollow Metal Doors and Frames
 - .8 ANSI/NAAMM HMMA 841, Tolerances and Clearances for Commercial Hollow Metal Doors and Frames
 - .9 ANSI/NAAMM HMMA 866, Guide Specifications for Stainless Steel Hollow Metal Doors and Frames
 - .10 ANSI/NFPA 80, Standard for Fire Doors and Other Opening Protectives
 - .11 ANSI/NFPA 105, Standard for the Installation of Smoke Door Assemblies and Other Opening Protectives.
 - .12 ANSI/UL 9, Fire Test of Window Assemblies
 - .13 ANSI/UL 10C, Positive Pressure Fire Tests of Door Assemblies
 - .14 ANSI/UL 1784, Air Leakage Test of Door Assemblies
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A653/A653M - 18, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A568M - 17a Standard Specification for Steel Sheet, Carbon, Structural and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements.
 - .3 ASTM A924 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 - .4 ASTM A1008/A1008M-18, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 - .5 ASTM A1011/A1011M-18a, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra High Strength.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.

- .2 CGSB 41-GP-19Ma, Rigid Vinyl Extrusions for Windows and Doors.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA-G40.20-04/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA W59, Welded Steel Construction (Metal Arc Welding).
- .5 Canadian Steel Door Manufacturers' Association (CSDMA)
 - .1 CSDMA, Recommended Specifications for Commercial Steel Doors and Frames.
 - .2 CSDMA, Selection and Usage Guide for Commercial Steel Doors.
- .6 National Association of Architectural Metal Manufacturers (NAAMM):
 - .1 NAAMM HMMA 802, Manufacturing of Hollow Metal Doors and Frames
 - .2 NAAMM HMMA 803, Steel Tables
 - .3 NAAMM HMMA 805, Recommended Selection and Usage Guide
 - .4 NAAMM HMMA 810, Hollow Metal Doors
 - .5 NAAMM HMMA 810 TN01, Defining Undercuts of Doors
 - .6 NAAMM HMMA 820, Hollow Metal Frames
 - .7 NAAMM HMMA 820 TN01, Grouting Hollow Metal Frames
 - .8 NAAMM HMMA 820 TN02, Continuously Welded Frames
 - .9 NAAMM HMMA 830, Hardware Selection for Hollow Metal Doors and Frames
 - .10 NAAMM HMMA 831, Recommended Hardware Locations for Hollow Metal Doors and Frames.
 - .11 NAAMM HMMA 840, Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames
 - .12 NAAMM HMMA 840 TN01, Painting Hollow Metal Products
 - .13 NAAMM HMMA 850, Fire-Rated and Smoke Control Hollow Metal Door and Frame Products
- .7 National Fire Protection Association (NFPA)
 - .1 NFPA 80-99, Standard for Fire Doors and Fire Windows.
 - .2 NFPA 252-03, Standard Methods of Fire Tests of Door Assemblies.
- .8 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S702, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
 - .3 CAN/ULC-S704, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
 - .4 CAN4-S104-M, Standard Method for Fire Tests of Door Assemblies.
 - .5 CAN4-S105-M, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104.
 - .6 CAN4-S106, Standard Method for Fire Test of Window and Glass Block Assemblies

1.4 SYSTEM DESCRIPTION

- .1 Design Requirements:
 - .1 Design exterior frame assembly to accommodate expansion and contraction when subjected to minimum and maximum surface temperature of -35 degrees C to 35 degrees C.
 - .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.
 - .3 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 NFPA 252 for ratings specified or indicated.
 - .4 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104, ASTM E152, NFPA 252 and listed by nationally recognized agency having factory inspection services.

1.5 TESTING AND PERFORMANCE

- .1 Physical Endurance for Steel Doors and Hardware Reinforcement:

- .2 Test a 3 ft. x 7 ft. (914 mm x 2134 mm), 1.75 in. (44 mm) thick nominal size door representative of the construction and material to be provided.
- .3 Test in accordance with ANSI/SDI A250.4, Cycle and Twist Test procedure.
 - .1 Cycle Test Acceptance Criteria:
 - .1 Doors specified with 0.053 in. (1.3 mm) and thicker face sheets tested to 4,000,000 cycles.
 - .2 Doors specified with 0.042 in. (1.0 mm) minimum thick face sheets tested to Level A (1,000,000 cycles).
 - .2 Twist Test Acceptance Criteria: Maximum deflection under 300-pound (136.1 kg) load.
 - .1 4,000,000 cycle-tested doors not to exceed 0.625 in. (15.8 mm) deflection and maximum permanent deflection not to exceed 0.062 in. (1.5 mm).
 - .2 1,000,000 cycle-tested doors not to exceed 1.25 in. (31.7 mm) deflection and maximum permanent deflection not to exceed 0.125 in. (3.1 mm).
- .4 Provide Verification of Compliance from an Independent 3rd party which includes a description of the test specimen, procedures used in testing, and indicate compliance with the acceptance criteria of the standard.
- .5 Fire Rated Doors and Frames: Ratings as indicated on Door Schedule, when tested in accordance with NFPA 252, and applicable ULC Standard. UL 10B or UL 10C may be utilized if acceptable to Municipal Chief Building Official.
 - .1 Labelled by ULC, WH, or other agency acceptable to the Authorities Having Jurisdiction.
 - .2 For any door or frame product specified by the Architect to be fire-rated, which cannot qualify for labeling due to design, hardware or other reason, advise the Architect, in the submittal documents. Advise the Architect when hardware, glazing or other options specified, unknown at the time of submittal document preparation, affect fire labeling eligibility.
- .6 Prime Paint Performance
 - .1 Sheet steel specimens, with the product manufacturer's production primer, replicating finish 'as shipped', tested in accordance with ANSI/SDI A250.10
 - .2 Provide Verification of Compliance from an Independent 3rd party which include a description of the test specimen, procedures used in testing, and indicate compliance with the acceptance criteria of the standard.

1.6 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Provide all products from a single manufacturer who is a member of the Steel Door Institute.
- .2 Meet fabrication methods and product quality standards set by the Hollow Metal Manufacturers Association, HMMA, a division of the National Association of Architectural Metal Manufacturers, NAAMM, as set forth in the contract documents and NAAMM's HMMA 800 through 850 Series documents.
- .3 Doors and frames shall conform to the requirements of ANSI A250.8-1998 (SDI-100) and other specifications herein named.
- .4 Cold rolled steel shall conform to ASTM A1008 and A568.
- .5 Hot rolled, pickled and oiled steel shall comply with ASTM A1011 and A568.
- .6 Hot dipped zinc coated steel shall be of the alloyed type and comply with ASTM A924 and A653.
- .7 Steel Sheet, Electrolytic Zinc-Coated shall conform to ASTM A591.

1.7 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Product data sheets: Provide technical data sheets.
- .3 Shop Drawings:

- .1 Indicate each type of door, dimensions, materials, core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed or louvre, arrangement of hardware fire rating and finishes.
- .2 Indicate each type frame material, core materials and thicknesses, reinforcements, glazing stops, location of anchors and exposed fastenings reinforcing, adjacent construction, fire rating and finishes.
- .3 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .4 Submit test and engineering data, and installation instructions.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00
- .2 Waste Management and Disposal: separate waste materials for reuse or recycling as applicable in accordance with Section 01 74 19.
- .3 Mark products with Architect's opening number on doors, frames, misc. parts and cartons.
- .4 Protect doors and frames during shipping and storage. Notify manufacturers in writing of damage incurred during shipping.
- .5 Make good immediately any damage done or return products to manufacturer. Clean scratches and touch up with rust inhibitive primer. Replace damaged work which cannot be repaired, restored or cleaned.
- .6 Remove wrappings or coverings from doors upon delivery to Site.
 - .1 Store doors in vertical position, spaced by blocking to permit air circulation between them.
 - .2 Do not use non-vented plastic or canvas shelters.
 - .1 Should wrappers become wet, remove immediately.
 - .3 Provide 6 mm (1/4 inch) space between doors to promote air circulation.
- .7 Store materials on wood sleepers in dry area and cover to protect from damage and coordinate with Section 06 10 00. Place units on 102 mm (4 inch) high wood sills or in a manner that will prevent rust or damage.

Part 2 Products

2.1 MANUFACTURERS

- .1 Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:
 - .1 Daybar Industries Ltd.
 - .2 S.W. Fleming Ltd.
 - .3 Approved alternate

2.2 SHEET STEEL

- .1 Commercial grade steel to ASTM A568M, Class 1, hot-dip galvanized to ASTM A527M, coating designation to ASTM A525M, ZF 75 (A25), known commercially as "Colourbond", "Satincoat", or "Galvanneal".
- .2 Doors, frames, frame anchors, and hardware reinforcing for each of the levels and models specified shall be provided to meet the requirements of the performance levels specified. The material used in manufacturing these products and components shall comply with ANSI/SDI A250.8. Hardware reinforcing on doors and frames shall comply with ANSI/SDI A250.6. The physical performance levels shall be in accordance with ANSI/SDI A250.4.
- .3 Steels used to manufacture doors, frames, anchors, and accessories shall meet at least one or more of the following requirements:
 - .1 Cold rolled steel shall conform to ASTM A1008 and A568.
 - .2 Hot rolled, pickled and oiled steel shall comply with ASTM A1011 and A568.

- .3 Hot dipped zinc coated steel shall be of the alloyed type and comply with ASTM A924 and A653.
- .4 Steel Sheet, Electrolytic Zinc-Coated shall conform to ASTM A591.

2.3 STEEL THICKNESS (MINIMUM)

- .1 Review door schedule for continuous hinges, automatic door operators, self-closing devices and other items that would require reinforcement within doors or frames.
- .2 Review Drawings for installation conditions including wall type, door swing and fire resistance ratings. Any closure within a partition shown with a fire resistance rating shall also have a fire resistance rating appropriate to the partition or wall whether noted as such within schedules or not.

.3 Door and Glazed Screen Frames - Thickness		Metric	Gauge
.1 All interior hollow metal door frames:		1.519 mm	16
.2 Equivalent to Fleming "DW" series frames.			
.3 All exterior hollow metal door frames thermally broken:		1.519 mm	16
.4 Equivalent to Fleming "TB" series.			
.5 Steel Hollow Door Construction –Thickness			
.1 Face Sheets		1.214 mm	20
.2 Equivalent to Fleming "D" Series.			
.3 Exterior door cores: polyurethane foam.			
.4 Accessories (Doors and Frames) - Thickness		Metric	Gauge
.1 Reinforcements			
.1 Lock and Strike Reinforcements		1.519 mm	16
.2 Hinge Reinforcements		3.416 mm	10
.3 Flush Bolt Reinforcement		1.519 mm	16
.4 Reinforcement for Surface Applied Hardware:		1.214 mm	18
.2 Top and Bottom End Channels		1.214 mm	18
.3 Glass Trim (Screw Fixed/Snap-In):		0.912 mm	20
.4 Floor Anchors:		1.519 mm	16
.5 Jamb Spreaders:		0.912 mm	20
.6 Wall Anchors:			
.1 Steel/Wood Stud Type		0.912 mm	20
.2 Steel/Wood Stud Tension		0.912 mm	20

2.4 DOOR CORE MATERIALS

- .1 Interior Doors:
 - .1 Honeycomb construction: 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 Doors:
 - .1 Insulated with polyurethane foam, closed cell, minimum 1 kg/m³ density applied under high pressure.

2.5 ADHESIVES

- .1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
- .2 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.

- .3 Lock-seam for interior doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.
- .4 Lock seam for exterior doors: continuously welded.

2.6 PRIMER

- .1 Touch-up prime CAN/CGSB-1.181.

2.7 PAINT

- .1 Field paint steel doors and frames in accordance with Section 09 91 00. Protect weather strips from paint. Provide final finish free of scratches or other blemishes.
 - .1 Maximum VOC emission level 50 g/L to SCAQMD Rule 1113.

2.8 ACCESSORIES

- .1 Door silencers: single stud rubber/neoprene type.
- .2 Exterior doors top and bottom caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.
- .3 Interior Door Caps: steel formed to fit.
- .4 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.
- .5 Metallic paste filler: to manufacturer's standard.
- .6 Fire labels: metal, riveted to hinge side of frame; hinge side of door.
- .7 Sealant: Refer to 07 92 00.
- .8 Glazing: Clear tempered and polished wired glass; refer to Section 08 81 00.
- .9 Make provisions for glazing 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.
 - .2 Design exterior glazing stops to be tamperproof.

2.9 FRAMES FABRICATION GENERAL

- .1 Fabricate frames in accordance with CSDMA specifications.
- .2 Exterior frames: thermally broken construction.
- .3 Interior frames: welded construction.
- .4 Fabricate frames to profiles and maximum face sizes as indicated.
- .5 Interior door frames welded; interior and exterior frames equipped with temporary spreader bars.
- .6 Fabricate frames for doors, screens and borrowed lights to profiles indicated.
- .7 Where frames occur in gypsum board provide stud type anchors.
- .8 Blank, reinforce, drill and tap frames for mortised, and hardware templates using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .9 Protect mortised cut outs with steel guard boxes.
- .10 Prepare frame for door silencers, 3 for single door, 2 at head for double door.
- .11 Manufacturer's nameplates on frames and screens are not permitted.
- .12 Conceal fastenings except where exposed fastenings are indicated.
- .13 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .14 Insulate exterior frame components with polyurethane insulation.
- .15 Frames are to terminate at concrete floor slab or wood sub floor level: provide plates for anchorage to floor assembly.

- .16 Install door anchor clips to gypsum board installer's directions for steel door frames in solid gypsum board partitions. Ensure clips are supplied by Section 09 21 16 Gypsum Board Assemblies.
- .17 Factory apply touch-up primer to areas where zinc coating has been removed during fabrication.
- .18 Construct door frames of labelled fire doors as detailed in Follow-up Service Procedures/Factory Inspection Manuals issued by nationally recognised listing agency to individual manufacturers and tested in conformance with CAN4-S104-M. Ensure ratings for frames match doors as minimum requirement. Locate label on frame jamb on hinge side, so it is concealed when door is closed.

2.10 WELDED FRAMES

- .1 Welding in accordance with CSA W59.
- .2 Mitre head corners tightly; weld on inside of profile and grind smooth on exterior face.
- .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 Protect mortise cut outs with mortar guard boxes. Omit for gypsum board applications.
- .6 Cope and weld butt joints of mullions, transom bars, centre rails and sills. Grind welded joints to smooth uniform finish.
- .7 Attach floor anchors to inside of each jamb profile.
- .8 Weld in 2 temporary jamb spreaders at each frame to maintain alignment during shipment.
- .9 Securely attach lead to inside of frame profile from return to jamb soffit (inclusive) on door side of frame only.
- .10 Form glazing stops into channels, minimum 15.8 mm (5/8") height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.

2.11 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.
- .4 Locate anchors for frames in existing openings not more than 150 mm from top and bottom of each jamb and intermediate at 660 mm on centre maximum.
- .5 For frames in previously placed concrete, masonry or structural steel provide anchors located not more than 150 mm (6") from top and bottom of each jamb and intermediate anchors at 650 mm (26") on centre maximum.

2.12 FRAMES: KNOCKED-DOWN TYPE

- .1 Not permitted.

2.13 FRAMES: SLIP-ON TYPE

- .1 Not permitted.

2.14 DOOR FABRICATION GENERAL

- .1 Fabricate doors to be swing type flush with 1 continuous face free from joints, tool markings and abrasions and with provisions for glass and louver openings as indicated on Door Schedule and Drawings.
- .2 Doors: swing type, flush, with provision for glass and louvre openings as indicated.

- .3 Fabricate doors with longitudinal edges locked seam with adhesive assist.
- .4 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketing and hardware in accordance with ASTM E330 and other standards listed.
- .5 Blank, reinforce, drill doors and tap for mortised, for templates provided by hardware supplier.
- .6 Fabricate interior doors with top and bottom inverted recessed spot-welded channels.
- .7 Fabricate exterior doors with non-metallic caps - provide flush PVC top caps.
- .8 Coordinate louver openings with Mechanical.
- .9 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
- .10 Reinforce doors where required, for surface mounted hardware Provide inverted, recessed, spot welded channels to top and bottom of interior doors. Reinforce selected doors for automatic door operator. Refer to drawings and schedules.
- .11 Reinforce panels to prevent oil canning. Install panels with concealed fasteners and reinforce to accommodate hardware as required. Provide door top and rebated matching panel where no transom mullion occurs.
- .12 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .13 Provide fire labelled doors for those openings requiring fire protection ratings scheduled. Test such products in conformance with CAN4-S104 and ASTM E152 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.
- .14 Manufacturer's nameplates on doors are not permitted.

2.15 DOORS: HONEYCOMB CORE CONSTRUCTION

- .1 Fabricate each face steel sheet for interior doors using thickness indicated and laminate under pressure to honeycomb core.
- .2 Reinforce, stiffen and sound deaden doors with core laminated to inside faces of panels. Core shall completely fill inside hollow of door.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION GENERAL

- .1 Refer to Section 06 10 00.
- .2 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .3 Install doors and frames to CSDMA Installation Guide.

3.3 FRAME INSTALLATION

- .1 Set frames plumb, square, level and at correct elevation.
- .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.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.

- .5 Caulk perimeter of frames between frame and adjacent material where exposed to view.
- .6 Maintain continuity of air barrier.

3.4 DOOR INSTALLATION

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00.
- .2 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows.
 - .3 Hinge side: 1.0 mm.
 - .4 Latchside and head: 1.5 mm.
 - .5 Finished floor, non-combustible sill: 13 mm.
- .3 Adjust operable parts for correct function.

3.5 FINISH REPAIRS

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

3.6 GLAZING

- .1 Install glazing for doors in accordance with Section 08 81 00.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 21 19 Foamed-in-Place Polyurethane
- .3 Section 07 27 10 Air Barrier and Transition Membrane
- .4 Section 07 92 00 Joint Sealants
- .5 Section 08 42 29 Automatic Swinging Door Entrance Operators
- .6 Section 08 80 50 Glass and Glazing
- .7 Section 09 21 16 Gypsum Board Assemblies
- .8 Section 09 22 16 Non-Structural Metal Stud Framing

1.2 WORK INCLUDED

- .1 Supply and installation of wide-style doors, set withing frames made using nominal 50 mm wide froming members to form sidelights and transom units, together with associated glass units and door hardware.
- .2 For interior aluminum doors and frames, provide single-glazed glass units.
- .3 For exterior aluminum doors and frames, provide sealed insulating glass units for exterior and interior vestibule doors according to Section 08 80 50 Glass and Glazing. Provide sealed insulating glass units for all exterior doors unless otherwise noted on schedule. One exterior door at the roof level is a hollow steel door.
- .4 Provide weather stripping for interior doors of vestibules.
- .5 Furnish labour, materials and services for the complete fabrication, assembly and installation of aluminum framing system manufactured by door manufacturer. Include all necessary accessories, anchors and sealants required for a complete installation meeting performance requirements in this Section.
- .6 Provide double-glazed insulated, sealed fixed glass units for doors, sidelights and transoms shown; all glass tempered and assembled into IGU according to Section 08 80 50.
- .7 Provide all hardware associated with aluminum entrance doors except lock cylinder which is provided under Section 08 71 00 Door Hardware. All hardware shall accommodate automatic door operators specified within Section 08 42 29.

1.3 WORK EXCLUDED

- .1 Structural steel, wood or steel stud partition framing, interior trims, concrete masonry, related work specified elsewhere.

1.4 APPROVED PRODUCTS:

- .1 List of acceptable manufacturers is included with this section.
- .2 Alternative products are acceptable provided that they meet or exceed minimum standards indicated in this section and meet with the consultant's approval. All test data for alternate products must be submitted to the consultant a minimum of 5 working days prior to Bid Closing. Use of alternate manufacturer is permitted by written addendum issued by the Consultant only.

1.5 REFERENCES

- .1 Aluminum Association (AA)
 - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA)
 - .1 AAMA 609/610-09, Cleaning and Maintenance Guide for Architecturally Finished Aluminum.
 - .2 AAMA 701/702-04, Voluntary Specifications for Pile Weather Stripping and Replaceable Fenestration Weatherseals.
- .3 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
 - .1 ANSI/BHMA A156.1-2006, American National Standard for Butts and Hinges.
 - .2 ANSI/BHMA A156.3-2001, Exit Devices.

- .3 ANSI/BHMA A156.4-2008, Door Controls - Closers.
- .4 ANSI/BHMA A156.5-2001, Auxiliary Locks and Associated Products.
- .5 ANSI/BHMA A156.10-2005, Power Operated Pedestrian Doors.
- .6 ANSI/BHMA A156.19-2007, Power Assist and Low Energy Power Operated Doors.
- .4 ASTM International
 - .1 ASTM A167-99(R2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
 - .2 ASTM B209M-07, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
 - .3 ASTM B221M-07, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
 - .4 ASTM D2000-08, Classification System for Rubber Products in Automotive Applications.
 - .5 ASTM D2287-96(R2010), Standard Specification for Non Rigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds.
 - .6 ASTM E283-04, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - .7 ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .5 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.40-97, Anticorrosive Structural Steel Alkyd Primer.
 - .2 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
 - .3 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.
 - .4 CGSB 1.132M-90, Zinc Chromate Primer, Low Moisture Sensitivity.
 - .5 CAN/CGSB 1.181-99, Ready-Mixed, Organic Zinc-Rich Coatings.
- .6 Canadian Standards Association (CSA International)
 - .1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .7 Environmental Choice Program (ECP)
 - .1 CCD-045-95(R2005), Sealants and Caulking Compounds.
 - .2 CCD-047-98(R2005), Architectural Surface Coatings.
 - .3 CCD-048-98(R2006), Surface Coatings - Recycled Water-borne.
- .8 Green Seal Environmental Standards (GS)
 - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
- .9 National Research Council of Canada (NRC)
 - .1 MNECB-97, Model National Energy Code of Canada for Buildings.
- .10 Underwriters' Laboratories of Canada (ULC)
 - .1 ULC/ORD C305-72, Panic Hardware.
 - .2 CAN/ULC-S524-06, Standard for the Installation of Fire Alarm Systems.
 - .3 CAN/ULC-S533-08, Egress Door Securing and Releasing Devices.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for door, frame and sidelights, glass, hardware, and accessories and include product characteristics, performance criteria, physical size, finish and limitations and electrical service diagrams for electric strike.
- .3 Shop Drawings:

- .1 Indicate layout, dimensions, elevations, detail sections of members and operator, interior finish conditions, materials, recesses, hardware including mounting heights, anchors and reinforcements, provisions for expansion and contraction, methods of joining sheet metal and joint locations, types of sealants, details of other pertinent components of the work, and illustrate actual adjacent construction and future construction intended by the Contract Documents to which work of this section is attached.
- .2 Identify installation tolerances required, assembly conditions, routing of service lines, locations of operating components, controls and boxes.
- .3 Indicate door signs.
- .4 Indicate the following:
 - .1 Interior and exterior junctions with adjacent construction.
 - .2 Junctions between combination units.
 - .3 Elevations of units.
 - .4 Core thicknesses of components.
 - .5 Type and location of exposed finishes, method of anchorage, number of anchors, supports, reinforcement, and accessories.
 - .6 Location of caulking.
 - .7 Each type of door system including location.
 - .8 Arrangement of reinforcing for hardware and joints.
 - .9 Arrangement of hardware and required clearances.

1.7 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit project record documents that accurately record locations of concealed and remote equipment, services, and conduit.
- .3 Submit warranty.
- .4 Operation and Maintenance Data: submit operation and maintenance data for door operator system including all reviewed shop drawings bearing review annotations for incorporation into manual.
- .5 Submit cleaning instructions.

1.8 QUALITY ASSURANCE

- .1 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Strength: CAN3-S157-M83 Strength Design in Aluminium.
- .3 Energy Performance: CAN/CSA-A440-M90, Windows.
- .4 Welder qualifications: Structural components to be welded by fabricators certified by Canadian Welding Bureau to CSA standard W47.2 for welding aluminium.
- .5 Installers qualifications: Installer experienced (as determined by contractor) to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.
- .6 Manufacturers qualifications: 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.
- .7 AAADM Compliance: Both installer and manufacturer to meet requirements necessary to get certification/license agreement.

1.9 WARRANTY:

- .1 Submit extended warranty for a period of five years following the date of substantial performance of the Contract covering all defects in manufacturing and installation of the entrance framing system and all parts of the window framing system. Defects include but are not limited to: leaking, loosening in whole or in part of all components in the system, breakage or deformation of the metal work, breakage of

glass or rupturing or other failing of sealed units attributable to in appropriate transfer of stress developed in the frame do to lack of expansion room, wind loading or deflections. Fading or other discolouration of the finish to the metal components of any type.

- .2 Submit a 10-year warranty covering defects and failure of the double-glazed, sealed thermal insulating window and door glass panels. Defects and failure of the sealed unit shall be considered to have occurred, but not limited to the appearance of the following effects: breakage due to thermal stress, hazing, fogging, condensing moisture, or other similar phenomena occurring between the panes of glass. Defects in the low E coating will also be considered a failure in the performance of the sealed unit.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements together with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations and store indoors within clean, dry, well-ventilated area.
 - .2 Store and protect entrance doors and frames and glass from blemishes, dust, dirt, debris and damage of any kind including splattering paint and concrete.
 - .3 Replace defective or damaged materials with new.
- .4 Cover exposed metal surfaces with pressure sensitive heavy protection paper or strippable plastic coating.
 - .1 Use materials of type which will not leave residue or become bonded when exposed to sun.
 - .2 Use padded blankets or approved protective wrapping for decorative metal work and similarly finished exposed elements.
- .5 Develop Construction Waste Management Plan related to Work of this Section.
- .6 Packaging Waste Management: remove for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 DESIGN CRITERIA AND BASIS FOR DESIGN

- .1 The specifications for the framing system within this Section is based upon Series 2500 manufactured by Commdoor Aluminum 2" x 6.0" (50.8 mm x 152 mm).
- .2 Specification for entrance swinging doors within this Section is based upon 4400 Series Wide Style Thermally broken doors manufactured by Commdoor Aluminum.
- .3 Design frames and doors in exterior walls to:
 - .1 Accommodate expansion and contraction within service temperature range of -35 to 35 degrees C.
 - .2 Limit deflection of mullions to maximum 1/175th of clear span when tested to ASTM E330 under wind load of 1.2 kPa and submit certificate of tests performed.
 - .3 Accommodate movement within system including movements induced by temperature changes.
 - .4 Accommodate movement between system and perimeter framing components or substrate.
 - .5 Accommodate action of automatic door operator including load imposed by weight of operator and load imposed by actuation of operator.
- .4 All door and framing fabrication to meet or exceed CAN/CGSB 1.108M-M89
- .5 Size glass thickness and glass unit dimensions to limits in accordance with Section 08 80 50, all panes tempered and two panes assembled into IGU for exterior doors.
- .6 Assemble windows and doors to ensure neat, weather tight construction and well fitted joints square and true with maximum tolerance of 2.0mm in diagonal dimensions.
- .7 Joints shall be made by welding or concealed mechanical fastenings. A weather tight joint shall be made at the juncture of sill and jamb, horizontal rails and jambs and at vertical couplings.

- .8 Sash joints shall be fixed such that they will retain their shape and remain square during replacement of glazing.
- .9 Cut and fit snugly expanded bead rigid insulation within all voids in frame backs.
- .10 Install manufacture's name plates in semi-concealed space bearing name and location of manufacturer and identification of entrance framing product.
- .11 Install weather stripping mechanically locked or otherwise secured in position but easily removed and replaceable without special tools. Surface applied and glued-on weather stripping is not acceptable.
- .12 Equalize pressure in the cavity surrounding the perimeter of the glass with the outside air and provide drainage from the sill cavity to the outside. The inside stop shall provide a positive seal against any moisture that may enter the cavity. The interior perimeter of the glass unit shall be sealed with a rope type backing on a continuous heel bead of caulking that is compactable with the sealed glass units used. Aluminium glazing stops complete with flexible vinyl gaskets are to be used on all interior sides of all windows.
- .13 Include continuous air barrier and vapour retarder through door system. Primarily in line with inside pane of glass and heel bead of glazing compound.

2.2 SYSTEM TOLERANCES:

- .1 Fabricate units to a tolerance of +/- 1.5 mm (1/16") for vertical, horizontal and diagonal dimensions less than 1828 mm (72") and +/- 3 mm (1/8") for dimensions greater than 1828 mm (72").
- .2 Entrance framing uniform load: To meet or exceed ASTM E330. At a static air design load of 1.2kPa (20 psf) applied in the positive and negative direction. No part of the system shall have a deflection exceeding 1/175 of the span.
- .3 Fabricate all mullions and doorframe components to ensure a maximum deflection of 1/175 of the span and at a structural test load of 1.5 times the specified design load, no glass breakage or permanent set in the framing in excess of 0.2% of their clear spans shall occur.
- .4 Entrance Framing Air Infiltration: to meet or exceed ASTM E283. Infiltration not to exceed 2.81 m³/s/m² (0.06 cfm/ft²) at a static air pressure differential of 3 kPa (6.24 psf).
- .5 Entrance Framing Water Resistance: To meet or exceed ASTM E331.

2.3 SYSTEM COMPONENTS:

- .1 This section is responsible for providing all required components in the entry system including glass and glazing, hardware indicated below and sealants with foam rope bond breaker at the exterior face of the system.
- .2 This section shall co-ordinate installation of automatic entrance door operators associated with aluminum entrance doors. This section shall ensure that arms and other components of the operator are compatible with the installation conditions on the site including power to door and frame, electric strike and installation of activation switches, etc.
- .3 Where entrance framing includes a transom, panel at location of automatic door operator shall be minimum 150 mm (6") wide to match width of operator housing.
- .4 The entrance system includes supply and installation of extruded aluminium sills and aluminium flat panels complete with spacers, stiffeners, fasteners and rigid insulation in spandrel panels and specified hardware.
- .5 This section includes the supply of all parts of the aluminum window system including extruded aluminum sills and all required hardware and the tempered glass units.
- .6 This section shall install sprayed-in-place polyurethane insulation between aluminum frames and wall components surrounding the entrance framing in such a way as to allow for deflections and thermal movements.
- .7 This section shall install foam rope as a bond breaker for the exterior sealant around aluminum frames. This section shall also install and tool the exterior sealant around all windows.
- .8 This section shall supply and install interior paintable sealants, interior patching and interior finishes to other interior materials and components including gypsum board indicated.

- .9 Set threshold in full bed of mastic.

2.4 MATERIALS

- .1 Aluminum extrusions: to Aluminum Association alloy AA6063-T6 anodizing quality.
- .2 Sheet aluminum: to Aluminum Association anodizing quality.
- .3 Steel reinforcement: to CSA G40.20/G40.21, grade 300 W.
- .4 Fasteners: aluminum, cadmium plated steel, stainless steel, finished to match adjacent material.
- .5 Weatherstrip: replaceable backed wool pile.
- .6 Door bumpers: black neoprene.
- .7 Door bottom seal: operable and automatic, adjustable, door seal of anodized extruded aluminum frame and vinyl weather seal, surface mounted with drip cap, closed ends, automatic retract mechanism when door is open.
- .8 Isolation coating: bituminous paint or epoxy resin solution.
- .9 Glass: tempered glass to CAN/CGSB-12.1, clear float.
- .10 Glazing materials: Section 08 80 50 Glazing, tempered.
- .11 Sealants: colour selected by Consultant and in accordance with Section 07 92 00 - Joint Sealants.

2.5 ALUMINUM DOORS

- .1 Doors shall be dimensioned as shown on drawing: 2135mm (7'-0") high and 57.2mm (2.25") thick complete with glazing; size noted on drawings.
- .2 All hardware shall be supplied by this Section except for lock cylinders. All aluminum doors provided by this Section shall have electronic strike and lock.
- .3 Provide door operator push buttons and card readers within mid-rail of sidelight framing system as noted on drawings.
- .4 Provide appropriate conductor raceways from electronic items wall-mounted or mounted within glazing framing to activate automatic door operators and the card readers and electric strikes.
- .5 Protect lock positions with plates fixed to door and framing system to suit circumstances.
- .6 **Door Finish: Clear anodized.**
- .7 Acceptable Products are Equal to:
 - .1 Commdoor Aluminum Series 4400, double-glazed, full lights.
 - .1 Weather stripping kit with automatic door bottom.
 - .2 Stiles: 127mm (5").
 - .3 Top Rail: 127mm (5").
 - .4 Bottom Rail: 127mm (5").
 - .5 Width and height of door marked on drawings.
- .8 Sealed glass units: double-glazed, sealed thermal glass units of overall 25.4mm (1") thickness, tempered glass for all doors.
- .9 Hardware as follows:
 - .1 Rim panic device Commdoor 2090 for all exit doors from stairwells.
 - .2 Doors Leading to roof: 9000-201 M.S Deadlock; cylinder 9000-302, keyed both sides; LCN 4040 self-closing device; weatherstrip and threshold specified below.
 - .3 Main Entrance door: push/pull hardware, electric strike; auto-door operator coordinated.
 - .4 Double entrance doors: all hardware below plus one set of flush bolts: 9000-390/391; 4590 exit paddle; lock guard.
 - .5 Electric strike 9000-348 or 9000-351, clear anodized 12V or 24V to suit hardware and access system, for each of two main entrance vestibule doors: one exterior door and one interior door and for each exterior door in other locations throughout the building.
 - .6 Cylinder: 7 pin cylinder lock compatible with Owner's keying system, supplied under hardware allowance.
 - .7 KN Crowder CT 74 threshold, frost-free; AODA compliant, 4" width, mill finish aluminum.
 - .8 Weather stripping and automatic door bottom,

- .9 Pull: Hager 18-Degree Pull, 990 P, stainless steel, through bolt.
- .10 Connect electric strike via relay to automatic door operator. Accommodate automatic door operator and defeat operation of operator if lock is not released electronically.
- .11 9000-144 continuous geared hinge.
- .12 Coordinate electronic strike to automatic operator.
- .13 Self-closing device LCN 4040 Commdoor product number 4111.
- .10 Schedule:
 - .1 Ground level main entrance door and frame with interior vestibule.
 - .2 Secondary entrances: leading out of the northern wall - refer to plans; with vestibule (exterior and interior doors).
 - .3 Secondary doors for future tenancies: refer to plans.
 - .4 Exterior Stair Door – one at ground floor service entrance and one at roof level.

2.6 ENTRANCE FRAMING:

- .1 General:
 - .1 This section shall review installation requirements including all site conditions and prepare required extruded aluminium frame, trims and insulated panels to complete the installation required.
- .2 Finish: Framing All materials exposed to view:
 - .1 **Black thermosetting acrylic enamel coating or alternative colour selected by architect.**
- .3 Acceptable Products are equal to:
 - .1 Commdoor Aluminium 2500 series thermally-broken framing system including all required accessories. Mullion products and entrance adapters as required by the installation and all other required accessories including aluminum threshold.
 - .2 Matching profile by other manufacturers with identical CSA-A440 ratings as approved by consultant prior to tender closing, including US Aluminum, Alumicor, Kawneer products.
 - .3 Provide appropriate raceways within framing system to energize automatic door operators, electric strikes and card readers shown on drawings.

2.7 GLASS AND GLAZING:

- .1 Doors, side lights and interior glazed framing systems including glass and glazing systems within doors, all cases: to CAN/CGSB-12.1, transparent and as follows:
 - .1 Type 2-tempered.
 - .2 Class B-float.
 - .3 Refer to Section 08 80 50.
- .2 Glass thickness: as required by unit size and site conditions to all applicable codes and standards, but not less than 6mm (1/4") thickness.
- .3 All glass panes for entrance doors - exterior entrances and interior doors for vestibules, frames, sidelights and transoms shall be assembled into sealed, double-glazed units as follows:
 - .1 Inter-cavity space thickness: as determined by glass thickness, nominal 25.4mm (1") overall sealed unit thickness comprised of 2 panes of glass, 6mm thick, tempered, assembled into sealed glazing unit with low conductivity spacers and performance and qualities specified within 08 80 50.
- .4 Setting blocks: Neoprene, EPDM, Silicone, 80-90 Shore A durometer hardness to ASTM D 2240, length of 25mm for each square meter of glazing, minimum 102mm x width of glazing rabbet space minus 1.5mm x height or to suit glazing method, glass light weight and area.
- .5 Spacer shims: Neoprene, 50-60 Shore A durometer hardness to ASTM D 2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.
- .6 Glazing tape:
 - .1 Preformed butyl compound, 10-15 Shore "A" durometer hardness to ASTM D 2240; coiled on release paper; black colour.
 - .2 Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume 2%, designed for compression of 25 %, to effect an air and vapour seal.

- .7 Glazing splines: resilient polyvinyl chloride, extruded shape to suit glazing channel retaining slot.
- .8 Lock-strip gaskets: to ASTM C 542.

2.8 STEEL FINISHES

- .1 Finish steel clips and reinforcing steel with zinc coating to CAN/CSA-G164.

2.9 FABRICATION

- .1 Doors and framing to be by same manufacturer.
- .2 Fabricate doors and frames to profiles and maximum face sizes as indicated. Provide minimum 22mm bite for insulating glazed units.
- .3 Provide structural steel reinforcement as required.
- .4 Fit joints tightly and secure mechanically.
- .5 Conceal fastenings.
- .6 Mortise, reinforce, drill and tap doors, frames and reinforcements to receive hardware using templates provided under this Section and Section 08 71 00 - Door Hardware.
- .7 Isolate aluminum from direct contact with dissimilar metals, concrete and masonry.

Part 3 Execution

3.1 EXAMINATION

- .1 Ensure that concrete placement adjacent to the work, is completed prior to installation. If exterior concrete slabs on ground are not placed, ensure that Construction Manager has a plan to protect aluminum products after they are installed.
- .2 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for aluminum doors and frames installation in accordance with manufacturer's written instructions.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied receipt of written approval to proceed from Consultant.

3.2 INSTALLATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 The work shall be performed by qualified skilled personnel ensuring proper equipment provided in order to expedite the project in an efficient professional manner.
- .3 Inspect door and frame unit for defects attributable to manufacturer or shipping including damage to glass units and hardware preparation. Notify supplier and return defective products for replacement with new.
- .4 Set new doors and frame in opening and verify fit prior to removal of any stiffening or shipping restraint devices. Remove door and frame to complete preparation of opening and door and frame.
- .5 Install mastic below aluminium threshold such that mastic is in full contact with building components and threshold for a full mastic bed.
- .6 Verify attachment points and square position of doorframe prior to fixing in place including installation of shims at each jamb fastener point. Do not fasten jambs to building without supporting shim behind each fastener. Use opposing wedge shims for accurate fit. Frequently check plumb and horizontal alignment of door and frame.
- .7 Fix frame in place into building components in a pre-drilled pilot hole. Do not completely install screws until final fastening. Verify available fastener penetration prior to setting frame.
- .8 Check level and hardware (hinge and latch function in pre-hung units prior to installation of final fasteners.
- .9 Ensure that all locking and latching hardware is installed in accordance with manufacturer's templates and that it operates properly.

- .10 Install foam rope bond breaker snugly and exterior sealant at exterior side of jamb and building juncture prior to installing polyurethane foam insulation.
- .11 Ensure that sealant is sufficiently cured to resist deformation by foam insulation.
- .12 Mask adjacent interior or exterior surfaces as required including the installation of plastic sheets to protect interior finishes and the new door from contact with polyurethane foam.
- .13 Install polyurethane foam insulation to fill cavity leaving at least 20mm when cured without foam at exterior and interior face of joints if bond-breaker and sealant is not installed. Scrape excessive foam from joint if necessary to achieve this condition. Fill foam in multiple layers as recommended by manufacturer and around entire opening to entirely fill cavity from the outside to approximately $\frac{3}{4}$ of the void depth or as recommended by polyurethane manufacturer. After foam expansion is complete, touch-up foam application to ensure that the entire cavity is filled as described above. Remove over-sprayed foam in accordance with manufacturer's instructions. Do not use metal scrapers on aluminium finishes.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Interim and final cleaning shall be performed in accordance with the general conditions listing methods outlined in AAMA 609.1 Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum and 610-02, latest edition.
 - .3 Remove all labels and other marks from frames and glass.
 - .4 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
 - .5 Clean aluminum with damp rag and approved non-abrasive cleaner.
 - .6 Remove traces of primer, caulking, epoxy and filler materials; clean doors and frames.
 - .7 Clean all tracks and grooves of debris or dust.
 - .8 Clean glass and glazing materials with approved non-abrasive cleaner.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 – Construction Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by aluminum door and frame installation.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Solid core interior swinging doors hung in steel frames supplied under Section 08 11 00 Steel Doors and Frames and as part of a closure with a fire resistance rating of 20 -minutes.
- .2 Preparation for hardware supplied under Section 08 71 00 Finish Hardware.
- .3 Mechanical Division for undercutting and door grilles.

1.2 RELATED SECTIONS

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 08 11 00 Steel Doors and Frames
- .3 Section 08 71 00 Door Hardware
- .4 Section 08 80 50 Glass and Glazing
- .5 Section 09 91 23 Interior Painting

1.3 REFERENCES

- .1 Architectural Woodwork Manufacturers Association of Canada (AWMAC).
 - .1 Architectural Woodwork Standard (AWS) also known herein as the Standard, first edition, 2009.
- .2 ANSI/WDMA I.S. 1A Industry Standard for Architectural Wood Flush Doors
- .3 American Society for Testing Materials:
 - .1 ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 - .2 ASTM E413 - 10 Classification for Rating Sound Insulation.
- .4 Canadian General Standards Board:
 - .1 CAN/CGSB-71.19-M, Adhesive, Contact, Sprayable.
 - .2 CAN/CGSB-71.20-M, Adhesive, Contact, Brushable.
- .5 Canadian Standards Association (CSA Group):
 - .1 CSA O115-M, Hardwood and Decorative Plywood.
 - .2 CAN/CSA O132.2 Series-90, Wood Flush Doors.
 - .3 CAN/CSA-O132.5-M, Stile and Rail Wood Doors.
 - .4 CAN/CSA-Z808, A Sustainable Forest Management System: Guidance Document.
 - .5 CSA Certification Program for Windows and Doors 00.
 - .6 CAN-4S104M, Fire Tests of Door Assemblies.
 - .7 CAN4-S105M, Fire Door Frames Meeting the Performance Required by CAN4-S104.
- .6 National Fire Protection Association (NFPA):
 - .1 NFPA 80, Standard for Fire Doors and Fire Windows.
 - .2 NFPA 252, Standard Method of Fire Tests of Door Assemblies.

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00.
 - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00, and indicate VOCs.
 - .3 Indicate door core materials, thickness, construction, veneer species.
 - .4 Indicate rail finishes and materials.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00.

- .2 Submit shop drawings in conformance to the requirements of the AWS.
- .3 Illustrate door opening information such as location, size types, construction, swings, undercuts, special bevelling, hardware location and preparation requirements, blocking for hardware in mineral core doors, fire ratings, lite cut-outs, factory finish, glass, and other pertinent data.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements:
 - .1 Wood fire rated doors: labelled and listed by an organization accredited by Standards Council of Canada.
- .2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Perform work to Premium Grade in accordance with the Grade requirements specified in the Architectural Woodwork Standards 1st Edition 2009, or as herein otherwise specified.
- .5 Manufacturer specializing in products herein specified with a minimum of five years documented experience.
- .6 Manufacturer must be a member in good standing of the Architectural Woodwork Manufacturer Association of Canada (AWMAC).
- .7 Provide fire-rated wood doors in compliance with NFPA 80 or CAN 4 S104-M.
- .8 Provide fire-rated wood doors with ULC or ITS/Warnock Hersey label.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Storage and Protection:
 - .1 Protect doors from dampness. Arrange for delivery after work causing abnormal humidity has been completed. Do not store doors on site when gypsum board compound has not dried for a minimum 7 days, and until all sanding is completed.
 - .2 Do not store within 10 feet of heat source.
 - .3 Deliver, store, protect and handle products in compliance with the Architectural Woodwork Standards; Section 2 Care & Storage, and manufacturer's care and handling instructions.
 - .4 Deliver materials when required for installation and the general contractor has provided a clean storage area.
 - .5 Accept doors on site in manufacturer's standard packaging. Inspect for damage.
 - .6 Protect doors from exposure to natural and artificial light after delivery.
 - .7 Store doors in well ventilated room, off floor, in accordance with manufacturer's recommendations.
 - .8 Arrange doors for even air flow between and around panels to facilitate even drying.
 - .9 Protect doors from scratches, handling marks and other damage. Wrap doors.
 - .10 Store doors away from direct sunlight.
 - .11 Apply finish to edges of doors as soon as possible following delivery and prior to installation.

1.7 WARRANTY

- .1 Provide manufacturer's warranty of 10 years against delamination of any layer or part of the door, warping or distortion, bow, cup and telegraphing of core construction beyond warranty tolerances experienced or arising from normal use.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Dispose corrugated cardboard, box board, paper, polystyrene and plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

- .3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .4 Divert unused adhesive material from landfill to official hazardous material collections site approved by Owner's Representative.
- .5 Do not dispose of unused paint materials into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MANUFACTURERS

- .1 Provide doors list below by single manufacturer with variances according to characteristics of the product applications listed herein.
- .2 Acceptable Manufacturers:
 - .1 Baillargeon Intense, 8600-ME, hardwood edge match face veneer; wood veneer face to be Maple.

2.2 COMPONENTS

- .1 Manufacture doors to ANSI/WDMA I.S. 1A-11 Heavy Duty performance level. Comply with *Architectural Woodwork Standards 1st Edition 2009 (AWS)*, page 209 and page 231.
- .2 Identify doors in pairs and sets on door schedule by door numbers, including doors separated by a mullion.
- .3 Solid hardwood lumber 32mm thickness for both exposed stile edges, species for exposed stile edges shall match face veneer species, finished to match face veneer.
- .4 Adhesives: AWS Type I.
- .5 Laminating adhesives, on-site and shop-applied must not contain added urea-formaldehyde resins.
- .6 Construction:
 - .1 Solid core: to CAN/CSA-O132.2.1; particle board core suitable for 20-minute fire resistance rating.
 - .2 Doors shall be 5-ply construction.
 - .3 Faces of wood veneered doors intended for transparent finish: AWS Premium Grade (A Grade WDMA Premium Grade), quarter cut, red oak species, centre balance, both faces.
 - .4 Stile: solid 22mm (7/8") thick red oak hardwood lumber, exposed, bonded to 8 mm lumber or structural LVL material. Total stile edging thickness minimum of 30 mm bonded to core.
 - .5 Rails – 30 mm thick, top and bottom: Manufacturer's choice - LVL or LSL lumber formed with 3mm (1/8") veneer layers bonded by hot pressing with Type 1 structural glue, 57mm (2.25") wide.
 - .6 Door overall thickness: 44mm (1.75").
 - .7 Adhesive: Glue shall be Type 1 PVA cross-link or Type 1 structural glue meeting or equal to CCMC 12453-R.
 - .8 Provide appropriate lumber blocking for hardware to avoid necessity for through-bolting.
 - .9 Cut hinge mortise in factory. Factory drill pilot holes for hinges.
 - .10 Bevel lock and hinge stile to Architectural Woodwork Standard 1st Edition 2009, 3 degree bevel.
- .7 Fire Rated Wood Doors:
 - .1 Wood doors: tested in accordance with CAN4-S104 or NFPA 80 or NFPA 252, to achieve 20-minute rating indicated on schedule and marked on the door.
 - .2 Provide rating label printed on door or applied as metal plate to edge on hinge side bearing ULC Certification or WH or IT.
 - .3 Door supplier shall notify architect immediately if any door will not achieve fire resistance rating indicated on drawings as a result of specifications.
 - .4 Fire-rated glazing stops: Wood species same as door face.
- .8 Non-Rated Wood Doors:
 - .1 Stiles: structural composite lumber laminated to hardwood exposed edge.

- .2 Top and bottom rails for non-rated doors structural composite lumber.
- .3 Glazing Stops: Non-rated glazing stops wood species same as door face.
- .4 Clear laminated safety glass, 6 mm thick, install where shown on schedules.

2.3 GLAZING

- .1 Glass: 6mm, clear tempered or laminated safety, refer to 08 80 50 and schedules on drawings.
- .2 20-minute door: 6mm Georgian wired polished.

2.4 TRANSOM AND SIDE PANELS

- .1 Construction: to match adjacent door.
- .2 Meeting edges of doors and transom panels: square.
- .3 Veneer of doors and transom panels: end matched.

2.5 METAL LOUVERS

- .1 Material: Bronze anodized aluminum.
- .2 Type: inverted-vee slat (sight proof), size indicated.
- .3 Free area: 50% minimum.

2.6 FABRICATION

- .1 Vertical edge strips to match face veneer.
- .2 Prepare doors for louvres and glazing. Provide glazing stops to match face veneer of door. Hardwood maple species with mitred corners.
- .3 Bevel vertical edges of single acting doors 3 mm in 50 mm on lock side and 1.5 mm in 50 mm on hinge side.
- .4 Provide waterproof non-staining membrane at cut outs on exterior doors to exclude moisture from core.

2.7 QUALITY CONTROL

- .1 Tolerances for size and shape of door panels:
 - .1 Tolerance for Height and width: 1.5mm (1/16");
 - .2 Limits for Squareness: 3mm (1/8") measured between the two diagonal distances across the face of the door.
 - .3 Tolerance Hardware Location: 0.5mm (1/32"). Factory drill pilot holes.
 - .4 Allow a fitting clearance of 3mm (1/8").
- .2 Seal all four edges of doors upon receipt at the site using alkyd primer for painted doors and sanding sealer for clear finished doors. Do not permit sealer or paint to run or drip on faces of doors.
- .3 Apply finish paint (two coats) to all 6 sides of each door before hanging.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 EXAMINATION

- .1 Verify that opening sizes and tolerances are acceptable and ready to receive this work.
- .2 Do not install doors in frame openings that are not plumb or are out of tolerance for size or alignment.

3.3 INSTALLATION

- .1 Unwrap and protect doors in accordance with CAN/CSA-O132.2 Series, Appendix A.
- .2 Install labelled fire rated doors to NFPA 80.

- .3 Install doors and hardware in accordance with manufacturer's printed instructions and CAN/CSA-O132.2 Series, Appendix A.
- .4 Trim non-rated door widths as required by cutting equally on both edges. Reseal and refinish cut or planed surfaces immediately to match factory finish.
- .5 Trim door height by cutting bottom edges to a maximum 19mm (3/4").
- .6 Trim fire door heights at bottom edge only in accordance with fire rating requirements.
- .7 Do not trim fire rated door widths.
- .8 Adjust hardware for correct function.
- .9 Install glazing in accordance with Section 08 81 00.
- .10 Install louvres and stops.
- .11 Secure transom and side panels by means of stops.

3.4 ADJUSTMENT

- .1 Adjust doors and hardware within the three business days occurring prior to substantial completion of building. Ensure that doors and hardware function freely as intended.

3.5 TOLERANCES

- .1 Conduct measurements and testing to ensure conformance to the Architectural Woodwork Standards 1st Edition 2009 sections associated with standards and testing methods for warp, cup, bow, and telegraphing.

3.6 CLEANING

- .1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .2 Remove traces of primer, caulking; clean doors and frames.
- .3 Clean glass and glazing materials with approved non-abrasive cleaner.
- .4 On completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 GENERAL:

1.1 GENERAL REQUIREMENTS

- .1 Conform to Sections of Division 1 as applicable.

1.2 RELATED WORK

- .1 Section 06 10 00 – Rough Carpentry
- .2 Section 06 41 00 – Fine Carpentry and Millwork
- .3 Section 07 92 00 – Sealants
- .4 Section 09 11 00 - Steel Stud Wall Framing
- .5 Section 09 12 00 – Steel Framing Ceiling and Bulkhead
- .6 Section 09 25 00 – Gypsum Board
- .7 Section 09 51 00 - Acoustic Ceilings
- .8 Sections of Mechanical Divisions.
- .9 Sections of Electrical Divisions.

1.3 SECTION INCLUDES

- .1 Review of all Contract Documents, coordination with all other sections and trades and production of an inventory of all required access panels for the scope of the work.
- .2 Supply and installation of access panels (doors) for all devices requiring access through gypsum board ceilings or gypsum board wall finishes, junction boxes, valves, dampers, controls and similar items built into gypsum board sheathed assemblies that are otherwise inaccessible.
- .3 Access panels specified herein are for provision within partitions, walls and ceilings finished with gypsum board.
- .4 Access panels required within duct work shall be provided under division 15.
- .5 Access panels required within fire rated assemblies shall be fire rated to match assembly rating.
- .6 No aspect of this section or the scope of the work anticipates an access door exceeding 24"x24". Report any instances of door larger than this to architect prior to fabrication.

1.4 REFERENCE STANDARDS

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A525M-91a - Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
 - .2 ASTM A527M-90 - Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock-Forming Quality
 - .3 ASTM A568M-92 - Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold Rolled, General Requirements for
 - .4 ASTM A568 - Standard Specification for Steel Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
 - .5 ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .6 ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 - .7 ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 - .8 ASTM A1011 - Standard Specification for Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- .2 American National Standards Institute (ANSI)
 - .1 ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames.

- .2 ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcings.
- .3 ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
- .4 ANSI/SDI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 1998.
- .5 ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
- .6 ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames (Formerly SDI-105).
- .7 ANSI/NFPA 252 - Fire Tests of Door Assemblies.
- .8 ANSI/UL 10B - Fire Tests of Door Assemblies.
- .9 ANSI/UL 10C - Positive Pressure Fire Tests of Door Assemblies.
- .10 ANSI/UL 1784 - Air Leakage Tests of Door Assemblies
- .3 UL- Building Materials Directory; Underwriters Laboratories Inc.
- .4 ULC – Underwriters' Laboratory of Canada
- .5 WH - Certification Listings; Warnock Hersey International Inc.
- .6 Canadian Standards Association (CSA)
 - .1 CSA W59-M89 - Welded Steel Construction (Metal Arc Welding)
 - .2 CAN4-S104-M80 - Fire Tests of Door Assemblies
 - .3 CAN4-S105-M85 - Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104
- .7 NFPA 80-90 - Fire Doors and Windows

1.5 QUALITY ASSURANCE

- .1 Provide all access panels from single manufacturer unless specialized to exhaust hood or duct work installations.
- .2 Provide all products with ULC or similar label listed within Ontario Building Code for all access panels installed within fire rated assemblies.

1.6 FIRE-RESISTANCE RATINGS:

- .1 Wherever an access panel is required within an assembly that requires a fire-resistance rating, provide access door and panel assemblies with panel door, frame, hinge, and latch from manufacturer listed in ULC, "Building Materials Directory" for rating shown.
- .2 Alternative ratings and testing agencies for specific instances may be acceptable to Municipal Building Official. No product may be used unless proven acceptable to the Municipal Chief Building Official in writing.

1.7 SUBMITTALS

- .1 Shop drawings, installation instructions and product data sheets for each type of access panel required.
- .2 Submit diagram illustrating locations for access doors larger than 16"x16".
- .3 Shop Drawings:
 - .1 Door and panel units: Show types, elevations, thickness of metals, full size profiles of door members.
 - .2 Hardware: Show materials, finishes, locations of fasteners, types of fasteners, locations and types of operating hardware, and details of installation.
 - .3 General: Show connections of units and hardware to other Work. Include schedules showing location of each type and size of door and panel units.
- .4 Product Data:
 - .1 Manufacturer's technical data for each type of access door and panel assembly, including setting drawings, templates, fire-resistive characteristics, finish requirements, and details of anchorage devices.
 - .2 Include complete schedule, types, locations, construction details, finishes, latching or locking provisions, and other pertinent data.

- .5 Manufacturer's Installation Instructions: Indicate installation requirements and rough-in dimension
- .6 Warranty:
 - .1 Provide manufacturer's written warranty within closeout documents.
 - .2 Warrant materials and workmanship against defects after completion and final acceptance of Work.
 - .3 Repair defects, or replace with new materials, faulty materials or workmanship developed during the guarantee period at no expense to Owner.
 - .4 Warranty period shall be 1 year from substantial performance of the Contract.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to Site with manufacturers original labels intact. Do not remove wrappings until ready for use.
- .2 No outside storage permitted.
- .3 Store in clean, dry area and elevated off ground and in an area free of other construction activity.
- .4 Do not store in areas subject to continuous work or where operations are producing dust unless products are completely covered.
- .5 Review, inspect and accept products as they arrive. Reject products damaged during shipping and obtain new products.
- .6 Store products where they will not receive direct sunlight.

PART 2 PRODUCTS

2.1 FABRICATION

- .1 Manufacture each access panel assembly as an integral unit ready for installation.
- .2 Gypsum board access panel installation: Fabricate with integral gypsum board galvanized taping beading where shown.
- .3 Reinforce panel as required to prevent buckling.
- .4 Furnish number of latches required to hold door in fl

2.2 MANUFACTURERS:

- .1 Acudor, Nystrom, APS Access Panel Solutions.

2.3 WALL AND CEILING GYPSUM BOARD INSTALLATIONS:

- .1 General:
 - .1 Manufacture units as single, completed element, factory fabricated and primed, packaged and delivered ready for installation.
 - .2 All access panels shall be hinged with removable doors.
 - .3 All frames and doors shall be flush type for all applications and fabricated with galvanized taping beads for gypsum board installations in all cases.
 - .4 Latch operation shall be cam style, screw driver operated.
 - .5 Surfaces shall be delivered prepared for application of finish paints used on gypsum board surrounding access door.
 - .6 Interior, non-fire rated access panels shall be uninsulated unless installed in insulated ceiling space.
 - .7 Fire rated access panels for ceiling applications shall be insulated with mineral fibre insulation selected to meet rating requirements. Fire rated assemblies include both walls and ceilings. Floor assemblies are fire rated assemblies; wall assemblies that have fire resistance ratings are shown on drawings.
 - .8 Select size of door to suit application 8" to 24", square.
- .2 Acceptable Products:
 - .1 Acudor
 - .1 Fire rated installation for partitions: FB-560-DW.
 - .2 Fire rated installation for ceilings: FW-5050-DW

- .3 Non-Fire rated: DW-5040
- .2 Nystrom Non-Fire Rated Access Panels:
 - .1 Door: Fabricate from 14-gauge cold rolled sheet steel.
 - .2 Frame: Fabricate from 16-gauge cold rolled sheet steel. Provide 1/4 inch mounting holes.
 - .3 NW - Wallboard surfaces – 22-gauge galvanized drywall bead at perimeter.
 - .4 Hinge: NW – Concealed continuous piano hinge.
- .3 Nystrom Non-Fire Rated Access Panels:
 - .1 Insulated fire rated access panels for walls and ceilings, Nystrom I series
 - .1 Maximum size horizontal applications = 24 inch x 36 inch.
 - .2 Maximum size vertical applications: IT= 48 inch x 48 inch, IW, and IP= 36 inch x 48 inch.
 - .3 Door: Fabricate from 20-gauge cold rolled sheet steel, insulated sandwich type construction.
 - .4 Frame: Fabricate from 16-gauge cold rolled steel of configuration to suit material application.
 - .5 IW - Wallboard surfaces - 22-gauge galvanized drywall bead at perimeter.
 - .6 Hinge: Flush continuous piano type on model IT. Concealed pin hinge on style IW and IP.
 - .7 Latching/Locking mechanism: Knurled knob/flush key operated latch bolt - standard.
- .4 Access Panel Solutions (APS):
 - .1 Non rated flush access doors, baucoplus drywall with concealed hinge; BP58-for 5/8" gypsum board.
 - .1 Door: Fabricate using extruded aluminum frame with gypsum board inlay and structural nylon corner elements. The door is to be taped and finished consistent with the surrounding surface.
 - .2 Frame: Recessed aluminum frame provides edge similar to drywall bead against which wall or ceiling surface can be finished. Specify model
 - .3 Hinge: Patented, concealed, two-point pin hinge, non-corroding. Allows door to open 120 degrees. Door can be removed.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verify that rough openings for door and frame are correctly sized and located.
- .2 Verify mechanical and electrical requirements for ceiling or wall access panels.
- .3 Verify fire rating requirements for all assemblies.

3.2 PREPARATION

- .1 Advise installers of work relating to access panel installation including rough opening dimensions, locations of supports, and anchoring methods. Coordinate delivery with other work to avoid delay

3.3 INSTALLATION – GENERAL

- .1 Install access door and frame units per manufacturer's written instructions.
- .2 Install frames plumb and level in opening. Secure rigidly in place.
- .3 Position units to provide convenient access to concealed Work requiring access.
- .4 Fire-rated units: Include UL or Warnock-Hersey labels.

3.4 CLEANING AND ADJUSTMENT

- .1 Adjust panel after installation for proper operation.
- .2 Clean all panel surfaces of grease, finger marks.
- .3 Remove and replace panels or frames that are warped, bowed, or damaged.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Sliding security grilles with glass-filled panels folding into a pocket.

1.2 RELATED SECTIONS

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 06 41 00 Cabinetry and Millwork
- .3 Section 05 50 00 Metal Fabrications
- .4 Section 08 71 00 Door Hardware
- .5 Section 09 11 00 Steel Stud Wall Framing
- .6 Section 09 12 00 Steel Stud Ceiling and Bulkhead
- .7 Section 09 21 60 Gypsum Board Assemblies
- .8 Section 09 91 23 Interior Painting

1.3 REFERENCES

- .1 American Society for Testing Materials:
 - .1 ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

- .1 Locking members provided for every 10 feet of running length of grille.
- .2 Provide opening clear of posts and obstructions when grille is in closed position.
- .3 Stacking:
 - .1 Minimum stacking shall be 1.05 inches/linear foot (87.5 mm/meter) of opening plus 3.5 inches (89 mm) for each locking member.
- .4 Grille support:
 - .1 Must be designed to carry the weight of a fully stacked door at any point along its length.
 - .2 Support is to carry the total weight / the total stacking and is expressed as lbs./lin. ft.
 - .3 Lintel Deflection: Accommodate deflection of lintel to prevent damage to components, deterioration of seals, or movement between door frame and perimeter framing.
 - .4 Thermal Movement: Design sections to permit thermal expansion and contraction of components to match perimeter opening construction.

1.5 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00.
 - .2 Indicate rail finishes and materials.
 - .3 Include preparation instructions and recommendations; storage and handling requirements and recommendations and Installation methods.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00.
 - .2 Shop Drawings Content: Indicate opening dimensions, curves, type of locking posts, elevations and framed opening tolerances.

1.6 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: A company that specializes in the manufacturing of the folding grille products required for the project with a minimum of 10 years documented experience.

- .2 Installer Qualifications: Contractor that has minimum of two years documented experience installing folding grille products similar to those specified.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Storage and Protection:
 - .1 Store products in original packaging, inside the building; in a well-ventilated room, off floor, in accordance with manufacturer's recommendations.
 - .2 Protect grilles from dampness.
 - .3 Deliver materials when required for installation and the general contractor has provided a clean storage area.
 - .4 Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.
 - .5 Arrange doors for even air flow between and around panels to facilitate even drying.
 - .6 Protect doors from scratches, handling marks and other damage. Wrap doors.

1.8 WARRANTY

- .1 Provide manufacturer's warranty of 2 years against manufacturing defects.

1.9 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Dispose corrugated cardboard, box board, paper, polystyrene and plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

Part 2 Products

2.1 MANUFACTURERS

- .1 Provide doors list below by single manufacturer with variances according to characteristics of the product applications listed herein.
- .2 Acceptable Manufacturers:
 - .1 Amstel Manufacturing (1993) Inc.
 - .1 128 Centre Street East, Richmond Hill, Ontario. L4C 1A6. Canada.
 - .2 Ph. 1-800-663-6206 or 905-508-0855 Fx. 1-866-525-1304 or 905-508-8487
 - .3 E. projects@amstel-doors.com
 - .4 W. www.amstel-doors.com.
- .3 Substitute products by the following manufacturers are accepted:
 - .1 Cornell Iron Works Inc.
 - .2 The Cookson Company, Inc.
 - .3 McKinlay Door Sales
 - .4 MobilFlex Inc.

2.2 COMPONENTS

- .1 Basis of Design: AS100 GLASS VISTA Sliding Security Grille manufactured by Amstel Manufacturing Inc.
 - .1 Curtain:
 - .1 Panels to have full height butt hinges on 7 inches (178 mm) centers.
 - .2 Panels to have 4 inches (102 mm) high truss-like plates at the top and bottom of the closure.
 - .3 Panel Inserts are separated by 1" height aluminum extrusions with "T" shaped ends to fit into full height aluminum extruded channels for added strength.
 - .4 Constructed of 6 inches (152 mm) wide by 1/8 inch (3.2 mm) thick tempered glass panel inserts.
 - .5 Tempered Glass is sandwiched between co-extruded neoprene and P.V.C. gaskets.
 - .6 Weight: AS100 Glass Vista: 2.5 lbs./sq. ft. (12.2 kg/sq.m).
 - .7 Aluminum is to be 6063 aluminum alloy with T-5 temper conforming to ASTM B 221.
 - .2 Locking:

- .1 Lead Posts:
 - .1 Standard: Provide (#7) hook bolt post with a concealed hook bolt lock activated by a keyed cylinder or thumb turn that engages hook bolt into full height wall channel.
- .2 Intermediate posts:
 - .1 Standard:
 - .1 Provide (#4) intermediate posts at maximum of 10 feet (3048 mm) of curtain length for floor mounting condition. For counter mounts and at each curve provide intermediate posts at maximum of 6 feet (1828 mm) of curtain length.
- .3 End Posts:
 - .1 Standard:
 - .1 Provide (#6) self-locking post with an attached full height protection plate, self-locking into a steel V-stop mounted to the floor or counter inside the storage pocket.
- .4 Floor Sockets:
 - .1 Standard:
 - .1 Supply Stainless Steel dustproof floor sockets for all drop bolts.
- .3 Track:
 - .1 Provide in standard 8 foot and 10 foot lengths or cut to size.
 - .2 Overhead track shall be 1.3 inches (33 mm) wide by 1.8 inches (46 mm) high and sized to accept 1-1/8 inches (29 mm) diameter roller trolleys.
 - .3 Rollers bear on 0.27 inch (7 mm) thick aluminum surface within the track.
 - .4 Radius Track: Provide the following where indicated.
 - .1 Standard:
 - .1 Radius: 14.625 inches (372 mm) in 90 degrees.
 - .2 Radius: 14.625 inches (372 mm) in 45 degrees.
- .4 Factory Finishes:
 - .1 Use two letter suffix to denote required door finish.
 - .1 Standard: CA - Clear Anodized, 0.0004 inch (10 micron) clear anodizing.

2.3 ACCESSORIES

- .1 Fasteners: Galvanized or corrosion resistant steel.

2.4 FABRICATION

- .1 Size and fabricate grille assembly to allow for tolerances of rough framed openings, clearances, shim spacing and shims around perimeter of assemblies.
- .2 Ensure joints and connections are flush and hairline.
- .3 Accurately and rigidly fit joints and corners.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 EXAMINATION

- .1 Do not begin installation until substrates have been properly prepared and are able to carry the weight of the folded grille.
- .2 Verify openings are ready to receive work and opening dimensions and clearances are as indicated on shop drawings.
- .3 Consult with manufacturer for radius track. Custom radius track will require a full-size template. Full size templates produced at a 1 to 1 ratio are plotted with Autocad.
- .4 Provide full size template or CAD file for custom radius track prior to fabrication.

- .5 If openings are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.3 PREPARATION

- .1 Clean surfaces thoroughly prior to installation.
- .2 Prepare surfaces as recommended by the manufacturer for achieving the correct installation under the project conditions.

3.4 INSTALLATION

- .1 Install in accordance with manufacturer's instructions.
- .2 Attach frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- .3 Use anchoring devices that securely fasten sliding door assembly to wall and ceiling construction without distortion or imposed stresses.
- .4 Separate aluminum and other corrodible surfaces from sources of corrosive or electrolytic action at points of contact with other materials.
- .5 Adjust hardware for smooth operation.

3.5 CLEANING

- .1 Remove protective material from factory finished surfaces.
- .2 Remove temporary labels and visible markings

3.6 PROTECTION

- .1 Protect installed products until completion of project.
- .2 Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES:

- .1 Automatic, low energy, operators for swinging aluminum entrance doors and for doors inside the building including steel doors mounted in steel frames.
- .2 Operators for vertical lift doors are specified within vertical lift door Section.

1.2 COORDINATION

- .1 Coordinate door operators with doors, frames and related work to ensure proper size, thickness, hand, function and finish. Coordinate hardware for automatic entrances with hardware required for rest of the project.
- .2 Electrical System Roughing-in: Coordinate layout and installation of power door operators with connections to power supplies and access control system as applicable

1.3 RELATED REQUIREMENTS

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 92 00 Joint Sealants
- .3 Section 08 11 00 Steel Doors and Frames
- .4 Section 08 11 16 Aluminum Doors and Frames
- .5 Section 08 71 00 Swinging Door Hardware
- .6 Section 09 21 16 Gypsum Board Assemblies
- .7 Sections of electrical Divisions

1.4 REFERENCE STANDARDS

- .1 Aluminum Association (AA)
 - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA)
 - .1 AAMA 701/702-04, Voluntary Specifications for Pile Weather Stripping and Replaceable Fenestration Weatherseals.
 - .2 AAMA 611 Voluntary Specification for Anodized Architectural Aluminum.
- .3 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
 - .1 ANSI/BHMA A156.1-2006, American National Standard for Butts and Hinges.
 - .2 ANSI/BHMA A156.3-2001, Exit Devices.
 - .3 ANSI/BHMA A156.4-2008, Door Controls - Closers.
 - .4 ANSI/BHMA A156.5-2001, Auxiliary Locks and Associated Products.
 - .5 ANSI/BHMA A156.10-2005, Power Operated Pedestrian Doors.
 - .6 ANSI/BHMA A156.19-2007, Power Assist and Low Energy Power Operated Doors.
- .4 American Society for Testing Materials (ASTM):
 - .1 ASTM A167-99(R2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
 - .2 ASTM B209M-07, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
 - .3 ASTM B221M-07, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
 - .4 ASTM D2000-08, Classification System for Rubber Products in Automotive Applications.
 - .5 ASTM D2287-96(R2010), Standard Specification for Non Rigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds.
 - .6 ASTM E283-04, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - .7 ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
 - .8 ASTM E331-00(2009), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

- .9 ASTM E547-00(2009), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference.
- .5 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.132M-90, Zinc Chromate Primer, Low Moisture Sensitivity.
 - .2 CAN/CGSB 1.181-99, Ready-Mixed, Organic Zinc-Rich Coatings.
 - .3 CAN/CSA-C22.2 NO 223-M91 – Power Supplies With Extra-Low-Voltage Class 2 Outputs.
 - .4 CAN/CSA-C22.2 NO 223-M92 – Operators and Systems of Doors, Gates, Draperies, and Louvers.
- .6 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A440-00, Windows /Special Publication A440.1-00(R2005), User Selection Guide to CSA Standard CAN/CSA-A440-00, Windows.
 - .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .7 Environmental Choice Program (ECP)
 - .1 CCD-045-95(R2005), Sealants and Caulking Compounds.
 - .2 CCD-047-98(R2005), Architectural Surface Coatings.
 - .3 CCD-048-98(R2006), Surface Coatings - Recycled Water-borne.
- .8 Green Seal Environmental Standards (GS)
 - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
- .9 National Research Council of Canada (NRC)
 - .1 MNECB-97, Model National Energy Code of Canada for Buildings.
- .10 Underwriters' Laboratories of Canada (ULC)
 - .1 ULC/ORD C305-72, Panic Hardware.
 - .2 CAN/ULC-S524-06, Standard for the Installation of Fire Alarm Systems.
 - .3 CAN/ULC-S533-08, Egress Door Securing and Releasing Devices.

1.5 DEFINITIONS

- .1 Activation Device: Device that, when actuated, sends an electrical signal to the door operator to activate the operation of the door.
- .2 Knowing act: Consciously initiating the opening of a power operated door using acceptable methods including wall mounted switches such as push plates and controlled access devices such as keypads, card readers and key switches.
- .3 Safety Device: A device that detects the presence of an object or person within a zone where contact could occur and provides a signal to stop the movement of the door.

1.6 ADMINISTRATIVE REQUIREMENTS

- .1 Operators in the scope of this Section are installed on single doors shown on plans, noted in schedules and as marked herein. Review all documents and seek clarification if there are conflicts among them.
- .2 Submission of a Bid signifies complete understanding of the content of all documents with respect to number, location and nature of operators.
- .3 Shop Drawing Review and Site Visit:
 - .1 This Section shall review Shop Drawings illustrating the steel doors and frames, the exterior and interior aluminum entrance door and Section 08 71 00 hardware together with applicable product literature and schedules and lists and attend the site to measure conditions affecting the work of this Section.
 - .2 This section shall attend the site to review exterior main entrance door and hardware insitu prior to preparation of hardware list or ordering products associated with the work of this section.
 - .3 Provide relays, strikes and other components required to ensure compatibility with all products and work of other Sections.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for operator, push button, hardware, and accessories and include product characteristics, performance criteria, physical size, finish and limitations and electrical service diagrams.
- .3 Shop Drawings:
 - .1 Indicate layout, dimensions, elevations, detail sections of members and operator, interior finish conditions, materials, recesses, hardware including mounting heights, anchors and reinforcements, provisions for expansion and contraction, methods of joining sheet metal and joint locations, types of sealants, details of other pertinent components of the work, and illustrate actual adjacent construction and future construction intended by the Contract Documents to which work of this section is attached.
 - .2 Identify installation tolerances required, assembly conditions, routing of service lines, locations of operating components, controls and boxes.
 - .3 Indicate door signs.
- .4 Samples:
 - .1 Provide samples of aluminum finish exposed to view.

1.8 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit project record documents that accurately record locations of concealed and remote equipment, services, and conduit.
- .3 Submit warranty.
- .4 Operation and Maintenance Data: submit operation and maintenance data for door operator system including all reviewed shop drawings bearing review annotations for incorporation into manual.
- .5 Parts List:
 - .1 Submit manufacturer's parts lists; include servicing frequencies, instructions for adjustment and operation applicable to each type of component or hardware, and name, address and telephone number of nearest authorized service representative.
- .6 Maintenance Contract:
 - .1 Supply complete service and maintenance of operating equipment for 1 year from date of substantial performance of the contract.

1.9 MAINTENANCE MATERIALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Supply wrenches and tools required for maintenance of equipment.

1.10 QUALITY ASSURANCE

- .1 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Installers qualifications: Installer experienced (as determined by contractor) to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.
- .3 Manufacturers' qualifications: 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.
- .4 AAADM Compliance: Both installer and manufacturer to meet requirements necessary to get certification/license agreement.

1.11 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements together with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:

- .1 Store materials in accordance with manufacturer's recommendations and store indoors within clean, dry, well-ventilated area.
- .2 Store and protect automatic entrance doors operator from blemishes, dust, dirt, debris and damage of any kind.
- .3 Replace defective or damaged materials with new.
- .4 Cover exposed metal surfaces with pressure sensitive heavy protection paper or strippable plastic coating.
 - .1 Use materials of type which will not leave residue or become bonded when exposed to sun.
 - .2 Use padded blankets or approved protective wrapping for decorative metal work and similarly finished exposed elements.
- .5 Develop Construction Waste Management Plan related to Work of this Section.
- .6 Packaging Waste Management: remove for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.12 WARRANTY

- .1 Contractor and this Section hereby warrants that automatic door operator will function as specified in accordance with for 12 months.
- .2 Warranty: include coverage of repair or replacement of components or entire units which fail in materials workmanship. Failures include but are not necessarily limited to, structural failures including excessive deflection, excessive leakage or air infiltration, faulty operation of operators, electrical conductor, motor and component failure, speed control and hardware failure or malfunction, deterioration of metals, metal finishes, and other materials beyond normal weathering.
- .3 During the warranty period a factory-trained technician shall perform service and affect repairs. An inspection shall be performed after each adjustment or repair.
- .4 Installer shall have in place a dispatch procedure that shall be available 24 hours a Day, 7 Days a week for emergency call back service.

Part 2 Products

2.1 DESIGN REQUIREMENTS:

- .1 Design power assist and low energy power operated doors to applicable requirements of ANSI/BHMA A156.19.
- .2 Coordinate with card reader system.

2.2 PERFORMANCE REQUIREMENTS:

- .1 Automatic door equipment to accommodate medium to heavy frequency pedestrian traffic of at least 8 cycles per hour, and shall be designed to operate effectively given weight of doors.
- .2 Activate doors through use of push buttons connected by conductors to door operator motor. Wireless and battery-powered actuation not permitted.
- .3 Operator Equipment: CSA approved; designed for anticipated wind exposure.
- .4 Automatic Locks and Hardware to all doors shall be ULC listed and labelled.
- .5 Design operation for swinging door system to operate, hold open and close under design wind and suction loads, as calculated in accordance with Ontario Building Code but not less than 1.2 kPa wind pressure in any direction.
- .6 Design framing members to withstand their own weight, weight of glass, loads imposed by motion of operable elements, and design wind and suction loads, to maximum allowable deflection of 1/175 of span, when tested in accordance with ASTM E330.
- .7 Design for thermal movement of door and screen framing system caused by ambient temperature range of -35 to +40 degrees C without causing buckling, failure of seals, undue stress on fasteners or other detrimental effects, and to prevent transmission of stress to operators.
- .8 Design for dimensional distortion of components during operation.
- .9 Supply manual operation for opening and closing of doors routinely and during electrical power failure and when power is manually switched off.

.10 Closing Time:

- .1 Doors shall be field adjustable to close from 90 degrees to 10 degrees in 3 seconds or longer as applicable per ANSI/BHMA A156.19 standards.
- .2 Doors shall be field adjusted to close from 10 degrees to fully closed in not less than 1.5 seconds.

.11 Include fully adjustable operators for opening and closing speeds, checking speeds, hold open time.

2.3 AUTOMATIC DOOR SYSTEM

- .1 Single Automatic Door Operator and Installed on active door for pairs: electro-mechanically operated using push-buttons switching control device. Permit manual operation of door.
- .2 Type of Door Operations: low energy power operated and manual.
- .3 Door: single swing.
- .4 Traffic Movement: disabled persons access.

2.4 ACCEPTABLE SUPPLIERS:

- .1 Horton Entrance Solutions.
- .2 Hunter Automatics.
- .3 Assa Abloy Entrance Systems.
- .4 Stanley Access Technologies.
- .5 NABCO Entrances.

2.5 MATERIALS

- .1 Aluminum Extrusions: alloy and temper recommended by producer or finisher for type of use and finish indicated, and to ASTM B221 for Aluminum Association designation 6063-T5.
- .2 Fasteners: aluminum, non-magnetic stainless steel, cadmium plated steel, or other non-corrosive metal fasteners compatible with aluminum components, hardware, anchors and other items being fastened.
 - .1 For exposed fasteners (for hardware only), supply Phillips flat head screws with finish matching item being fastened.

2.6 AUTOMATIC OPERATORS

- .1 Visibly mounted, overhead operator for accommodating door action.
- .2 Fully adjustable without removal of doors. Supply adjustable speed control for checking opening and closing cycles and length of time door remains open.
- .3 On-Off-Hold Open: toggle switch at operator housing.
- .4 Supply connections for power and control wiring.
- .5 Supply for manual operation when power is off.
- .6 Equip operators with current characteristics to suit building's electrical service.

2.7 DOOR OPERATOR CONTROL SYSTEMS

- .1 All entrance doors with operators - Coordinate operation of automatic door operator with card reader operation. On activation by card reader, operate strike and permit operation of door operator when activated by push button.
- .2 Push Switch: manufacturer's standard push plate, wall mounted, on approach side of opening, for wired connection to operator, plain face with disabled person pictogram and operating instructions engraved into surface.
- .3 Door Signs:
 - .1 Sign Material: self-adhesive type for mounting on glass.
 - .2 Include arrow sign on approach side of power operated swinging doors; green circle surrounding black arrow on white background, to ANSI/BHMA A156.10.
 - .3 Include "CAUTION - AUTOMATIC DOOR" and "ATTENTION - PORTE AUTOMATIQUE" sign on both sides of power operated swinging doors.
 - .4 Include international pictogram sign for disabled persons on door leaf.

2.8 EQUIPMENT

- .1 Automatic door operator units:

- .1 Surface Applied Operator with Connecting Arms: The operator header shall be mounted to the surface of the door frame or wall. 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" (101.6 mm) of the door frame, specify a parallel arm.
- .2 All arms shall be selected to accommodate site conditions including hollow steel door frame and gypsum board wall assembly.
- .3 The operator shall be shock mounted and concealed in an extruded aluminum case 4" x 6" (102 mm x 152.4 mm) side access header cover running full width of door or a minimum 23" (584 mm) in length.
- .4 The operator shall be readily convertible to any hand required. Opening force shall be accomplished by a 1/15 HP D.C. permanent magnet motor working through reduction gears to the output shaft. Closing force shall be supplied by a field replaceable spring/clutch mechanism.
- .5 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.
- .6 The master control unit shall incorporate an adjustable time delay of 2 to 30 seconds (ANSI A156.19 requirement is 5 second minimum time delay). It shall provide infinite adjustment to opening and back check speeds including adjusting the opening force without affecting the opening speed.
- .7 The master control unit shall provide for immediate reversal of door motion without undue strain on the drive train by supplying stepped voltage to the motor. The door shall reverse when closing if an object stops the door.
- .8 A locked door motor protection circuit will be supplied that will shut off current to the motor if it is applied when the door is inadvertently locked or otherwise prevented from opening.
- .9 **OPERATION:** Automatic or manual:
 - .1 Automatic: Pushbutton switch actuates door open; door closes after time delay expires. Operator to include the following variable adjustments so as to comply with ANSI Standard A156.19: Opening speed – 4 to 6 seconds; Closing speed – 1.5 to 6 seconds. 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.
 - .2 Manual: Manually pushing door activates automatic opening cycle; door closes after time delay expires (approximately 30% less than after pushbutton actuation).
- .10 Exterior Doors - heavy-duty to accommodate wind exposure
- .11 Interior Door Units:
 - .1 Besam ASSA ABLOY SW200i.
 - .2 NABCO GT20.
 - .3 Stanley M Force
 - .4 Horton Automatics 7100
 - .5 Hunter Automatics type HA8.

2.9 RELATED EQUIPMENT

- .1 Activating device: Shall be marked Press to Open and located on each side of the opening as per ANSI Safety Standard A117.
 - .1 Push plate: 6" Diameter (152 mm) round, stainless steel switch.

2.10 RELATED WORK REQUIREMENTS

- .1 Division 15 ELECTRICAL: 120-VAC, 60 cycle, 1 phase, 15 amp. Operator must have 240-volt power supply. Two low-voltage wires shall be furnished to connect push button/plate switch to the operator.
- .2 Card reader supplied and installed by other Sections.

2.11 FABRICATION

- .1 Conceal fastenings from view. Exposed fastenings where specified or indicated.
- .2 Field-apply isolation coating to aluminum, galvanized steel or prime coated steel in contact with dissimilar metals, and cementitious materials. Touch-up damaged or scratched surfaces or steel with appropriate primer.

- .3 Manufacturer's nameplates in semi-concealed locations.
- .4 Shop-install hardware, except surface mounted hardware. Remove only as required for final finishing operations, and for delivery and installation of work at project site.

2.12 FINISHES

- .1 Finish exposed surfaces of aluminum components in accordance with AA DAF-45 - Aluminum Association Designation System for Aluminum Finishes.
 - .1 Black thermal setting acrylic enamel.

Part 3 Execution**3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for automatic entrances installation in accordance with manufacturer's written instructions.
 - .1 Inform Contractor and Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation following correction of unacceptable conditions and subsequent receipt of consultant's written authorization to proceed.

3.2 INSTALLATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Set work plumb, square, level, free from warp, twist and superimposed loads.
- .3 Securely anchor work in required position. Do not restrict thermal movement.
- .4 Apply isolation coating to separate aluminum and primed or galvanized steel surfaces at points of contact with cementitious materials.
- .5 Install door operator system in accordance with manufacturer's instructions, including controls, control wiring and push switch.

3.3 SEALANT APPLICATION

- .1 Set sill members in bed of sealant or mastic.

3.4 ADJUSTING

- .1 After repeated operation of completed installation equivalent to three days of use by normal traffic (minimum 50 cycles), readjust door operators and controls for optimum, smooth operating condition and safety and for weather tight closure. Lubricate hardware, operating equipment and other moving parts.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Remove traces of primer, caulking; clean doors and frames.
 - .3 Clean aluminum surfaces promptly after installation. Exercise care to avoid damage to coatings.
 - .4 Clean glass and glazing materials with approved non-abrasive cleaner.
 - .5 Remove protective material from prefinished aluminum surfaces.
 - .6 Wash exposed surfaces with mild solution of detergent and warm water, using soft, clean wiping cloths. Remove dirt from corners. Wipe surfaces clean.
 - .7 Remove excess sealant by moderate use of solvent, of type acceptable to sealant manufacturer.
 - .8 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 – Construction Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 DEMONSTRATION

- .1 Demonstrate operation, operating components, adjustment features, and lubrication requirements to Owner.
- .2 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.

3.7 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by aluminum door and frame installation.

END OF SECTION

Part 1 General

1.1 RELATED WORK

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 21 16 Batt Insulation
- .3 Section 07 21 19 Foamed-in-Place Polyurethane
- .4 Section 07 27 10 Air Barrier and Transition Membrane
- .5 Section 07 62 00 Prefinished Metal Siding, Soffit, Flashing and Trim
- .6 Section 07 92 00 Joint Sealants
- .7 Section 08 42 29 Automatic Swinging Door Entrance Operators
- .8 Section 07 84 00 Fire Stopping
- .9 Section 08 80 00 Glass and Glazing

1.2 WORK INCLUDED IN THE SCOPE OF THIS SECTION

- .1 Furnish labour, materials and services for the complete fabrication, assembly and installation of curtain wall framing and glazing system with the following features:
 - .1 Designed and performing as a thermally broken, open, pressure-equalized, rain screen system.
 - .2 Include sealed, insulated glass units and spandrel glass units with insulated back pans. Spandrel unit shall have back-painted glass outboard finished face.
 - .3 Include all necessary accessories, shims, reinforcements, anchors and sealants required.
 - .4 Maintain anchors within wall and ceiling assemblies shown on drawings.
 - .5 Maintain depth of mullion to match drawings. Provide captured glass unit design with capped mullion and pressure plates. Utilize non-metallic pressure plates and sealed glass unit spacers as necessary in order to achieve where shown.
 - .6 Meet or exceed resistance to wind load applicable at the Place of the Work.
 - .7 Gaskets used for glazing must permit dry glazing and ease re-glazing following initial installation.
 - .8 The framing and glazing systems shall act as guards as they are defined within the Ontario Building Code. No additional rail or guard shall be required for the installations shown.

1.3 WORK EXCLUDED

- .1 Structural steel, wood blocking or framing, interior trims, concrete masonry, final cleaning, protection, related work specified elsewhere, convactor covers and trims and ceiling trims.

1.4 BASIS OF DESIGN

- .1 The Commdoor Aluminum 5200 HP Series stick-built curtain wall system.
- .2 Two mullion depths required:
 - .1 6" (152mm) measured from tip of neck to back of section for larger openings and as necessitated by resistance to wind loads.
 - .2 5" (125 mm) measured from tip of neck to back of section for smaller openings and particularly, for dining room openings.
 - .3 Standardized "U" value for glass and framing system for any proposed system shall not exceed 0.34 BTU/hr/ft.²/°F.

1.5 REFERENCE STANDARDS

- .1 Aluminum Association (AA)
 - .1 DAF 45 2003, Designation System For Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA).
 - .1 AAMA-501.2 Field Check of Metal Curtain Walls for Water Leakage

- .2 AAMA-501-2005, Methods of Test for Exterior Walls.
- .3 AAMA-2603-2013, Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
- .4 AAMA-2604-2013, Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
- .5 AAMA-2605-2013, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- .6 AAMA CW DG-1-96, Aluminum Curtain Wall Design Guide Manual.
- .7 AAMA CW-10-2012, Care and Handling of Architectural Aluminum From Shop to Site.
- .8 AAMA CW-11-1985, Design Windloads for Buildings and Boundary Layer Wind Tunnel Testing.
- .9 AAMA-TIR A1-2004, Sound Control for Fenestration Products.
- .3 American Society for Testing Materials (ASTM)
 - .1 ASTM A653 / A653M – 09a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM B209-2010, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - .3 ASTM B221-2013, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - .4 ASTM C612–2014, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 - .5 ASTM E283-2012, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - .6 ASTM E331-2009, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.
 - .7 ASTM E413–04, Classification for Rating Sound Insulation.
 - .8 ASTM E1105–2008, Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.
 - .9 ASTM D2240–2010, Standard Test Method for Rubber Property—Durometer Hardness.
- .4 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-12.8-97, Insulating Glass Units.
 - .2 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.
 - .3 CAN/CGSB-19.13-M87, Sealing Compound, One-Component, Elastomeric, Chemical Curing.
- .5 Canadian Standards Associations (CSA)
 - .1 CAN/CSA-S157-2005, Strength Design in Aluminum.
 - .2 CAN/CSA-S136–2007, North American Specification for the Design of Cold-Formed Steel Structural Members.
 - .4 CAN/CSA W59.2-M1991(R2003), Welded Aluminum Construction.
- .6 Environmental Choice Program (ECP)
 - .1 CCD-45-1995, Sealants and Caulking Compounds.
- .7 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S710.1-2005, Standard for Thermal Insulation – Bead-Applied One Component Polyurethane Air Sealant Foam, Part 1: Materials Standard for Thermal Insulation - Bead - Applied One Component Polyurethane Air Sealant Foam, Part 1: Materials.

1.6 ADMINISTRATIVE REQUIREMENTS

- .1 Co-ordination: Co-ordinate work of this Section with work of other Sections for proper time and sequence to avoid construction delays.

1.7 PERFORMANCE

- .1 Air infiltration: tested in accordance with ASTM E 283. Air infiltration rate not exceeds 0.04 cfm/ft² at a static air pressure differential Of 6.24 psf (300 Pa).

- .2 Water Pressure Achieved: No leakage at a static air pressure differential at 15.04 psf.
- .3 Maximum of structural pressure achieved of 90.23 psf.
- .4 Ensure interior surfaces have no condensation before exposed edges of sealed units reach dew point temperatures during testing to AAMA 501.
- .5 Maintain continuous air barrier and vapour retarder throughout building envelope and curtain wall assembly.
- .6 Thermal Transmittance (U-factor)
 - .1 When tested to NFRC 100, the thermal transmittance (U-factor) and Condensation Resistance (CRF) are as follows:
 - .1 1/4" Solar Ban 60 XL, 13mm argon gas fill, 1/4" Clear, warm edge Spacer
 - .1 Standardized U-value (NFRC 100): not to exceed 0.34 BTU/hr/ft.²/°F
 - .2 CRF 64.
- .7 Sound Transmission Loss:
 - .1 When tested to ASTM E90 and ASTM E1425, the Sound Transmission Class (STC) and Outdoor/Indoor Transmission Class (OITC) shall not be less than:
 - .1 STC 35 or OITC 29 when tested with base 1" insulating glass (1/4", 1/2" AS, 3/4").

1.8 DESIGN REQUIREMENTS:

- .1 Design curtain wall to AAMA CW-DG-1.
 - .1 Ensure horizontal members are sealed to vertical members to form individual compartments in accordance with rainscreen principles.
 - .2 Ventilate and pressure equalize air space outside exterior surface of insulation to exterior.
- .2 Design aluminum components to CAN/CSA S157.
- .3 **Design and size curtain wall components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of wall using a minimum unfactored design pressure of 1.134 kPa (28 psf) to AAMA CW 11 and ASTM E330.**
- .4 Design curtain wall system for expansion and contraction caused by cycling temperature range of 95 degrees C over 12-hour period without causing detrimental effect to system components.
- .5 Metal stick framed systems with interior and exterior exposed metal framing.
- .6 System manufacturer shall provide curtainwall systems, including necessary modifications to meet specified requirements and maintaining visual design concepts.
- .7 Fabricate glazing systems for exterior glazing at vision areas and exterior glazing at spandrel areas.
- .8 Perimeter conditions shall allow for installation tolerances, expansion and contraction of adjacent materials, and sealant manufacturer's recommended joint design.
- .9 Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage or moisture disposal.
- .10 Requirements shown by details are intended to establish basic dimension of unit, sight lines and profiles of members.
- .11 Do not assume glass, sealants, and interior finishes contribute to framing member strength, stiffness, or lateral stability.
- .12 Attachment considerations are to take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.
- .13 Allow for expansion and contraction due to structural movement without detriment to appearance or performance.

- .14 System shall drain to exterior face of wall, water entering joints and condensation occurring within system by drain holes and gutters of adequate size to evacuate water without infiltration to interior or the top of lower lights of glass.
- .15 Provide concealed fastening.
- .16 Metal faces are required to be visually flat under all lighting conditions, subject to acceptance of the Consultant.
- .17 Use dense EPDM isolators to maintain adequate compression on glazing material.
- .18 Provide uniform color and profile appearance at components exposed to view.
- .19 Provide interior dense EPDM gasket with sealed corners, with maximum 30% compression when glazed, to create a water and air seal. Provide exterior dense EPDM wedge gasket at the verticals and exterior EPDM gasket at the horizontals, with a maximum 30% compression when glazed, to create a water & air seal.
- .20 Provide pre-punched pressure plates to ensure correct quantity and spacing of fasteners.
- .21 Design vertical expansion joints with baffled overlaps and compressed resilient air seal laid between mullion ends.
- .22 Ensure system is designed to accommodate:
 - .1 Movement within curtain wall assembly.
 - .2 Movement between system and perimeter framing components.
 - .3 Dynamic loading and release of loads.
 - .4 Deflection of structural support framing.
 - .5 Shortening of building concrete structural columns.
 - .6 Creep of concrete structural members.
 - .7 Mid-span slab edge deflection: 20mm maximum.
 - .8 Thermal resistance:
 - .1 Spandrel areas: RSI 3.0 (R 16.8).
 - .9 Limit mullion deflection to flexure limit of glass 19 mm (0.75 inches); L/240 maximum with full recovery of glazing materials.
 - .10 Mullion Depth - 5" (125mm) measured from tip of neck to back of section for larger openings and as necessitated by resistance to wind loads.
 - .11 Mullion Depth - 4" (102mm) measured from tip of neck to back of section for smaller openings and particularly, for dining room openings.
- .23 Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.

1.9 QUALITY ASSURANCE

- .1 Curtain Wall System supplied under this specification must comply to the performance requirements of the project specifications, local building codes and industry standards. A copy of the test report from an independent testing laboratory certifying compliance must be furnished upon request by the owner/architect.

1.10 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 glazed aluminum curtain wall extruded members, panels, components and accessories, indicating compliance with specified requirements and material characteristics.
 - .1 Submit list on curtain wall manufacturer's letterhead of materials, components and accessories to be incorporated into Work.

- .2 Include product names, types and series numbers.
- .3 Include contact information for manufacturer and their representative for this Project.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by Professional Engineer registered or licensed in Province of Ontario, Canada.
 - .2 Include on shop drawings:
 - .1 Curtain wall panel and component dimensions, framed opening requirements and tolerances, adjacent construction, anchor details anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required. Indicate location of manufacturer's nameplates.
 - .2 Show size and location of seismic restraints. Include seismic design calculations.
 - .3 Include details of fasteners between interior and exterior extrusions ensuring no penetration of thermal break or thermal bridging.
- .4 Samples:
 - .1 Submit duplicate 65mm x 65mm (2.5 x 2.5 inches) sample sections showing prefinished aluminum surface, finish, colour and texture, and including section of infill panel.
 - .2 Submit duplicate 300 x 300 mm (12 x 12 inches) sample sections of insulating glass unit showing glazing materials and edge and corner details and label with performance specification.
 - .3 Thermal Performance: Submit verification that Insulating Glass Units used in curtain wall system meet RSI (R) values required by SB-10 of the Ontario Building Code.
- .5 Test Reports:
 - .1 Submit test reports showing compliance with specified performance characteristics and physical properties including air infiltration, water infiltration and structural performance.

1.11 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: Supply maintenance data for curtain wall for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Record Documentation: In accordance with Section 01 78 00 - Closeout Submittals.
 - .1 List materials used in curtain wall work.
 - .2 Warranty: Submit warranty documents specified.

1.12 WARRANTY

- .1 Provide written warranty in form acceptable to Owner jointly signed by manufacturer, installer and Construction Manager warranting work to be watertight, free from defective materials, defective workmanship, glass breakage due to defective design, and agreeing to replace components which fail within 2-years next following date of Substantial Completion.
- .2 Warranty shall cover following:
 - .1 Complete watertight and airtight system installation within specified tolerances.
 - .2 Glass and glazing gaskets will not break or "pop" from frames due to design wind, expansion or contraction movement or structural loading.
 - .3 Glazing sealants and gaskets will remain free from abnormal deterioration or dislocation due to sunlight, weather or oxidation.
 - .4 Insulating glass units: 10-years commencing on the date of Substantial Performance of Work.
 - .5 Provide written warranty stating organic coating finish will be free from fading more than 10%, chalking, yellowing, peeling, cracking, pitting, corroding or non-uniformity of color, or gloss deterioration beyond manufacturer's descriptive standards for 5 years from date of Substantial Completion and agreeing to promptly correct defects.
- .3 Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.

1.13 DELIVERY, STORAGE, AND HANDLING

- .1 Comply with requirements of Section 01600.
- .2 Protect finished surfaces to prevent damage.
- .3 Do not use adhesive papers or sprayed coatings, which become firmly bonded when exposed to sun.
- .4 Do not leave coating residue on surfaces.
- .5 Material handling and storage: To AAMA CW-10.

1.14 WASTE MANAGEMENT:

- .1 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 in accordance with Waste Management Plan.

Part 2 PRODUCTS

2.1 SYSYEMS:

- .1 **Basis of Design: Commdoor Series 5200 HP stick and capped, 2" wide mullion.**
- .2 Oldcastle Building Envelope, Reliance Wall meeting performance specified.
- .3 Kawneer 1620 UT or 1600UT System 1.
- .4 Alumicor Limited, ThermaWall 2600 Series, with generic Group 4, non-metallic materials.

2.2 MATERIAL

- .1 Aluminum Extrusion
 - .1 All extruded aluminum sections to ASTM B221 and 6063-T6 alloy or equivalent.
 - .2 Frame members (back section) size will be based on published wind load charts to meet specified wind load. Available back section sizes will be 3" (76.2mm) measured from shoulder behind neck to back side of mullion, and 4" (101.6mm) measured the same way.
 - .3 Mullion depth will be selected for each circumstance from these two options; however, dining room windows shall have the 76.2mm mullion depth.
- .2 Thermal Break: extruded virgin polyvinyl chloride (P.V.C.)
- .3 Finish coatings: To AAMA 2605.
- .4 Sheet aluminum: To ASTM B209, utility grade for unexposed surfaces.
- .5 Air barrier liner: Reinforce panels to maintain flat surface.
- .6 Concealed locations: 0.952 mm (20 gauge) steel sheet to CSA-S136M and ASTM A653/A653M with 458 g/m² (1.25 oz/sq.ft) galvanized coating and corners sealed at concealed locations.
- .7 Interior exposed locations: 1.588 mm (16 gauge) clear anodized aluminum sheet.
- .8 Fasteners, screws and bolts: Tamperproof, cadmium plated stainless steel 300 or 400 series to meet curtain wall requirements and as recommended by manufacturer.
- .9 Anchors: Ensure anchors have three-way adjustment.
- .10 **Insulating glass units:**
 - .1 Insulating glass units: To CAN/CGSB-12.8, double glazed, hermetically sealed, argon filled insulating glass units with low conductance black stainless steel warm edge spacer.
 - .2 Outer lite: 6 mm (0.25 inches), tempered Vitro Architectural Glass, Solarban 70 on surface 2 with Azuria coating, float glass.
 - .3 Inner lite: 6 mm (0.25 inches) tempered, clear float glass with low-E coating on surface three.

- .4 Select tempered glass or laminated safety glass for interior window panes to meet or exceed Ontario Building Code load requirements for guards.
- .11 Spandrel Glass Units: Outer light, surface 2, opacifying coating, ICD High-Performance Glass Coatings, Opaci-Coat 6-0025 Blue.
- .12 Aluminum panels: 3mm (0.125 inches) thick factory formed panels.
 - .1 Finish after forming to match curtain wall system.
 - .2 Thermal Break: Glass fibre reinforced polyamide porthole extrusion.
- .13 Curtain wall back pan insulation: 100 mm (4 inches) thick and 76mm (3") to suit mullion size.
 - .1 Density: 64 kg/m³ (4 lbs/cu ft) minimum.
 - .2 Thermal resistance: minimum RSI 3.0 (R 16.8).
- .14 Glazing Material
 - .1 Exterior Glazing: Extruded EPDM flexible gasket.
 - .2 Interior Glazing: Extruded EPDM flexible gasket.
- .15 Fasteners
 - .1 Fasteners shall be zinc plated or Stainless Steel.

2.3 CURTAIN WALL SYSTEM FABRICATION

- .1 Do aluminum welding to CAN/CSA W59.2.
- .2 Fabricate aluminum assemblies of extruded sections to sizes and profiles indicated.
 - .1 Ensure vertical and horizontal members are tubular extrusions designed for shear block corner construction.
 - .1 Mullion depth sizes as indicated for dining room windows and according to wind resistance requirements otherwise.
 - .2 Cap depth sizes: 19 mm (0.75 inches).
 - .3 Ensure caps for mullion assemblies are constructed without gap.
 - .2 Construct units square, plumb and free from distortion, waves, twists, buckles or other defects detrimental to performance or appearance.
 - .1 Ensure curtain wall is fabricated with separate, integrated support for insulating glass unit.
 - .2 Do glazing in accordance with Section 08 80 50 – Glass and Glazing.
 - .3 Site glazing is permitted.
- .3 Fabricate curtain wall with minimum clearances and shim spacing around panel perimeter and ensure installation and dynamic movement of perimeter seal is enabled.
- .4 Fabricate infill panels with 6mm tempered glass finished with opacifying coating.
- .5 Reinforce interior surface of exterior infill panel sheet from deflection caused by wind and suction loads.
- .6 Place insulation within infill panel adhered to exterior face of interior panel sheet over entire area of sheet using impale fasteners with integral discs.
- .7 Reinforce infill panels to receive [convector cabinet] [finned tube radiation cabinet] [electrical component] brackets and attachments as indicated.
- .8 Accurately fit and secure joints and corners.
 - .1 Ensure joints are flush, hairline, and weatherproof.
- .9 Prepare curtain wall to receive anchor devices.
- .10 Use only concealed fasteners
 - .1 Ensure fasteners do not penetrate thermal break.
 - .2 Where fasteners cannot be concealed, countersunk screws finished to match adjacent material may be used upon receipt of written approval from Consultant.
- .11 Visible manufacturer's labels are not permitted.

2.4 FINISH

- .1 Exterior Surfaces: Fluoropolymer paint Coating:
 - .1 Based on Kynar 500 Resins are to be applied in accordance AAMA 2605.
 - .2 Exterior exposed aluminum surfaces: To AAMA 2605, 3-coat, thermal setting enamel consisting of primer, colour coat and clear coat with 70% minimum fluoropolymer resin and polvinylidene fluoride (PVDF), 0.03 mm (1.2 mil) minimum total thickness.
 - .1 PPG Industries Inc. Duranar Black UC40577 colour.
 - .3 Deleted.
- .2 Interior Surfaces: Fluoropolymer paint Coating:
 - .1 Interior exposed aluminum surfaces: AAMA 2604, 2-coat, thermal setting enamel consisting of primer and topcoat with 70% minimum fluoropolymer resin and polvinylidene fluoride (PVDF), 0.025 mm (1 mil) minimum total thickness
 - .1 White colour selected by Consultant from PPG Industries Duranar standard range.
 - .2 Deleted.

2.5 ACCESSORIES

- .1 Fibre board: to ASTM C612.
 - .1 Type: 1VB.
 - .2 Density: 64 kg/m³ (4 lbs per cu.ft.) minimum.
 - .3 Thickness: 100 mm (4 inches) minimum.
 - .4 Acceptable material: Roxul Inc., CurtainRock.
- .2 Gasketing: To CCD-45 Silicone compatible rubber or extruded silicone gaskets.
- .3 Setting Blocks: To CCD-45 and ASTM D2240, EPDM, 80 - 90 Shore A Durometer hardness.
- .4 Spacers: To CCD-45 and ASTM D2240, EPDM, 50 - 60 Shore A Durometer hardness.
- .5 Sealant: To CAN/CGSB-19.13, Class 40, one-component, cold-applied, non-sagging silicone.
 - .1 Acceptable material: Dow Corning 795.
 - .2 Sealant Bond Breaker: Open cell foam backer rod sized to suit project requirements.
 - .3 Flashings: 3 mm (0.125 inches) thick aluminum flashing to profiles indicated and in accordance with Section 07 62 00 - Sheet Metal Flashing and Trim.
 - .4 Liquid Foam Insulation: Single component, moisture cure, low expansion rate spray-in-place polyurethane liquid foam insulation to ULC-S710.1 and in accordance with manufacturer's written recommendations.
 - .5 Miscellaneous Components: Covers, copings, special flashings, filler pieces, termination pieces, cap closures, expansion joint covers, and metal bellows to match curtain wall system as indicated.

Part 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for curtain wall installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of the Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the Consultant.

3.2 INSTALLATION

- .1 Products shall be installed according to manufacturer's instructions and in conjunction with approved shop drawings. The work shall be performed by qualified skilled personnel ensuring proper equipment provided in order to expedite the project in an efficient professional manner.

- .2 Install curtain wall in accordance with manufacturer's written instructions.
- .3 Do aluminum welding to CAN/CSA W59.2.
- .4 Attach curtain wall assemblies to structure plumb and level, free from warp, and allow for sufficient adjustment to accommodate construction tolerances and other irregularities.
 - .1 Maintain dimensional tolerances and align with adjacent work.
 - .2 Use alignment attachments and shims to permanently fasten elements to building structure.
 - .3 Clean welded surfaces and apply protective primer to field welds and adjacent surfaces.
 - .4 Install thermal isolation where components penetrate or disrupt building insulation.
 - .5 Install sill flashings.
 - .6 Co-ordinate installation of fire stop insulation, in accordance with Section 07 84 00 - Firestopping, at each floor slab edge and intersection with vertical construction where indicated.
 - .7 Install smoke sealing in accordance with Section 07 80 00 – Fire and Smoke Protection where indicated.
 - .8 Co-ordinate attachment and seal of perimeter air barrier in accordance with Section 07 27 10 – Air Barriers.
 - .9 Install liquid foam insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
 - .10 Install insulating glass units and infill panels in accordance with Section 08 80 00 - Glazing and to manufacturer's written instructions.
 - .11 Install perimeter sealant [to method required to achieve performance criteria, backing materials, and installation criteria in accordance with Section 07 92 00 - Joint Sealing.

3.3 FIELD QUALITY CONTROL

- .1 Field Inspection: Coordinate field inspection in accordance with Section 01 45 00 - Quality Control.
- .2 Site Installation Tolerances:
 - .1 Variation from plumb: 12 mm per 30 m (0.5 inches per 100 feet) maximum.
 - .2 Misalignment of two adjacent panels or members: 0.8 mm (0.03 inches) maximum.
 - .3 Sealant space between curtain wall and adjacent construction: 13 mm (0.5 inches) maximum.

3.4 PROTECTION

- .1 Aluminium shall be isolated from concrete, mortar, plaster and dissimilar materials with a coating of Bituminous paint. Exposed aluminium surface shall be protected from long term contamination of mortar, concrete, paint, mud, etc. Doors and door frames shall be protected from impact damage by wood sheathing and plastic wraps.

3.5 CLEANING

- .1 Progress Cleaning: Perform cleanup as work progresses in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave work area clean end of each day.
- .2 Final cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment [in accordance with Section 01 74 19 – 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.
- .4 Interim and final cleaning shall be performed in accordance with the general conditions listing methods outlined in AAMA 609 & 610-02 (2002)

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 05 10 Masonry Procedures
- .2 Section 06 10 00 Rough Carpentry
- .3 Section 07 27 10 Weather Resistive Air Retarder and Transition Membrane
- .4 Section 07 62 00 Sheet Metal Flashing and Trim
- .5 Section 07 92 00 Joint Sealants
- .6 Section 08 80 00 Glass and Glazing
- .7 Section 09 21 16 Gypsum Board Assemblies

1.2 REFERENCES

- .1 Aluminum Association (AA)
 - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 ASTM International
 - .1 ASTM A123/A123M-12, Standard Specification for Zinc (Hot-Dip galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM E1748-95(2009), Standard Test Method for Evaluating the Engagement Between Windows and Insect Screens as an Integral System.
 - .3 ASTM E90-09 "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements".
 - .4 ASTM E283-12 "Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen".
 - .5 ASTM E330-14 "Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference".
 - .6 ASTM E331-09 "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference".
 - .7 ASTM E547-09 "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Differential".
 - .8 ASTM E2190-10 "Standard Specification for Insulating Glass Unit Performance and Evaluation".
 - .9 ASTM F588-07 "Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact".
- .3 CSA Group
 - .1 AAMA/WDMA/CSA 101/I.S.2/A440-11, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights.
 - .2 CSA A440S1-09, Canadian Supplement to AAMA/WDMA/CSA 101/1.S.2/A440, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights.
 - .3 CAN/CSA-A440.4-07(R2012), Window, Door, and Skylight Installation
 - .4 CAN/CSA-A440.2/A440.3-09, Fenestration energy performance/User guide to CSA A440.2, Fenestration energy performance.
 - .5 CAN/CSA-Z91-02(R2013), Health and Safety Code for Suspended Equipment Operations.
 - .6 CAN/CSA-Z809-08(R2013), Sustainable Forest Management.
 - .7 AAMA 611-12 "Voluntary Specification for Anodized Architectural Aluminum".

- .8 AAMA 701/702-11 "Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals".
- .9 AAMA 904-09 "Voluntary Specification for Multi-bar Hinges in Window Applications".
- .10 AAMA 910-10 "Voluntary 'Life Cycle' Specifications and Test Methods for AW Class Architectural Windows and Doors".
- .11 AAMA 920-11 "Specification for Operating Cycle Performance of Side-Hinged Exterior Door Systems".
- .12 AAMA 1304-02 "Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems".
- .13 AAMA 1503-09 "Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections".
- .14 AAMA 2605-13 "Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels"
- .15 AAMA CW-10-12 "Care and Handling of Architectural Aluminum from Shop to Site"
- .4 IGCC - Insulating Glass Certification Council.
- .5 NFRC - National Fenestration Rating Council:
 - .1 NFRC 100-2010 "Procedure for Determining Fenestration Product U Factors".
 - .2 NFRC 102-2010 "Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems".
- .6 Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.
 - .1 MPI #79, Primer, Alkyd, Anti-Corrosive for Metal.
- .7 SGCC - Safety Glazing Certification Council:
 - .1 ANSI Z97.1-09 "American National Standard for Safety Glazing Materials used in Buildings - Safety Performance Specifications and Methods of Test".
 - .2 16 CFR 1201 "Consumer Product Safety Commission Safety Standard for Architectural Glazing Materials - codified at Title 16, Part 1201 of the Code of Federal Regulations 2011 Edition".
- .8 Screen Manufacturers Association (SMA)
 - .1 SMA 1201R-2002 Specification for Insect Screens for Windows, Sliding Doors and Swinging Doors.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for windows and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings of actual installation for this site including jamb, sill and head conditions with all components labeled with dimensions and product numbers.
 - .2 Indicate materials and details in 1/2 size or larger scale for head, jamb and sill, profiles of components, interior and exterior trim, 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.
 - .3 Provide window identification numbering and letter designations to match designations used on architectural drawings.
- .4 Test and Evaluation Reports:

- .1 Submit test reports from approved independent testing laboratories, certifying compliance with specifications.
- .2 Furnish a valid AAMA "Authorization for Product Certification" or waiver indicating that the windows for the project conform to AAMA/WDMA/CSA 101/I.S.2/A440-08.
- .3 Furnish certification indicating AAMA Certification: Conformance with ASTM E 2190 on the insulating glass units.
- .4 Furnish visible, permanent SGCC certification labels indicating AAMA Certification: Conformance with ANSI Z97.1-09 and/or 16 CFR 1201 on tempered glass lights, if included on the project, and laminated glass lights, if included on the project.
- .5 All test reports that reference the NAFS must include, on the first page, a summary of the results including, at minimum:
 - .1 The product manufacturer.
 - .2 The type of product.
 - .3 The model number/series number.
 - .4 The primary product designation.
 - .5 The secondary product designation.
 - .1 Positive design pressure.
 - .2 Negative design pressure.
 - .3 Water penetration resistance test pressure.
 - .4 Canadian air infiltration and exfiltration levels.
 - .6 The test completion date.
- .6 The report will also contain the following information:
 - .1 Test dates.
 - .2 Report preparation dates.
 - .3 Test information retention period.
 - .4 Location of testing facilities.
 - .5 Full description of test samples, including:
 - .1 Anodized finish weathering characteristics.
 - .2 Condensation resistance.
 - .3 Safety drop - vertical sliding windows only.
 - .4 Block operation - sliding windows only.
 - .5 Sash strength and stiffness - operable casement or awining.
 - .6 Forced entry resistance.
 - .7 Mullian deflection - combination and composite windows.
 - .6 Complete description of amendments, as applicable.
 - .7 Conclusion.
 - .8 Drawings signed by the testing laboratory, if provided.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for windows for incorporation into manual.

1.5 QUALITY ASSURANCE

- .1 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address. Inspect all products immediately to ensure compliance with specifications and that they are undamaged.
- .3 Reject damaged or inappropriate materials.
- .4 Storage and Handling Requirements:
 - .1 Handle and protect windows and accessories in accordance with AAMA CW-10-12 until project completion.
 - .2 Store materials indoors within a clean, dry, well-ventilated area and in accordance with manufacturer's recommendations.
 - .3 Store and protect windows from damage of any kind including exposure to processes, chemicals and materials that may damage the finish or the material.
 - .4 Replace defective or damaged materials with new.
- .5 Develop Construction Waste Management Plan related to Work of this Section.
- .6 Packaging Waste Management: remove for reuse or recycling all packaging materials as specified in accordance with Section 01 74 21 - Construction Waste Management and Disposal. Recycle card stock packaging, corrugated cardboard and metal shipping bands.

1.7 MANUFACTURER'S WARRANTIES:

- .1 Windows: Manufacturer shall warrant for one year against defects in material and workmanship under normal use.
- .2 Insulating Glass Units: Glass manufacturer shall warrant seal for ten years against visual obstruction from film formation or moisture collection between internal glass surfaces, excluding that caused by glass breakage or abuse.

Part 2 Products

2.1 MATERIALS

- .1 Materials: to AAMA/WDMA/CSA 101/I.S.2/A440 supplemented as follows:
- .2 Modify the following paragraph to include specific types of windows and materials to suit project and repeat paragraph as necessary.
- .3 All shall be fabricated by the same manufacturer.
- .4 Sash and Frame: aluminum, thermally broken with virgin PVC or polyurethane.
- .5 Main frame: aluminum thermally broken.
- .6 Only specify wood species if specific material is required. Include special requirements for natural or stain grade wood.
- .7 Refer to Section 08 80 50 - Glazing and insert appropriate text to suit project requirements.
- .8 Glass: provide in accordance with Section 08 80 50 - Glazing.
- .9 Specify translucent glass where required, i.e. washrooms.
- .10 Specify particular types and design of insect screens, hardware, frames and mesh finishes or ensure that this information is indicated on drawings.
- .11 Screens: to ASTM E1748 SMA 1201R installed on the ventilating unit:
 - .1 Fiberglass mesh, black.
 - .2 Insect screening mesh: count 18 x 16.

- .3 Fasteners: aluminum or stainless steel with clear acrylic retaining clip.
- .4 Screen frames: aluminum colour to match window frames.
- .5 Mount screen frames for interior replacement.
- .12 Ensure that different types of metal sills are indicated. Also, ensure that accessories are correct for sill type specified.
- .13 Exterior sills: pre-finished steel to match siding, detailed and to suit job conditions, complete with jamb drip deflectors, chairs, anchors, anchoring devices.
- .14 Isolation coating: alkali resistant bituminous paint.
- .15 Sealants:
 - .1 Section 07 92 00 Joint Sealants.

2.2 WINDOW TYPE AND CLASSIFICATION

- .1 Product type:
 - .1 Awning projected ventilation window units (operators).
 - .2 Fixed unit glazing.
- .2 Classification rating: to AAMA/WDMA/CSA 101/I.S.2/A440.
 - .1 Surface condensation control: compliant with standard CAN/CSA-A440.2/A440.3.

2.3 FABRICATION

- .1 Fabricate in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 supplemented as follows:
- .2 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less and plus or minus 3 mm for units with a diagonal measurement over 1800 mm.
- .3 Face dimensions detailed are maximum permissible sizes.
- .4 Brace frames to maintain frame in square position and rigidity during shipment and installation.
- .5 Finish steel clips and reinforcement with MPI #79 g/m² zinc coating to ASTM A123/A123M.
- .6 All frame joints butted or mitred tightly and fastened with concealed screws. Overlapped framing members not permitted.
- .7 Sealed assembly; not rain screen.
- .8 Hardware:
 - .1 One pair stainless steel friction arms or two or more butt hinges selected based on operating unit size.
 - .2 One rotary operator with crank handled coloured to match window frame.
 - .3 Two claw lock mechanisms.
 - .4 Glass stop, interior.
 - .5 Interior glazing spline.

2.4 ALUMINUM EXTRUSION

- .1 All extruded aluminum sections to be 6063-T6 alloy or equivalent.
- .2 Frame members size will be based on published wind load charts to meet specified wind load.
- .3 Available section sizes 4-1/2" (114.3mm), 5" (127.0mm) and 6" (152.4mm).

2.5 WINDOW FRAMING:

- .1 General:
 - .1 Form arch-top matching existing arch topped windows where new windows are illustrated with arch top.

- .2 This section shall verify wind loading criteria and reinforce mullions as required.
- .3 Minimum CAN/CSA A440-M90 test results required:
 - .1 Operating Windows:
 - .1 Ease of Operation: PASS
 - .2 Air Tightness: A3.
 - .3 Water Resistance: B7.
 - .4 Wind Load Resistance: C5 (Deflection).
 - .5 Wind Load Resistance: C5 (Blow-out).
 - .6 Sash Strength: PASS (warping).
 - .7 Condensation Resistance: I = 58.4.
 - .8 Condensation Resistance: I = 50 (frame).
 - .9 Condensation Resistance: I = 50.9 (glass).
 - .2 Fixed Windows:
 - .1 Air Tightness: Fixed.
 - .2 Water Resistance: B7.
 - .3 Wind Load Resistance: C5 (Deflection).
 - .4 Wind Load Resistance: C5 (Blow-out).
 - .5 Sash Strength: PASS (warping).
 - .6 Condensation Resistance: I = 50 (frame).
 - .7 Condensation Resistance: I = 50.9 (glass).
- .2 Acceptable Products:
 - .1 Commdoor Aluminium Series 625 fixed windows; 225 awning operating window.
 - .2 Equivalent profiles manufactured by Alumicor, Kawneer or US Aluminium meeting specified requirements.

2.6 ALUMINUM FINISHES

- .1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
 - .1 Exterior Surfaces: Fluoropolymer paint Coating:
 - .1 Based on Kynar 500 Resins are to be applied in accordance AAMA 2605.
 - .1 Exterior exposed aluminum surfaces: To AAMA 2605, 3-coat, thermal setting enamel consisting of primer, colour coat and clear coat with 70% minimum fluoropolymer resin and polvinylidene fluoride (PVDF), 0.03 mm (1.2 mil) minimum total thickness.
 - .2 PPG Industries Inc. Duranar Black UC40577 colour.
 - .2 Interior surfaces of frames: Fluoropolymer paint Coating:
 - .1 Interior exposed aluminum surfaces: AAMA 2604, 2-coat, thermal setting enamel consisting of primer and topcoat with 70% minimum fluoropolymer resin and polvinylidene fluoride (PVDF), 0.025 mm (1 mil) minimum total thickness
 - .2 White colour selected by Consultant from PPG Industries Duranar standard range.

2.7 ISOLATION COATING

- .1 Primers, Paints and Coatings: in accordance with manufacturer's recommendations for surface conditions.
- .2 Isolate aluminum from following components, by means of isolation coating:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

2.8 GLAZING

- .1 Glaze windows in accordance with AAMA/WDMA/CSA 101/I.S.2/A440. Refer to Section 08 80 50 Glazing.

2.9 AIR BARRIER AND VAPOUR RETARDER

- .1 All products to be installed according to manufacturer's instructions and in conjunction with approved shop drawings. The work shall be performed by qualified skilled personnel using proper equipment in order to expedite the project in an efficient professional manner.
- .2 Seal window frames to building wall assembly to form continuous air barrier and vapour barrier as follows:
 - .1 Set windows and doors with minimum of 10 mm and maximum of 16mm sealed joint all around windows to wall system as detailed.
 - .2 Transition and continuity membrane: applied to exposed face of wood blocks surrounding masonry openings by Section 07 27 10 prior to installation of windows. Verify that this is complete and installed appropriately. Cut off membrane exposed to view as necessary upon completion of installation.
 - .3 Material width: adequate to provide required air tightness and vapour diffusion control to building.
 - .4 Exterior Joint: This section shall install closed cell, foam rope as a sealant bond breaker between building components and window system frames. Sealant joints shall be smooth and tooled slightly recessed back from the face of the aluminium frame with a concave profile. Install this exterior joint prior to filling interior joint with specified filler.
 - .5 Interior continuity joint filling material: This section shall fill voids around windows and door system framing with sprayed in place polyurethane insulation installed to permit deflections. Foam product shall be identical to performance and chemical composition of the specified sprayed-in-place polyurethane insulation, applied from inside building fill to joint surrounding all window frames.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only following remediation of detrimental conditions and following receipt of consultant's written consent to commence installation.
- .2 Obtain critical dimensions in the field in order to facilitate production of shop drawings.
- .3 Examine structure and installation conditions and develop installation criteria to accommodate building movement, wind load and thermal stresses in the field. Review sealant joint width requirements and allow appropriate joint width in accordance with this specification and sealant manufacturer's literature.
- .4 Prepare and submit shop drawings. Do not permit fabrication without consultant's marks on shop drawing showing – "reviewed as noted" or "reviewed". Effect all adjustments noted on reviewed shop drawings.

3.2 PROTECTION

- .1 Aluminum shall be isolated from concrete, mortar, plaster and dissimilar materials with a coating of Bituminous paint.
- .2 Exposed aluminum surface shall be protected from long term contamination of mortar, concrete, paint, mud, etc.

3.3 INSTALLATION

- .1 All products to be installed according to manufacturers' instructions and in conjunction with approved shop drawings. The work shall be performed by qualified skilled personnel using proper equipment in order to expedite the project in an efficient professional manner.
- .2 Window installation:
 - .1 Install in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
 - .2 Arrange components to prevent abrupt variation in colour.
 - .3 Inform the Consultant of any discrepancies or interferences between windows and partitions.
 - .4 Install appropriate blocking and spacers between window units where required to ensure that partitions can be reinstalled tight to the interior side of new mullions.
 - .5 Install all components in accordance with manufacturer's instructions. Installation shall accommodate thermal expansion, building deflection and wind loading in the installation.
 - .6 Install blocking or other required shims on existing structure to ensure plumb, true and straight installation of the materials.
 - .7 Use purpose made cleats and fasteners to connect windows and entrance framing to the building structure.
 - .8 Reinforce connection points and mullions as required by wind load conditions.
 - .9 Install extruded sill in longest practical lengths no length less than 1850 mm.
 - .10 Protect all aluminium components from damage during the work and from caustic substances. Remove excess sealant from metals immediately.
 - .11 Set windows to accommodate a 10 mm minimum; 16 mm maximum width joint between window frame and exterior wall assembly all around windows to wall system as detailed.
 - .12 This section shall install closed cell foam rope as a sealant bond breaker between building components and window system frames. Sealant joints shall be smooth and tooled slightly recessed back from the face of the aluminium frame with a concave profile.
 - .13 Check all hardware for operation and adjust as required.
- .3 Sill installation:
 - .1 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb up-stands and faces. Use one piece lengths at each location.
 - .2 Secure sills in place with anchoring devices located at ends and evenly spaced 600 mm on centre in between.
 - .3 Fasten with self-tapping stainless steel screws.
- .4 Caulking:
 - .1 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip deflectors in bedding compound. 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.

3.4 CLEANING

- .1 Interim and final cleaning shall be performed in accordance with the general conditions listing methods outlined in AAMA 609 & 610-02 (2002).
- .2 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .3 Final Cleaning:

- .1 Remove all labels and other marks from frames and glass.
- .2 Remove excess sealant from frames, glass and adjacent building components with appropriate cleaning solutions recommended by sealant manufacturer.
- .3 Clean frames and glass at interior and exterior with appropriate detergents and clear water rinse. Perform glass cleaning with squeegees leaving glass free of streaks after cleaning.
- .4 Remove cut debris, fasteners, etc. not used during installation.
- .5 Ensure that all touch-up, painting, patching and all adjacent materials affected by the work whether interior or exterior are made satisfactory to the Owner. Remove all masking and tarps at completion of touch-up.
- .6 Check operating windows for screen installation, weather strip function, auto latch function and smooth operation of operable sections including positive locking mechanism. Make required adjustments and leave each unit with windows left in closed, locked position at the end of each workday.
- .7 Clean all tracks and grooves of debris or dust.
- .8 Refer to Division 1 for other notes regarding project closeout.
- .4 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 08 11 00 Steel Doors and Frames
- .3 Section 08 14 16 Flush Wood Doors
- .4 Section 08 11 16 Aluminum Doors and Frames
- .5 Section 08 35 00 Folding Security Grilles
- .6 Section 08 42 29 Automatic Swing Door Entrance Operators
- .7 Section 09 91 23 Interior Painting

1.2 GENERAL REQUIREMENTS

- .1 Conform to Sections of Division 1 as applicable.
- .2 Provide construction cylinders (cores) to Contractor. Provide a minimum of 25 such cores.
- .3 Include in Contract Price, the cost to change Construction Cores to Permanent Cores for all openings with locks.
- .4 All new lock cylinders shall be selected for compatibility with and of same manufacturer (number of pins and make and model) and keyed compatibly with the Owner's preferred lock system and alike to the Owner's existing grand master and sub-master keying system.
 - .1 Acceptable Cores: Cormax by Best - DormaKaba Group
- .5 This section shall supply a Finish Hardware schedule, keying list, product shop drawings, catalogue data sheets and bitting list under shop drawing procedures, Section 01330 Submittals.
- .6 Product Types: Products and Manufacturer Alternates Acceptable:
 - .1 Standard Weight Butt Hinge: TA714 by McKinney; alternates by Ives or Best.
 - .2 Heavy Weight Butt Hinge: TA786 by McKinney; alternates by Ives or Best.
 - .3 Continuous Hinge: FM_SLF_HD by Pemko; alternates by Ives and Select.
 - .4 Power Transfer: CEPT-10 by Securitron; alternates by Von Duprin or ABH.
 - .5 Combination Flush Bolt: 2845 by Rockwood; alternates by Ives or ABH.
 - .6 Auto Flush Bolt: 555 by Rockwood; alternates by Ives or ABH.
 - .7 Dust Proof Strike: 570 by Rockwood; alternates by Ives or ABH.
 - .8 Lockset: 10 Line by Sargent; no alternatives permitted.
 - .9 Deadlock: MS1850S by Adams Rite; alternates by KM Thomas or CR Laurence.
 - .10 Deadlatch: 4900 by Adams Rite; alternates by KM Thomas or CR Laurence.
 - .11 Thumbturn: 4066 by Adams Rite; alternates by KM Thomas or CR Laurence.
 - .12 Permanent Core: CORMAX by Best – DormaKaba Group; no alternatives permitted.
 - .13 Exit Device: 80 Series by Sargent; alternates by Schlage or Best.
 - .14 Electric Strike: 1500C HES by Von Duprin; alternates by Dormakaba.
 - .15 Electric Strike: 9500 HES by Von Duprin; alternates by Dormakaba.
 - .16 Magnetic Hold Open: 1560 Series by Sargent; alternates by LCN or Dormakaba.
 - .17 Door Pull: D453-2 by Standard Metal; alternates by CBH or Gallery Speciality Hardware.
 - .18 Door Pull: 2512-2 by Standard Metal; alternates by CBH or Gallery Speciality Hardware (GSH).
 - .19 Door pulls: 2012-2 x number 5 MNT by Standard Metal; alternates by CBH or Gallery.
 - .20 Push Plate: K11B by Standard Metal; alternates by CBH or Speciality Hardware (GSH).
 - .21 Coordinator: 2696 x FB2 by Rockwood; alternates by Ives or ABH.
 - .22 Overhead Stop: 1ADJ by Rixson; alternates by Glynn Johnson or ABH.
 - .23 Overhead Stop: 6ADJ by Rixson; alternates by Glynn Johnson or ABH.
 - .24 Self-Closing Device: 351 Series by Sargent; alternates by LCN or Dormakaba.

- .25 Self-Closing Device: 1431 Series by Sargent; alternates by LCN or Dormakaba.
- .26 Auto Operator: surface-mounted, SW200i by ASSA ABLOY; alternates by Dormakaba or Tormax.
- .27 Kick Plate: K10 Series by Standard Metal; alternates by CBH or Gallery Speciality Hardware (GSH).
- .28 Mop Plate: K10 Series by Standard Metal; alternates by CBH or Gallery Speciality Hardware (GSH).
- .29 Armour Plate: K10 Series by Standard Metal; alternates by CBH or Gallery Speciality Hardware (GSH).
- .30 Door Edge Guard: K42 Series by Standard Metal; alternates by CBH or Gallery Speciality Hardware (GSH).
- .31 Frame Guard: K50/51 Series by Standard Metal; alternates by CBH or Gallery Speciality Hardware (GSH).
- .32 Wall Stop: S120 by Standard Metal; alternates by CBH or Gallery Speciality Hardware (GSH).
- .33 Threshold: CT-45 by KN Crowder; alternates by Zero or Pemko.
- .34 Gasketing: W-66 by KN Crowder; alternates by Zero or Pemko.
- .35 Weatherstrip: W-15-1 by KN Crowder; alternates by Zero or Pemko.
- .36 Door Sweep: W-13S by KN Crowder; alternates by Zero or Pemko.
- .37 Auto Door Bottom: CT-52 by KN Crowder; alternates by Zero or Pemko.
- .38 Auto Door Bottom: CT-54 by KN Crowder; alternates by Zero or Pemko.
- .39 Illuminated Push Button Actuator: CM-45/254 by Camden; alternates by BEA.
- .40 Surface-Mounted Box: CM-43CBLA by Camden; alternates by BEA.
- .41 Push to Lock Kit: CX-WC13AXSM by Camden; alternates by BEA.
- .42 Emergency Call Kit: CX-WEC10K2 by Camden; alternates by BEA.
- .43 Logic Relay CX-33 by Camden; alternates by BEA.
- .44 Roller Catch: PL24 PRO Roller Latch by Precision Lock; alternates by Ives or ABH.
- .45 Barn Door Sliding Hardware: CCSF-998 with CC-3 for doors up to 136kg (300 lbs.), CC-980 fascia and CC-982 end cap pair and all related accessories by KN Crowder; no alternatives permitted.

1.3 REFERENCES

- .1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
 - .1 ANSI/BHMA A156.1-2000, American National Standard for Butts and Hinges.
 - .2 ANSI/BHMA A156.2-2003, Bored and Preassembled Locks and Latches.
 - .3 ANSI/BHMA A156.3-2001, Exit Devices.
 - .4 ANSI/BHMA A156.4-2000, Door Controls - Closers.
 - .5 ANSI/BHMA A156.5-2001, Auxiliary Locks and Associated Products.
 - .6 ANSI/BHMA A156.6-2005, Architectural Door Trim.
 - .7 ANSI/BHMA A156.8-2005, Door Controls - Overhead Stops and Holders.
 - .8 ANSI/BHMA A156.10-1999, Power Operated Pedestrian Doors.
 - .9 ANSI/BHMA A156.12-2005, Interconnected Locks and Latches.
 - .10 ANSI/BHMA A156.13-2002, Mortise Locks and Latches Series 1000.
 - .11 ANSI/BHMA A156.14-2002, Sliding and Folding Door Hardware.
 - .12 ANSI/BHMA A156.15-2006, Release Devices - Closer Holder, Electromagnetic and Electromechanical.
 - .13 ANSI/BHMA A156.16-2002, Auxiliary Hardware.
 - .14 ANSI/BHMA A156.17-2004, Self-closing Hinges and Pivots.
 - .15 ANSI/BHMA A156.18-2006, Materials and Finishes.
 - .16 ANSI/BHMA A156.19-2002, Power Assist and Low Energy Power - Operated Doors.
 - .17 ANSI/BHMA A156.20-2006], Strap and Tee Hinges and Hasps.
- .2 Canadian Steel Door and Frame Manufacturers' Association (CSDMA)
 - .1 CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames - 2009.

1.4 QUALITY:

- .1 Personnel who will be responsible for scheduling, ordering and co-ordination hardware for this project shall be an experienced hardware consultant and with an experienced hardware distributor both of which shall have a minimum of five years of experience.
- .2 The architect may request the submission of a qualification form.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for door hardware and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Hardware List Requirements and Submission:
 - .1 Submit contract hardware list.
 - .2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
 - .3 Provide warranty for all products.
 - .4 Hardware shall not be ordered from manufacturer until schedule and catalogue cuts have been reviewed by the Owner and the Consultant.
- .4 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .5 Manufacturer's Instructions: submit manufacturer's installation instructions.

1.6 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for door hardware for incorporation into manual.

1.7 MAINTENANCE MATERIALS SUBMITTALS

- .1 Extra Stock Materials:
 - .1 Supply maintenance materials:
 - .1 Provide 5 standard lever locksets with Cormax cores as spare materials. in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Provide 5 replacement Self-Closing Devices of each type: Self-Closing Device: 351 Series by Sargent; alternates by LCN or Dormakaba and Self-Closing Device: 1431 Series by Sargent; alternates by LCN or Dormakaba.
 - .2 Tools: Supply 2 sets of wrenches for door closers.

1.8 QUALITY ASSURANCE

- .1 Regulatory Requirements:
 - .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and consistent with manufacturer's instructions.

- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .4 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations.
 - .2 Store and protect door hardware from damage or loss.
 - .3 Protect prefinished surfaces with wrapping.
 - .4 Replace defective or damaged materials with new.
 - .5 Provide keys associated with Permanent lock cores to authorized Owner's representative, only.
- .5 Develop Construction Waste Management Plan related to Work of this Section.
- .6 Packaging Waste Management: remove for reuse and return to supplier, pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .7 Pack hardware in suitable wrappings and containers to protect it from injury during shipping and storage. Accessories, fastening devices and other loose items shall be enclosed with each applicable item of hardware. Mark packages for easy identification as indicated on approved delivery schedule.
- .8 Deliver to building finish hardware for door listed in Door Schedule or marked with residential unit number as applicable. Hand hardware over to trades which are designated to install it.
- .9 Where doors and frames are to be field painted or finished, all hardware shall be removed by the general contractor, prior to same. After finishing has been completed, the general contractor shall re-install all the hardware to manufacturer's recommendations.

1.10 PACKING:

- .1 Identify all hardware packaging with Project Name and location.
- .2 Ship materials with copies of the Hardware Schedule reviewed by the Owner and Consultant.
- .3 Label all finishing hardware packages with door numbers and item numbers.
- .4 The Contractor shall receive in a locked, dry storage area and advise consultant within 24 hours of any material found absent or not in compliance with reviewed Hardware Schedule.

1.11 WARRANTY

- .1 Warrant work of this Section against defects and deficiencies for period of 5 years for door closers, and 2 years for other hardware, in accordance with General Conditions of the Contract. Promptly correct defects and deficiencies which become apparent within warranty period, to satisfaction to Owner's Designee and at no expense to Owner.

1.12 SYSTEM DESCRIPTION

- .1 Keying System:
 - .1 Provide permanent lock cylinder for each aluminum door and for all other doors that require locks.
 - .2 Lay out keying system for building in consultation with Owner's Designee. Keying system shall include keying alike, keying differently, keying in groups, sub-master keying and grand-master keying locks. Keying system shall be co-ordinated with Owner's keying system.
 - .3 Select lock cylinders for compatibility with existing keying system and for universality of locking, keying and bitting system. All new lock cylinders shall be same manufacturer as Owner's existing lock cylinders.

- .4 Prepare and submit keying chart and related explanatory data to Owner's Designee for approval. Do not commence lock work until written confirmation of keying arrangements is received from Owner's Designee.
- .5 Supply keying schedule to the Owner for review. Include at least the following:
 - .1 5 grand-master keys.
 - .2 5 sub-master keys.
 - .3 2 change keys for each lock.
- .6 Hand over keys to Owner or Owner's assigned designee, only.
- .7 Provide 300 electronic access cards and fobs for general access door accessible to the Owner's staff.

Part 2 Products

2.1 HARDWARE ITEMS

- .1 Use one manufacturer's products, only, for similar items.

2.2 FABRICATION – GENERAL:

- .1 General:
 - .1 Fabrication standard is established by specified products within 08 71 00.1.2 and supplemented by the following.
- .2 Strikes
 - .1 Lock strikes shall be standard template box strikes, with extended lips to protect door frames and trim from marking with bolts, and shall be set flush in hollow metal door frames.
 - .2 Blank standardised template strikes for hollow metal door frames shall be supplied as scheduled for such doors without locks.
- .3 Door Closers
 - .1 Door closers shall be rack and pinion type with back checking feature and shall be of proper sizes to operate each respective door efficiently. Shaft packing shall be leak-proof.
- .4 Kick and Bumper Plates
 - .1 Kick and bumper plates shall be as scheduled with edges cut square and smoothed off and shall have countersunk holes and oval head screws which shall be placed at each corner and symmetrically arranged at a maximum spacing of 200 mm (8") along edges or equipped with double-sided tape where specified.
 - .2 All kick and bumper plates shall be stainless steel 1.27 mm (0.05") minimum thickness, satin finish, Type 304.
- .5 Fasteners
 - .1 Supply hardware complete with screws, bolts, expansion shields and other fastening devices as required for satisfactory installation and operating of the hardware.
 - .2 Supply fastening devices of same finish as hardware which is to be fastened.
 - .3 Where pull is scheduled on one side of door, and push plate on other side, issue installation directions to trade responsible for fixing, so that the pull shall be secured through door from reverse side and push plate installed to cover screws. Flush pulls shall be supplied with machine screws for attaching as specified above.
- .6 Finishes
 - .1 Type and finish of hardware shall be equal in all respects to samples of hardware and finishes approved by Owner's Designee.
 - .2 Metal finishes shall be free from defects, clean and unstained, and of uniform colour.
- .7 Fire Rated Closures:

- .1 Finish hardware for fire rated doors shall meet requirements of ULC as part of fire rated door assembly and shall carry ULC or WH label.

2.3 DOOR HARDWARE

- .1 Locks and latches:
 - .1 Bored and preassembled locks and latches: to ANSI/BHMA A156.2 designed for function and keyed as stated herein.
 - .2 Interconnected locks and latches: to ANSI/BHMA A156.12, designed for function and keyed as stated herein.
 - .3 Lever handles: specified within General Requirements for products named within 08 71 00.1.2.
 - .4 Escutcheons: round.
 - .5 Normal strikes: box type, lip projection not beyond jamb.
 - .6 Cylinders: key into keying system as directed.
- .2 Butts and hinges:
 - .1 Butts and hinges: to ANSI/BHMA A156.1.
- .3 Exit devices: to ANSI/BHMA A156.3, grade 2, modern-narrow stile.
- .4 Door Closers and Accessories:
 - .1 Door controls (self-closing device): to ANSI/BHMA A156.4, size in accordance with ANSI/BHMA A156.4, table A1.
 - .2 Door controls - overhead holders: to ANSI/BHMA A156.8.
 - .3 Closer/holder release devices: to ANSI/BHMA A156.15.
- .5 Auxiliary locks and associated products: to ANSI/BHMA A156.5.
 - .1 Cylinders: type 2, 613 finish, for installation in deadlocks provided listed in Hardware Schedule. Key into keying system as directed.
- .6 Architectural door trim: to ANSI/BHMA A156.6.
 - .1 Door protection plates: kick plate type 2, 1.27 mm thick.
 - .2 Push plates: type 2, 1.27 mm thick.
 - .3 Push/Pull units: type 2.
- .7 Door bottom seal: door seal of extruded aluminum frame, black anodized or powder coated, and hollow, closed cell neoprene weather seal, surface mounted, closed ends, adjustable, automatic retract mechanism when door is open.
- .8 Thresholds: 125 mm wide x full width of door opening, extruded aluminum mill finish, serrated surface AODA compliant (ADA Acceptable).
- .9 Weatherstripping:
 - .1 Head and jamb seal:
 - .1 Extruded aluminum frame and hollow closed cell neoprene insert, black anodized or black coated finish.
 - .2 Door bottom seal:
 - .1 Extruded aluminum frame and closed cell neoprene sweep, black anodized or black powder coated finish.

2.4 SPECIAL REQUIREMENTS:

- .1 Coordinate with electronic hardware and magnetic locks. Provide electric strikes for keypad-controlled doors, including, among others, the Universal barrier-free washroom door with automatic operator, lock release and panic button, all coordinated.
- .2 Provide "Push to Exit" buttons and other devices.

2.5 FASTENINGS

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

2.6 KEYING

- .1 Doors, padlocks and cabinet locks to be keyed alike in groups and master keyed, and grand master keyed as directed. Prepare detailed keying schedule in conjunction with Owner's Designee.
- .2 Supply keys in duplicate for every lock in this Contract and as follows:
 - .1 Refer to 08 71 00.1.11 Keying System.
- .3 Stamp keying code numbers on keys and cylinders.
- .4 Supply construction cores.
- .5 Hand over permanent cores and keys to Owner's Designee, only.

2.7 DOOR HARDWARE HEADINGS

- .1 Heading 1 Swing door with roller catch.
 - .1 Hinge – 3, Full Mortise, TA714 by McKinney - 127mm x 114mm, 652 finish.
 - .2 "Dummy" Lever Handle- 7U93 LL by Sargent; 630 Finish.
 - .3 Roller Catch – PL24 PRO Roller Latch by Precision Lock.
 - .4 Wall stop - S120 by Standard Metal, 630 satin stainless-steel finish.
- .2 Heading 2 – not used.
- .3 Heading 3 Office entry door - Swing door with Passage set.
 - .1 Hinges – 4, full mortise, TA786 – 114 x 102 by McKinney, 652 finish.
 - .2 Passage set with Lever Handle - 28-10U15 LL by Sargent, 630 satin stainless-steel finish.
 - .3 Kickplate - K10A - 305 x 1080 x 3M Tape by CBH, 630 satin stainless-steel finish.
 - .4 Wall stop - S120 by Standard Metal, 630 satin stainless-steel finish.
- .4 Heading 4.1 Barrier Free Washroom – Corridor to Washroom
 - .1 Hinges – 3, full mortise, TA786 – 114 x 102 by McKinney, 652 finish.
 - .2 Storeroom set, 28-70-10G04 LL by Sargent, handed to door; 630 finish.
 - .3 Permanent Core CORMAX - To Suit Building Key System x GMK by Best; 626 satin finish.
 - .4 Kickplate, K10A - 305 x 927 x 3M Tape by Standard Metal, 630 satin finish.
 - .5 Wall Stop - S120 by Standard Metal; 630 satin finish.
 - .6 By Automatics Supplier:
 - .1 Automatic Operator: SW200i-SA-Pull x 1043 Header Automatic Operator by ASA ABLOY, (selected according to door hand), 628 finish.
 - .2 Access Control Relay: CX-33 or equivalent.
 - .3 Illuminated Actuator and Push to Lock: CM-45/454SE1 and CM-2520/4854SE1 or equivalent:
 - .1 Install on both sides of door at barrier free mounting height as directed withing construction drawings
 - .2 Electrical requirement for above: single gang and double electrical box completed by Division 26

- .3 Refer to electrical riser diagram for Universal washroom installation.
- .4 Illuminated Restroom Control Kit: CX-WC13AXSM by Camden with "PUSH TO LOCK" sign installed on interior of room, 630 finish.
 - .1 Electrical requirement for above: single gang electrical box completed by Division 26
- .5 Occupancy Indicator: CM-AF500 with "OCCUPIED WHEN LIT" sign; 630 finish.
 - .1 Electrical requirement: for above, single gang electrical box completed by Division 26.
- .6 Electric Strike: 1500C by HES, 12/24VDC (Fail safe), 630 finish.
 - .1 Division 26 - Provide conduit through door and frame for electrified door hardware.
- .7 Door Contact: CX-MDA (Surface applied), White finish.
- .5 Heading 4.2 Not Used.
- .6 Heading 4.3 Universal Washroom
 - .1 Hinges: 3, full mortise, TA786 – 114 x 102 by McKinney; 652 finish.
 - .2 Storeroom set: 28-70-10G04 LL by Sargent, handed to door; 630 finish.
 - .3 Permanent Core CORMAX - To Suit Building Key System x GMK by Best; 626 satin finish.
 - .4 Kickplate, K10A - 305 x 927 x 3M Tape by Standard Metal, 630 satin finish.
 - .5 Wall Stop - S120 by Standard Metal; 630 satin finish.
 - .6 By Automatics Supplier:
 - .1 Automatic Operator: SW200i-SA-Pull x 1043 Header Automatic Operator by ASA ABLOY (selected according to door hand), 628 finish.
 - .2 Access Control Relay: CX-33 or equivalent.
 - .3 Illuminated Actuator and Push to Lock: CM-45/454SE1 and CM-2520/4854SE1 or equivalent:
 - .1 Install on both sides of door at barrier free mounting height as directed within construction drawings
 - .2 Electrical requirement for above: single and double gang electrical box completed by Division 26.
 - .3 Refer to electrical riser diagram for Universal washroom installation.
 - .4 Illuminated Restroom Control Kit: CX-WC13AXSM by Camden with "PUSH TO LOCK" sign installed on interior of room, 630 finish.
 - .1 Electrical requirement for above: single gang electrical box completed by Division 26.
 - .5 Emergency Call Kit, CX-WEC10K2 installed on interior and exterior of room, 630 finish.
 - .1 Electrical requirement for above: single gang electrical boxes completed by Division 26.
 - .6 Dual Duress / Audible Alert Button, CM-AF540SO "PRESS FOR EMERGENCY ASSISTANCE" "ASSISTANCE REQUIRED" installed on interior of room, 630 finish.
 - .1 Electrical requirement for above: single gang electrical box completed by Division 26.
 - .7 Exterior Audible/ Visual Alert, CM-AF140SO "ASSISTANCE REQUIRED" installed on exterior, White finish.
 - .1 Electrical requirement for above: single gang electrical box completed by Division 26.
 - .8 Electric Strike, 1500C by HES, 12/24VDC (Fail safe), 630 finish.
 - .9 Door Contact, CX-MDA (Surface applied), White finish.
- .7 Heading 4.4 Staff Washrooms, Privacy Lockset:
 - .1 Hinges: 3, full mortise, TA786 – 127 x 102 by McKinney; 652 finish.
 - .2 Privacy Set: 65-F67-LL by Sargent; 630 finish.
 - .3 Self-Closing Device: 1431-O (handed to door) by Sargent; 689 Finish.
 - .4 Kickplate: K10A 305mm X 1069mm x 3M tape by Standard Metal; 630 finish.
- .8 Heading 4.5 Not Used.

- .9 Heading 5.1 From to Private Office, Utility, Storage, IT Closet, IT Server Room, Janitorial, Mechanical,.
 - .1 Hinges: 3, full mortise, TA786 – 114 x 102 by McKinney; 652 finish.
 - .2 Electric Strike, 1500C by HES, 12/24VDC (Fail safe), 630 finish
 - .3 Self-Closing Device: 1431-O (handed to door) by Sargent
 - .4 Storeroom lockset: 28-70-10G04 LL by Sargent, handed to door.
 - .5 Card Reader: Dual-Function Device to suit building system
 - .6 Permanent Core: CORMAX - To Suit Building Key System x GMK; 626 finish.
 - .7 Kickplate- K10A 305mm X 1069mm x 3M tape by Standard Metal, 630 finish.
 - .8 Wall stop: S120 by Standard Metal; 630 finish.
 - .9 Overhead Stop: 1ADJ-336 by Rixon, 630 Finish.
- .10 Heading 9 Service Rooms:
 - .1 Hinges – 4, full mortise, TA786 – 114 x 102 by McKinney, 652 finish.
 - .2 Electric Strike, 1500C by HES, 12/24VDC (Fail safe), 630 finish at entry door only
 - .3 Card Reader: Dual-Function Device to suit building system, at entry door only
 - .4 Storeroom lockset: 28-70-10G04 LL by Sargent, handed to door, at entry door only
 - .5 Exit Device (exit only): 28-10G15 by Sargent; 626 finish at exit door only
 - .6 Permanent Core: CORMAX - To Suit Building Key System x GMK; 626 finish
 - .7 Wall stop: S120 by Standard Metal; 630 finish.
 - .8 Self-Closing Device: DA-351 by Sargent; 689 finish.
 - .9 Armour plate: K10F 864mm X 1069mm x 3M tape by Standard Metal; 630 finish.
 - .10 Mop plate: K10A 152mm X 1076mmx 3M tape by Standard Metal; 630 finish.
 - .11 Door Edge Guard: K42F x 2134mmx 3M tape by Standard Metal; 630 finish.
 - .12 Frame Guard: K50F x 1220mmx 3M tape by Standard Metal; 630 finish.
 - .13 Half Frame Guard: K51F x 1200mmx 3M tape by Standard Metal; 630 finish.
- .11 Heading 13.1 Entry door:
 - .1 Hinges – 4, full mortise, TA786 – 114 x 102 by McKinney, 652 finish.
 - .2 Overhead stop: 1ADJ-536 by Rixon; 622 finish.
 - .3 Door Sweep: W-13 by KN Crowder; 628 finish.
 - .4 Weatherstrip: KN Crowder - W-15; 628 finish.
 - .5 By Automatics Supplier:
 - .1 Automatic Operator: SW200i-SA-Pull x 1043 Header Automatic Operator by ASA ABLOY, (selected according to door hand), 628 finish.
 - .2 Actuator: CM-45/254:
 - .1 Install on both sides of door at barrier free mounting height as directed within construction drawings.
 - .2 Electrical requirement for above: single gang electrical box completed by Division 26.
- .12 Heading 13.2 Main Entry doors (exterior):
 - .1 Continuous Hinge: BSPFMSLF-HD1 x 2109 by Pemko; clear anodized finish.
 - .2 Exit Device : LD-53-55-56-70-AD8410G with exterior pull and thumb latch by Sargent; 622 finish
 - .3 Permanent Core: CORMAX - To Suit Building Key System x GMK; 626 finish.
 - .4 Overhead stop: 1ADJ-536 by Rixon; 622 finish.
 - .5 Door Sweep: W-13 by KN Crowder; 628 finish.
 - .6 Weatherstrip: by aluminum door supplier
 - .7 Threshold: CT-67 2438mm (field verify with opening) by KN Crowder; 627 finish.
 - .8 By Automatics Supplier:
 - .1 Automatic Operator: SW200i-SA-Pull x 1043 Header Automatic Operator by ASA ABLOY, (selected according to door hand), 628 finish.
 - .2 Access Control Relay: CX-33 or equivalent.

- .3 Actuator: CM-45/254:
 - .1 Install on both sides of door at barrier free mounting height as directed within construction drawings.
 - .2 Electrical requirement for above: single gang electrical box completed by Division 26.
 - .4 Electric Strike: 1500C by HES, 12/24VDC (Fail safe), 630 finish.
- .13 Heading 13.3 Entry door (exterior):
 - .1 Continuous Hinge: BSPFMSLF-HD1 x 2109 by Pemko; clear anodized finish.
 - .2 Exit Device : LD-53-55-56-70-AD8410G by Sargent; 622 finish
 - .3 Offset Door Pull: D453-2 x 1228 by Standard Metal, 630 finish.
 - .4 Permanent Core: CORMAX - To Suit Building Key System x GMK; 626 finish.
 - .5 Overhead stop: 1ADJ-536 by Rixon; 622 finish.
 - .6 Door Sweep: W-13 by KN Crowder; 628 finish.
 - .7 Weatherstrip: by aluminum door supplier
 - .8 Threshold: CT-67 2438mm (field verify with opening) by KN Crowder; 627 finish.
 - .9 Door Contact: to suit building system
 - .10 By Automatics Supplier:
 - .1 Automatic Operator: SW200i-SA-Pull x 1043 Header Automatic Operator by ASA ABLOY, (selected according to door hand), 628 finish.
 - .2 Access Control Relay: CX-33 or equivalent.
 - .3 Keypad/Card Reader: Dual-Function Device to suit building system
 - .4 Actuator: CM-45/254:
 - .1 Install on both sides of door at barrier free mounting height as directed within construction drawings.
 - .2 Electrical requirement for above: single gang electrical box completed by Division 26.
 - .5 Electric Strike: 1500C by HES, 12/24VDC (Fail safe), 630 finish.
- .14 Heading 13.4 Main Entry door (interior):
 - .1 Continuous Hinge: BSPFMSLF-HD1 x 2109 by Pemko; clear anodized finish.
 - .2 Exit Device : LD-53-55-56-70-AD8410G by Sargent; 622 finish
 - .3 Offset Door Pull: D453-2 x 1228 by Standard Metal, 630 finish.
 - .4 Permanent Core: CORMAX - To Suit Building Key System x GMK; 626 finish.
 - .5 Overhead stop: 1ADJ-536 by Rixon; 622 finish.
 - .6 Door Sweep: W-13 by KN Crowder; 628 finish.
 - .7 Weatherstrip: by aluminum door supplier
 - .8 Magnetic Lock: to suit building system
 - .9 Back Up Audible Alarm: to suit building system including BC2MW "Emergency Exit Unlocked by Fire Alarm" red/white sign by Dormakaba
 - .10 Remote Release Button: to suit building system
 - .11 Intercom: to suit building system
 - .12 Access Controller: to suit building system
 - .13 Power Supply: Located in central location
 - .14 Back Up Power Supply: to suit building system. Located in central location for Back Up Audible Alarm
 - .15 Door Contact: to suit building system
 - .16 By Automatics Supplier:
 - .1 Automatic Operator: SW200i-SA-Pull x 1043 Header Automatic Operator by ASA ABLOY, (selected according to door hand), 628 finish.
 - .2 Access Control Relay: CX-33 or equivalent.
 - .3 Keypad/Card Reader: Dual-Function Device to suit building system each side of door

- .4 Actuator: CM-45/254:
 - .1 Install on both sides of door at barrier free mounting height as directed within construction drawings.
 - .2 Electrical requirement for above: single gang electrical box completed by Division 26.
- .15 Heading 14 Exit doors (exterior stairwell):
 - .1 Continuous Hinge: BSPFMSLF-HD1 x 2109 by Pemko; clear anodized finish.
 - .2 Exit Device (exit only): LD-AD8510G (LD-8810G at hollow metal door), handed to door, by Sargent; 630 finish
 - .3 Overhead stop- 1ADJ-536 by Rixon, 630 Finish.
 - .4 Self-Closing Device: DA-351-OZ (handed to door), by Sargent.
 - .5 Kickplate (at hollow metal doors only): K10A 305mm x 1069mm x 3M tape by Standard Metal; 630 finish.
 - .6 Weatherstrip (at hollow metal doors only otherwise by aluminum door supplier): KN Crowder - W-15; 628 finish.
 - .7 Door Sweep: W-13 by KN Crowder; 628 finish.
 - .8 Door Contact: 1076CW-N 19.05mm diameter SPDT.
 - .9 Threshold: CT-45 1220mm by KN Crowder, (field verify with opening); 719 finish.
- .16 Heading 15 Exterior door, Commercial Tenancy:
 - .1 Hinges: 4 for each door leaf; full mortise, TA786 – 127 x 102 by McKinney; 652 finish.
 - .2 Deadlock: MS1850S-X by Adams Rite; 671 finish
 - .3 Mortise Cylinder: 70-#41 C/W C101 CAM.
 - .4 Permanent Core: CORMAX - To Suit Building Key System x GMK; 626 finish.
 - .5 Overhead stop- 1ADJ-536 by Rixon, 630 Finish.
 - .6 Self-Closing Device: DA-351-OZ (handed to door), by Sargent.
 - .7 Door Sweep: W-13; by KN Crowder; 628 finish.
 - .8 Threshold: CT-45 by KN Crowder, (field verify with opening); 671 finish
 - .9 Weatherstrip: by aluminum door supplier
 - .10 Offset Door Pull: D-453-2 by Standard Metal; 630 finish.
- .17 Heading 17 Exterior Maintenance Door, (Roof Level):
 - .1 Hinges: 4 for each door leaf; full mortise, TA786 – 127 x 102 by McKinney; 652 finish.
 - .2 Electric Strike, 1500C by HES, 12/24VDC (Fail safe), 630 finish
 - .3 Self-Closing Device: 1431-O (handed to door) by Sargent
 - .4 Storeroom lockset: 28-70-10G04 LL by Sargent, handed to door.
 - .5 Card Reader: Dual-Function Device to suit building system
 - .6 Weatherstrip: KN Crowder - W-15; 628 finish.
 - .7 Door Sweep: W-13 by KN Crowder; 628 finish.
 - .8 Threshold: KN Crowder CT-45 (field verify with opening); 671 finish

Part 3 Execution

3.1 INSTALLATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Supply metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Supply manufacturers' instructions for proper installation of each hardware component.
- .4 Install hardware to standard hardware location dimensions in accordance with CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction).

- .5 Where door stop contacts door pulls, mount stop to strike bottom of pull.
- .6 Install key control cabinet.
- .7 Use only manufacturer's supplied fasteners.
 - .1 Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .8 Remove construction cores or locks when directed by Owner's Designee.
 - .1 Install permanent cores and ensure locks operate correctly.

3.2 ADJUSTING

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

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
 - .3 Remove protective material from hardware items where present.
 - .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 DEMONSTRATION

- .1 Keying System Setup and Cabinet:
 - .1 Set up key control system with file key tags, duplicate key tags, numerical index, alphabetical index and key change index, label shields, control book and key receipt cards.
 - .2 Place file keys and duplicate keys in key cabinet on their respective hooks.
 - .3 Lock key cabinet and turn over key to Owner's Designee.
- .2 Maintenance Staff Briefing:
 - .1 Brief maintenance staff regarding:
 - .1 Proper care, cleaning, and general maintenance of projects complete hardware.
 - .2 Description, use, handling, and storage of keys.
 - .3 Use, application and storage of wrenches for door closers, locksets and fire exit hardware.
- .3 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

3.5 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by door hardware installation.

3.6 DELEGATED DESIGN

- .1 Provide shop drawing bearing name of hardware consultant, company and qualifications.
- .2 Provide engineering seal on security drawings illustrating all magnetic lock installations for the purposes of obtaining a Magnetic Lock Permit.
 - .1 Field review by the engineer who produces the magnetic lock installation drawing shall be provided by the design Engineer. Refer to section 01 35 73 Delegated Design Procedures. **END OF SECTION**

PART 1 General

1.1 RELATED SECTIONS

- .1 Requirements of Division 1 Sections
- .2 Section 05 17 13 – Pre-Finished Guards and Railings
- .3 Section 06 10 00 – Rough Carpentry
- .4 Section 06 41 00 – Fine Carpentry and Millwork
- .5 Section 08 11 00 – Steel Doors and Frames
- .6 Section 08 11 16 – Aluminum Doors and Frames
- .7 Section 08 14 16 – Wood Doors
- .8 Section 08 44 13 – Glazed Curtain Wall

1.2 WORK INCLUDED:

- .1 Glass units for aluminum windows, tempered.
- .2 Glass units for curtain wall.
- .3 Glass units for aluminum doors and frames, laminated.
- .4 Glass for exterior pre-finished metal guards and railings, laminated.
- .5 Glass for interior doors and frames, and for glass in doors and sidelights, laminated.
- .6 Glass for interior windows, laminated.
- .7 Glass for Millwork Items.
- .8 Mirror glass shall be provided by other sections: Section 10 28 10 Washroom Accessories and Section 06 40 00 Millwork, Fine Carpentry, Cabinetry and Plastic Laminate.
- .9 Polished, Georgian Wired Glass, 6mm thick for fire-rated closures.

1.3 DEFINITIONS

- .1 Laminated Glass Unit: Single pane comprised of two panels of glass bonded with an interlayer.
- .2 Interlayer: Bonding layer of a laminated glass unit that adheres the outer and inner lights together.
- .3 Insulated Glass Unit (IGU): a unit of glazing formed by two panes with an air space between the panes and intended to improve thermal resistance.

1.4 REFERENCES

- .1 American Architectural Manufacturers Association (AAMA):
 - .1 AAMA/NWWDA 101/I.S. 2-97 Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.
 - .2 AAMA/WDMA/CSA JOINT TECHNICAL BULLETIN Equivalency of Editions of NAFS.
 - .3 AAMA/WDMA/CSA 101/I.S.2/A440-11, NAFS, North American Fenestration Standard / Specification for windows, doors, and skylights.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM C 1036 - Standard Specification for Flat Glass.
 - .2 ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.
 - .3 ASTM C1172 - 19 Standard Specification for Laminated Architectural Flat Glass
 - .4 ASTM C 1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
 - .5 ASTM C542-05, Standard Specification for Lock-Strip Gaskets.
 - .6 ASTM D790-07e1, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - .7 ASTM D1003-07e1, Standard Test Method for Haze and Luminous Transmittance of Plastics.
 - .8 ASTM D1929-96(R2001)e1, Standard Test Method for Determining Ignition Temperature of Plastics.
 - .9 ASTM D2240-05, Standard Test Method for Rubber Property - Durometer Hardness.
 - .10 ASTM E84-10, Standard Test Method for Surface Burning Characteristics of Building Materials.

- .11 ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .12 ASTM E 2190 Standard Specification for Insulating Glass Unit Performance and Evaluation (specification for the evaluation of the durability of sealed insulating glass units).
- .13 ASTM F1233-08, Standard Test Method for Security Glazing Materials and Systems.
- .3 Canadian Door and Window Manufacturers, Certification Program.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
 - .2 CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass.
 - .3 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.
 - .4 CAN/CGSB-12.4-M91, Heat Absorbing Glass.
 - .5 CAN/CGSB-12.6-M91, Transparent (One-Way) Mirrors.
 - .6 CAN/CGSB-12.9-M91, Spandrel Glass.
 - .7 CAN/CGSB-12.10-M76, Glass, Light and Heat Reflecting.
 - .8 CAN/CGSB-12.11-M90, Wired Safety Glass.
 - .9 CAN/CGSB-12.12-M90, Plastic Safety Glazing Sheets.
 - .10 CAN/CGSB-12.13-M91, Patterned Glass.
- .5 Canadian Standards Association (CSA)
 - .1 CSA A440.2-00, Energy Performance Evaluation of Windows and Sliding Glass Doors.
- .6 Environmental Choice Program (ECP)
 - .1 ECP-045-95(R2005), Sealants and Caulking.
- .7 Flat Glass Manufacturers Association (FGMA), Glazing Manual
- .8 Fenestration and Glazing Manufacturers Industry Alliance (FIGMA) and Insulating Glass Manufacturers' Alliance (IGMA).
 - .1 TR-1000-75(91) Voluntary Test Methods for Chemical Effects of Glazing Compounds on Elastomeric Edge Seals –
 - .2 TB-1200-83(16) Guidelines for Insulating Glass Dimensional Tolerances
 - .3 TB-1201-89(05) Sealant Manufacturers Minimum Sealant Dimensions and Placement Survey
 - .4 IGMA/NGA PIB Primary Sealant in Insulating Glass Units – TB-1250-19
 - .5 Design Considerations for Multiple-Cavity IG Units – TM-1300-13
 - .6 Guidelines to Reduce Instances of Thermal Stress – TM-1500-14
 - .7 IGMA/GANA Guidelines for Use of Capillary/Breather Tubes – TB-1601-95(14)
 - .8 IGMA/NGA Unsupported Edge Conditions of Insulating Glass Units – TB-1800-18
 - .9 Voluntary Test Methods & Voluntary Performance Quality Assurance Criteria for Spacers for Sealed Insulating Glass Units – TM-2000-76(82)
 - .10 Recommended Voluntary In-Plant Test Methods and Performance Criteria of Desiccants for Sealed Insulating Glass Units – TM-2100-78-82
 - .11 Voluntary Test Methods & Voluntary Performance Quality Assurance Criteria for Two Component Polysulfide Sealants Used in Manufacturing Sealed Insulating Glass Units – TM-2301-86
 - .12 Test Methods of Insulating Glass Sealants – TM-2400-76(90)
 - .13 Vacuum Insulating Glass – TB-2600-15
 - .14 North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use – TM-3000-90(16)
 - .15 IGMA Guidelines for Sloped Glazing – TB-3001-01
 - .16 Voluntary Guidelines for the Identification of Visual Obstructions in the Airspace of Insulating Glass Units – TM-3100-09
 - .17 Preventing Glass Breakage During IG Design, Manufacture, Transport, Installation and Use – TR-3401-96
 - .18 25 Year Field Correlation Study Report (1980 – 2005) – TR-4000-08

- .19 Insulating Glass Manufacturing Quality Procedures – TM-4000-02(07)-1
- .20 Preventing Insulating Glass Failures – TM-4100-04
- .21 Voluntary Guidelines for IGU Cavity Width Manufacturing Tolerances – TM-4400-18
- .22 IGMA Quality Management System for the Fabrication of IG Units – TM-4500-16
- .23 Technical Manual for Acoustical Glass Design – TM-6000-01
- .24 IGMA Technical Binder – TB-9999
- .9 Glass Association of North American (GANA)
 - .1 GANA Glazing Manual - 2008.
 - .2 GANA Laminated Glazing Reference Manual - 2009.
- .10 Laminators Safety Glass Association, Standards Manual.

1.5 QUALITY ASSURANCE

- .1 Perform work in accordance with Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- .2 Perform work in accordance with FGMA Glazing Manual, IGMAC, and, Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- .3 Provide testing, and, analysis of glass under provisions of Section 01 45 00 - Quality Control.
- .4 Provide shop testing for glass upon request.
- .5 Fabricator's Certification: Submit fabricator's certification by manufacturer.
- .6 Fabricator's Qualifications:
 - .1 Minimum of 5-years experience manufacturing Laminated glass units meeting ASTM C 1172 and CPSC 16CFR-1201.

1.6 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for glass, sealants, and glazing accessories. Include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Manufacturer's instructions for delivery, storage and handling.
- .2 Shop Drawings:
 - .1 Submit drawings for all glass and glazing.
- .3 Submit Product Technical Data Sheets:
 - .1 Coatings applied to sealed glazing unit materials.
 - .2 Components used in sealed glass units.
- .4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements as follows:
 - .1 AAMA/NWWDA 101/I.S. 2-97 Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.
 - .2 AAMA/WDMA/CSA JOINT TECHNICAL BULLETIN Equivalency of Editions of NAFS.
 - .3 AAMA/WDMA/CSA 101/I.S.2/A440-11, NAFS, North American Fenestration Standard / Specification for windows, doors, and skylights.
- .5 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
 - .1 Submit testing and analysis reports associated with glass, sealed units

1.7 CLEANING INSTRUCTIONS:

- .1 Submit manufacturer's cleaning instructions.

1.8 WARRANTY:

- .1 Submit manufacturer's standard warranty for laminated glass units.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Install glazing when ambient temperature is 10 °C minimum. Maintain ventilated environment for 24 hours after application.
- .2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert metal cut-offs from landfill by disposal into on-site Metal recycling bin.
- .2 Divert uninstalled materials for reuse at nearest used building materials facility or similar type facility.
- .3 Divert unused caulking and sealant materials from landfill through disposal at special wastes depot.

1.11 PACKAGING MATERIALS

- .1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .2 Dispose of all corrugated cardboard, polystyrene, plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

1.12 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations.
 - .2 Store and protect glazing and frames from nicks, scratches, and blemishes and other damage.
 - .3 Protect prefinished aluminum surfaces with wrapping.
 - .4 Contractor shall inspect materials delivered to site. Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan and Waste Reduction Workplan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return to supplier, pallets, crates, padding, as specified within 01 74 21 - Construction/Demolition Waste Management and Disposal. Separate for recycling card stock, corrugated cardboard, paper and metal packaging bands.

1.13 AMBIENT CONDITIONS

- .1 Ambient Requirements:
 - .1 Install glazing in factory or in field when ambient temperature is 10 degrees C, minimum. Maintain ventilated environment for 24 hours after application.
 - .2 Maintain minimum ambient temperature before, during and 48 hours after installation of glazing compounds.

PART 2 Products

2.1 SEALED, INSULATING GLASS UNITS - EXTERIOR ALUMINUM WINDOWS

- .1 Design Criteria – sealed, double-glazed insulating glass units (IGU):
 - .1 Provide tempered glass for aluminum window frames.
 - .2 AAMA/NWWDA 101/I.S. 2-97 Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors
 - .3 Insulated Glass Unit to meet or exceed ASTM E 2190 Standard Specification for Insulating Glass Unit Performance and Evaluation (specification for the evaluation of the durability of sealed insulating glass units).

- .4 Ensure continuity of building enclosure vapour and air barrier using glass and glazing materials as follows:
 - .1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
 - .2 Size glass to withstand wind loads, dead loads and positive and negative live loads to ASTM E330, acting normal to plane of glass to design pressure of 10 kPa.
- .5 Limit glass deflection to 1/260 with full recovery of glazing materials.
- .6 All windows are glazed with nominal 25mm overall thickness, double-glazed, sealed glass units. Individual panes within each glazing unit shall be selected for thickness in accordance with applicable Building Code regulation or specified standards, but not less than 3mm (1/8") for any pane regardless of size or application.
- .7 Double-sealed insulating glass units shall be certified by IGMA and tested in accordance with ASTM E-2190.
- .8 Sealed units shall be installed as complete pre-assembled units within specified window frames following delivery to window manufactory.
- .9 IGU - Sealed, double-glazed insulating glass (IG) window glass units shall be equipped with low conductivity, dual sealed stainless steel spacer; air space filled with Argon gas; glass to have low E coatings containing 2 layers of silver applied to surface 3 using soft coat (sputtering) process. Equal to or exceeding:
 - .1 Cardinal Glass LoE-180ESC meeting Energy Star 2020 minimum energy rating of 34.
- .10 Sealed Unit Spacer: selected to achieve Energy Star performance, spacer filled with desiccant.
- .11 IGU Assembly: Primary seal between spacer and glass polyisobutylene (PIB); silicone secondary seal.
 - .1 A center-of-glass U-factor 1.22 (W/m²·K) / 0.21 (BTU/hr·ft²·°F).

2.2 CURTAIN WALL GLASS:

- .1 Clear tempered glass or laminated safety glass, minimum 6mm thickness to suit window sizes and curtain wall manufacturer's requirements. Utilize sealed, insulating glass unit with two panes and Argon gas fill and warm edge spacer.
- .2 Design Criteria – sealed, double-glazed insulating glass units (IGU):
 - .1 Refer to Section 08 44 13 Glazed Curtain Wall for specification.

2.3 DOORS, FRAMES AND SIDELIGHTS AND INTERIOR WINDOW GLASS AND GLAZING

- .1 Wired glass shall be used for all doors with fire resistance ratings.
- .2 Doors, side lights, transoms and interior glazed framing systems including glass and glazing systems within doors, all cases: to CAN/CGSB-12.1, transparent and as follows:
 - .1 Type 2-tempered.
 - .2 Class B-float.
 - .3 10 mm (3/8") thick laminated glass for each pane in a double-glazed IGU system. Transom glass, for exterior doors, frames and sidelights shall be two panes of tempered glass forming an IGU.
 - .4 Plastic Glazing Film applied to all sidelights and window associated with entrance framing systems.
- .3 Insulated Glass Units (IGU) matching requirements for aluminum window IGU's for all exterior doors and interior doors of entrance vestibules:
 - .1 Sealed insulating glass units to meet or exceed performance standards of Cardinal Glass LoE-180ESC meeting Energy Star 2020 minimum energy rating of 34.
 - .2 Two laminated glass units of clear glass, each with interlayers and joined into an IGU separated by thermal spacer;
 - .3 Argon fill.
- .4 Interior doors windows and sidelights within aluminum and steel frames:
 - .1 Type 2-tempered.
 - .2 Class B-float.

- .3 10 mm (3/8") thick laminated glass unit for single-glazed interior doors and sidelights; interior transom glass, may be tempered glass, 6 mm thick.
- .5 Glazing Warning Film:
 - .1 Apply Plastic Glazing Film (Scotchcal specified herein) window film strip to sidelights and interior windows with sills closer than 915 from finished floor. Fixed interior and exterior window glass provided in sidelight frames associated with hollow steel door frames. The Scotch window film is required for all sidelights and interior windows noted and on all sidelights associated with entrance door assemblies.
- .6 Doors and Sidelights and Transom with Fire Resistance Rating - Wired Glass:
 - .1 Wired glass: to CAN/CGSB-12.11, 6mm thick.
 - .2 Type 1-polished both sides (transparent)
 - .3 Wire mesh styles 3-square.

2.4 MATERIALS: FLAT GLASS, LAMINATED AND WIRED GLASS

- .1 Laminated glass: minimum pane thickness 5 mm for each glass panel bonded on either side of an interlayer of 0.38mm poly-vinyl butyral (PVB). Assembly is created under heat and pressure to meet or exceed CAN/CGSB-12.2017. Glass unit is 10 mm total thickness.
- .2 Laminated Safety Glass: as above. When required to have a fire resistance rating, the unit must also have a fire resistance rating determined by testing. Examples include Pyrotek.
- .3 Doors and Sidelights and Transom with Fire Resistance Rating - Wired Glass unless otherwise noted:
 - .1 Wired glass: to CAN/CGSB-12.11, 6mm thick.
 - .2 Type 1-polished both sides (transparent)
 - .3 Wire mesh styles 3-square.

2.5 MANUFACTURER

- .1 Guardian Glass, LLC, 2300 Harmon Road, Auburn Hills, Michigan 48326. Toll Free (866) 482.7374. Web Sites www.guardianglass.com.

2.6 MATERIALS - LAMINATED GLASS:

- .1 Glass Requirements:
 - .1 Glass thickness: each panel 5 mm bonded with interlayer. 10 mm total glass thickness plus interlayer thickness.
 - .2 Glass coating: N/A.
 - .3 Details:
 - .1 5 mm thick clear float glass.
 - .2 Interlayer: Polyvinyl butyral (PVB) plastic interlayer, clear, 0.060 inch thick.
 - .3 5 mm thick, clear float glass.
 - .4 Heat Treatment for both panes: Heat Treatment: Tempered; ASTM C 1048.

2.7 GLASS IN MILLWORK PRODUCTS:

- .1 Type 1 Laminated Safety Glass.
- .2 Transparent.
- .3 Minimum thickness: 6mm (¼").

2.8 BALCONY GUARD LAMINATED SAFETY GLASS

- .1 Meet or exceed ASTM C1172 - 19 Standard Specification for Laminated Architectural Flat Glass,
 - .1 Transparent
 - .2 10 mm minimum thickness, minimum 0.38 mm interlayer.
 - .3 Type 1-laminated.

2.9 MIRROR GLASS

- .1 Refer to Interior Design Drawings and Section 06 40 00.

- .2 Silvered mirror glass: 6mm thick.
 - .1 Type 1B-float glass for high humidity use.
 - .2 15-year warranty against silver spoilage.
- .3 Mirrors with stainless steel frames manufactured by Frost, Bobrick or ASI and supplied with Section 10 28 10 shall have mirror glass provided by the specified manufacturer.

2.10 PLASTIC GLAZING FILM:

- .1 Product: 3M Scotchal 7725-314 Dusted Crystal Film, applied where indicated on drawings and as follows:
 - .1 Sidelights adjacent to entrances: apply a strip 150mm wide at 1070mm above finished floor.
 - .2 Interior sidelights and interior windows with sill heights less than 915mm: apply a strip 150mm wide at 1070mm above finished floor.
 - .3 Strip of film shall be applied from glazing stop to glazing stop on interior face of glass.
 - .4 The above does not apply to windows set into exterior walls.

2.11 FABRICATION OF GLAZING UNITS

- .1 Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- .2 Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets.

2.12 ACCESSORIES

- .1 Setting blocks: Neoprene, EPDM, Silicone, 80-90 Shore A durometer hardness to ASTM D 2240, length of 1" for each square meter of glazing, minimum 4" x width of glazing rabbet space minus 1/16" x height or to suit glazing method, glass light weight and area.
- .2 Spacer shims: neoprene or silicone, 50-60 Shore A durometer hardness to ASTM D2240, 75mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.
- .3 Glazing tape:
 - .1 Preformed butyl compound, 10-15 Shore "A" durometer hardness to ASTM D 2240; coiled on release paper; black colour.
 - .2 Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume 2%, designed for compression of 25 %, to effect an air and vapour seal.
- .4 Glazing splines: resilient polyvinyl chloride or silicone, extruded shape to suit glazing channel retaining slot, colour selected from standard range.
- .5 Glazing clips: manufacturer's standard type.
- .6 Lock-strip gaskets: to ASTM C542.
- .7 Mirror attachment accessories:
 - .1 Stainless steel clips.
 - .2 Mirror adhesive, chemically compatible with mirror coating and wall substrate
 - .3 Adhesive equivalent to:
 - .1 Loctite PL 520 Mirror Adhesive.
 - .2 LePage PL 610 Mirror Construction Adhesive.

PART 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for glazing installation in accordance with manufacturer's written instructions.
 - .1 Verify that openings for glazing are correctly sized and within tolerance.
 - .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

- .3 Inform Contractor and Consultant of unacceptable conditions immediately upon discovery.
- .4 Proceed with installation following remediation of unacceptable conditions and subsequent receipt of Contractor's approval to proceed, only.

3.2 PREPARATION

- .1 Verify glazing openings are correct size and within tolerance.
- .2 Verify glazing channels, recesses, and weeps are clean and free of obstructions.
- .3 Clean contact surfaces with solvent and wipe dry.
- .4 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .5 Prime surfaces scheduled to receive sealant.

3.3 GLAZING

- .1 Install glass in accordance with manufacturer's instructions, except where local codes or GANA Glazing Manual indicate more stringent requirements.

3.4 INSTALLATION: PLASTIC FILM

- .1 Install plastic film with adhesive, applied in accordance with film manufacturer's instructions.
- .2 Place without air bubbles, creases or visible distortion.
- .3 Fit tight to glass perimeter with razor cut edge.

3.5 FIELD QUALITY CONTROL

- .1 Verify glass is free of chips, cracks, and other inclusions that could inhibit structural or aesthetic integrity.

3.6 CLEANING

- .1 Clean glass promptly after installation in accordance with manufacturer's instructions.
- .2 Remove labels from glass surface.
- .3 Do not use harsh cleaning materials or methods that would damage glass.

3.7 PROTECTION

- .1 Protect installed glass from damage during construction.
- .2 Protect installed glass from contact with contaminating substances resulting from construction operations.
- .3 Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents, and vandalism.

END OF SECTION

PART 1 GENERAL

1.1 RELATED WORK

1. All Sections of Division One
2. Section 06 10 00 - Rough Carpentry
3. Section 06 41 00 - Fine Carpentry and Millwork
4. Section 07 21 16 – Batt and Blanket Insulation.
5. Section 07 84 00 – Fire Stopping.
6. Section 07 92 00 - Sealants
7. Section 08 11 00 – Steel Doors and Frames
8. Section 08 21 00 – Wood Doors
9. Section 09 11 00 – Steel Stud Framing
10. Section 09 12 00 – Steel Framing Ceilings and Bulkheads
11. Section 09 91 23 - Painting and Finishing.
12. Mechanical installations: Mechanical Divisions.
13. Electrical installations: Electrical Division.

1.2 WORK INCLUDED

1. Supply and Installation of all labour, materials, joint treatments and associated framing products, trims and accessories to effect completion of the following:
 1. Moisture resistant, mould resistant, fiber reinforced, paperless gypsum board equivalent to Type X gypsum board panels applied to all walls and all ceilings and bulkheads in all cases, all layers for multiple layer assemblies.
 2. Where tile backer board assembly is shown, tile backer panels are applied over previously installed paperless, moisture resistant and mould resistant gypsum board panels where noted, shown or referenced in specifications.
 3. Sag resistant paperless gypsum board shall be used for all suspended ceiling or bulkhead panels.
 4. Sheathing joint and penetration treatment including blocking, reinforcements and all metal trims.
 5. Select tapes and joint fillers for mould and moisture resistance characteristics for all parts of the installation.
 6. Use stainless steel fasteners for tile backing panels.
 7. Patching and related remedial work required to ensure finish that meets or exceeds the standards referenced in this section.
 8. Finishing processes specified herein - Level 5.
 9. Application of acoustical sealants when not applied by section 07 92 00.
2. Coordination:
 1. Sequence applications that complete fire resistance rated assemblies prior to application of products used as a finish or installation of framing overlaid on completed fire rated assemblies including partitions that extend above bulkheads and suspended ceilings.
 2. Provide minor cutting and demolition of existing gypsum board panels to effect restoration work.
 3. Remedial work to existing interior finishes includes selection of products not specified to match existing wall assemblies where work is applied to existing framing and finishes as part of restoration or remedial work to existing assemblies that remain otherwise. This includes selection of panels with thickness that matches existing panel thickness.

1.3 REFERENCE STANDARDS

1. American Society for Testing Materials:
 1. ASTM C 11 - Standard Terminology Relating to Gypsum and Related Building Materials and Systems.
 2. ASTM C 473 - Standard Test Methods for Physical Testing of Gypsum Panel Products.
 3. ASTM C 475 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

4. ASTM C514-90 - Specification for Nails for the Application of Gypsum Wallboard
5. ASTM C 518 - Standard Test Method for Steady-State Thermal
6. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
7. ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board
8. Transmission Properties by Means of the Heat Flow Meter Apparatus.
9. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
10. ASTM C 954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 inch to 0.112 inch in Thickness.
11. ASTM C 1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
12. ASTM C 1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base.
13. ASTM C 1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
14. ASTM C 1280 - Standard Specification for Application of Gypsum Sheathing.
15. ASTM 1396 - Standard Specification for Gypsum Board.
16. ASTM C 1629- Standard Classification for Abuse-Resistant Non-decorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels
17. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mould on the Surface of Interior Coatings in an Environmental Chamber
18. ASTM D 3274 - Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Fungal or Algal Growth, or Soil and Dirt Accumulation.
19. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
20. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
21. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
22. ASTM A525M-91a - Specifications for General Requirements for Steel Sheet, Zinc-Coated (Galvanised) by the Hot-Dip Process
23. ASTM C645-88 - Specification for Non-load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board
24. ASTM E84-91a - Test Method for Surface Burning Characteristics of Building Materials.
2. Canadian General Standards Board:
 1. CAN/CGSB-19.21-M87 - Sealing and Bedding Compound Acoustical
 2. CAN/CGSB-51.33-M89 - Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
3. Canadian Standards Association:
 1. CAN/CSA-A82.27-M91 - Gypsum Board.
 2. CAN/CSA-A82.31-M91 - Gypsum Board Application.
4. Underwriters Laboratory of Canada:
 1. CAN/ULC-S101 - Standard Methods of Fire Endurance Tests of Building Construction and Materials
 2. CAN/ULC-S102- Surface Burning Characteristics of Building Materials and Assemblies
5. ANSI/UL 263 - Fire Resistance Ratings.
6. CGC Handbook -Gypsum Construction Handbook, CGC Gypsum-Division of CGC Inc., publisher, P.O. Box 4034, Station A, Toronto, Ontario, M5W 1K8.
7. Gypsum Association:
 1. Installation method, standards and reference material for all aspects of Gypsum Board supply installation - GA-253 Gypsum Association, Recommended Specifications, Application of Gypsum Sheathing. GA 600-2009, GA214-07, GA 214-M-97, GA216-07, GA-220-06, GA-221-2000, GA222-09, GA223-04, GA224-08, GA225-08, GA226-08, GA229-08, GA231-06, GA232-04, GA234-08, GA235-05,

GA236-2000, GA238-03, GA239-04, GA253-07, GA 254-07, GA290-02, GA605-08-08, GA610-02, GA 613-04, GA 801-07.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

1. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 (UL 263, CAN/ULC-S101) by a testing and inspecting agency acceptable to authorities having jurisdiction.
2. Fire-Resistance Ratings: Indicated by design designations from ULI and ULC "Fire Resistance Directory" and Products Certified for Canada. For all references to assemblies listed as matching the tested assemblies listed within referenced standards including the OBC, ULC or Warnock Hersey, assemblies must be matched exactly and without variation.
3. Acoustical Ratings:
 1. Where sound ratings are indicated or an assembly listed in the OBC Supplement is listed, provide materials and application procedures identical to those tested by manufacturer to achieve Sound Transmission Class (STC) and fire resistance rating scheduled or indicated in accordance with ASTM E90.
 2. Apply acoustical sealant in accordance with applicable requirements of ASTM C919 and as shown on drawings.

1.5 SUBMITTALS

1. Submit under provisions of Section 01300 - Submittals.
2. Provide written confirmations to Divisions 15, Mechanical and 16 Electrical, when requested by Consultant, that suspended ceiling is capable of supporting additional weight of mechanical and electrical fixtures specified in Divisions 15, Mechanical and 16, Electrical.
3. Provide manufacturer's literature verifying metal stud gauge, spacing and connection details for each situation.
4. Product Data: Manufacturer's data sheets on each product to be used, including:
 1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Design data test reports.
 4. Installation methods.
5. Verification Samples: For each product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product.
6. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.
2. Installer Qualifications: Company specializing in performing Work of this section with minimum three years documented experience.
3. Adhere to the provisions of the Gypsum Association Manuals, in particular GA 216 except for more stringent requirements of manufacturer, for all aspects of the work.
4. Apply Level 5 finishing to all existing walls when existing wall covering had been removed (full skim coat; multiple layers and applications of finish with full cure between applications).
5. Apply acoustical sealant in accordance with applicable requirements of ASTM C919.

1.7 DELIVERY, STORAGE, AND HANDLING

1. Store gypsum board and associated products in accordance with GA-238 and manufacturer's instructions.
2. Deliver and store products in manufacturer's packaging indicating manufacturer and product name and protect until ready for installation.

3. No outside storage permitted. Store in clean, dry area and off ground.
4. Store materials for protection against damage from weather, direct sunlight, surface contamination, construction traffic, or other causes.
5. Stack all gypsum board panels flat on levelled supports off the ground, under cover, and fully protected from weather.
6. Store and support boards in flat stacks to prevent sagging and without overhanging boards. Prevent damage to edges, ends and surfaces.
7. Protect bagged products from excessive moisture or wetting.
8. Handle products to protect edges and surfaces from damage. Discard damaged boards and wet materials.

1.8 PROJECT CONDITIONS

1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Report inappropriate conditions to Contractor and do not commence work unless conditions are appropriate for efficacious completion of work specified herein.
2. Do not install or store products under environmental conditions outside manufacturer's absolute limits. Do not allow joint treatment products to freeze or commence curing while stored. Keep lids tightly sealed for containers and keep dry materials packaged and elevated above soil or concrete.
3. Do not allow tools to rust. Clean tools frequently during work and before or after each day's work. Remove dried compounds and adhesives from tools whenever materials cure on tools.
4. Mask and prepare surfaces within the work area that are not part of the work for this section.
5. Remove dropped compound or scrap materials frequently and at end of work day, minimum
6. Environmental Requirements:
 1. Do not install gypsum board when ambient temperature is below 40°F or 10 degrees C.
 2. For adhesive attachment of gypsum board, and for finishing of gypsum board, maintain ambient temperature above 50°F from one week prior to attachment or joint treatment until joint treatment is complete and dry.
 3. Ventilate work area while joint treatment (compound) is curing.
 4. Ensure that temporary heating system is not generating moisture within the work environment.

PART 2 PRODUCTS

2.1 MANUFACTURERS

1. All gypsum board panel products to be manufactured by a member of the Gypsum Association.
2. Acceptable Manufacturers:
 1. American Gypsum.
 2. CertainTeed Gypsum, Inc.
 3. United States Gypsum. (USG)/ Canadian Gypsum Company Ltd. (CGC)
 4. Georgian Pacific Gypsum (GP).
 5. Continental Building Products.
3. Single Source Responsibility: Obtain gypsum sheathing products, joint treatment, and accessories from a single manufacturer or from manufacturers recommended by prime manufacturer of gypsum sheathing products.

2.2 GYPSUM SHEATHING

1. General requirements for Gypsum Board Panels:
 1. Minimum panel dimensions, all types: 48 by 96 inches (1219 by 2438 mm); increased length and width dimensions available from some manufacturers to reduce number of joints and these may be used.
 2. Provide all panels in sheets of maximum practical lengths to minimise end joints.
 3. When practical, provide panels of increased width to minimize horizontal joints.

4. Select product dimensions to accommodate horizontal orientation for all panels applied to vertical surfaces including partitions or exterior walls or panels laminated to masonry walls such that panel's long dimension is oriented parallel with floor.
5. All interior panels shall be fibre reinforced, moisture and mould resistant, paperless interior boards: covered and finished as manufactured by specified producers.
6. Tile Backer Board: cement board or paperless fibre reinforced panels, purpose made for support of wall mounted ceramic tiles or as specified.
2. Gypsum Board for Interior Fire Rated Assemblies and General Use for all applications specified on drawings and schedules:
 1. Mould resistant, moisture resistant, paperless, fibre reinforced interior complying with ASTM C1658, ASTM C473 and ASTM D3273 (score of 10 required) for moisture resistance, water absorption and support of mould growth.
 2. Complying with CAN/CSA-A82.27-M, ASTM C1396, ASTM C36 Type X. Fire Code C may be used as substitute for Type X products. Type X in all cases and formulated to comply with Ontario Building Code, Underwriters Laboratory, Underwriters Laboratory of Canada or Warnock Hersey for required fire ratings and assemblies and as noted on drawings. Apply using multiple layer assemblies where noted or specified.
 3. 5/8" thickness for all panels.
 4. Acceptable Products – Base layer as is or finish layer with Level 5 skim coated finish for all surfaces exposed to view:
 1. CGC Sheetrock Brand Glass-Mat Panels Mold Tough Firecode X
 2. CGC Fiberock Brand Aqua-Tough (smooth face; paintable)
 3. Certainteed GlasRocType X.
 4. Continental Building Products Weather Defense Platinum Interior Type X.
 5. Georgia Pacific DensArmor Plus Fiberglass Mat, Type X.
 6. US Gypsum Glass-Mat Panels Mold Tough Firecode X.
 5. Properties:
 1. Flame spread: ASTM E 84 (CAN/ULC-S102): 0 maximum.
 2. Smoke developed: ASTM E 84 (CAN/ULC-S102): 0 maximum.
 3. Thermal Resistance, R 0.51 as tested in accordance with ASTM C 518.
 4. Size: 48 by 96 inches by 5/8" (1219 by 2438 mm); longer lengths are available to reduce number of joints.
3. **Ceiling Board**, non-sag, for framed and suspended assemblies that do not require a fire resistance rating and that are suspended below fire rated assemblies, below non-combustible fire rated assemblies or below materials meeting requirements for heavy timber construction. Hanger wire, carrying channels, furring and resilient metal framing spaced 400 mm (16") on centre comprise the suspension system. Bulkheads may be framed using or wood or metal framing elements spaced 400 mm (16") on centre. Applications include bulkheads.
 1. Properties:
 1. ASTM C36, CAN/CSA-A82.27-M91, non-sag type.
 2. Thickness: 15.9 mm (5/8") or 12.7 mm (1/2 inch) illustrated or specified on drawings.
 2. Acceptable Materials:
 1. Canadian Gypsum Company Interior Ceiling Board.
 2. United States Gypsum Imperial Sag Resistant Interior Ceiling.
 3. Georgia Pacific Toughrock CD.
 4. American Gypsum Interior Ceiling Board
 5. Certainteed Easi-Lite Lightweight Interior Gypsum Ceiling Board and Interior Ceiling Board

2.3 FASTENERS AND JOINT TREATMENT FOR CERAMIC TILE BACKER PANELS AND MOULD AND MOISTURE RESISTANT, PAPERLESS GYPSUM OR CEMENT PANELS:

1. Bugle head stainless steel screws.
2. For tile backing, set fibre tape in tile setting material to finish joints.
3. Tile Backer Board Joint Tape:
 1. CGC/USG Joint tape: Durock Nex Gen alkali resistant joint tape.
 2. Certainteed: ProRoc Mold Resistant Product 312910 compound;
 3. Fiba Tape Mold X10 Mesh Tape.
4. Paperless, Moisture and Mould Resistant Gypsum Board Panel Joint Tape and Finishing Compound:
 1. Certainteed Mold Resistant Lite All Purpose Joint Compound, Product 313556;
 2. FibaFuse paperless drywall tape.

2.4 SETTING COMPOUND

1. Certainteed M2Tech 90 Moisture and Mould Resistant Joint Compound

2.5 LAMINATING ADHESIVE

1. Laminating adhesive for multiple layer assemblies:
 1. Special adhesive or joint compound specifically recommended for laminating gypsum boards.
2. Laminating adhesive for direct application:
 1. Special adhesive or joint compound specifically recommended for laminating gypsum boards and for adhering gypsum boards to solid substrates.

2.6 MISCELLANEOUS ACCESSORIES:

1. Provide all accessories required for complete installations.
2. Provide control and expansion joints in gypsum board walls where indicated.

2.7 SUSPENSION MATERIALS

1. **Hangers:** 4.8 mm (3/16") nominal diameter mild steel rod.
2. **Eye Bolts:** ¼" diameter penetrating 1.5" into wood framing minimum, selected to facilitate connection of suspension tie wire.
3. **Tie Wire:** 1.60 mm nominal diameter (16 IW ga.) galvanized, soft annealed steel.
4. **Furring Channels:** Galvanised sheet steel, minimum 0.59 mm overall thickness (25 gsg., 0.0247"), zinc coating Z275 screw channels, 66.7 mm wide x 22.2 mm deep, (2-5/8" x 7/8").
5. **Runner Channels:** Galvanised sheet steel, minimum 1.64 mm overall thickness (16 gsg) (0.0635"), zinc coating Z275, 38.1 mm (1-1/2") high with 19 mm (3/4") flanges, for primary furring member in suspended ceilings and as horizontal stiffeners or bracing in metal stud systems.
6. **Resilient Channels:** Galvanised sheet steel, nominal 1.64 mm (1-1/2") overall width, 12.5 mm (1/2") overall depth, thickness 25 gsg. (0.0635"), zinc coating Z275, with perforations to allow flexibility for tertiary furring members in partitions and suspended ceilings.

2.8 TILE OR FRP BACKER BOARD ACCESSORIES:

1. Provide stainless steel accessories and stainless steel screws recommended by backer board manufacturer and required for complete installation.
2. Isolate dissimilar metals in all cases using transition membranes or gaskets formed from isolation membranes specified in section 0601 or 07271.
3. Joint tape to be fibre tape low alkali. Joint compound shall be mould resistant

2.9 ELASTOMERIC SEALANT:

1. As recommended by manufacturer of fibre-reinforced gypsum sheathing board.

2.10 INTERIOR TRIM:

1. Complying with ASTM C 1047.
2. Conform to profile and dimensions indicated.

3. Material for interior Work:
 1. Galvanized steel, 26 gage minimum.
4. **Corner Bead:**
 1. Galvanised steel sheet, minimum 0.59 mm overall thickness zinc coating Z275 (25 gsg) (0.0247"), ASTM A525M, minimum width of flanges 28.6 mm (1-1/8") for 12.7 mm (1/2") thick board and 31.8 mm (1-1/2") for 15.9 mm (5/8") thick board.
 2. Equivalent to Dur-A-Bead by CGC.
5. **Casing Bead/J Trims:**
 1. Galvanised steel sheet, minimum 0.59 mm overall thickness zinc coating Z275 (25 gsg) (0.0247"), ASTM A525M, designed for finishing with joint compound.
6. **Control Joint:** Galvanised sheet steel with perforated flanges, manufacturer's standard.
 1. Control joint properties:
 1. Roll formed zinc with perforated flanges.
 2. Size: 1-3/4 inch wide, with 1/4 inch wide center channel.
 3. Provide with removable tape strip over channel.
 4. Equivalent to No. 093 by USG.

2.11 FASTENERS:

1. Screws complying with ASTM C 954 and ASTM C 1002 shall be used for all applications.
2. Sheathing: Steel drill screws or nails, in lengths recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating. Use minimum 1.5" for single layer assemblies and minimum 2.5" long for two layer assemblies.
3. Ceiling/Soffits: For painted ceilings/soffits, use fasteners having a salt spray resistance of more than 800 hours according to ASTM B 117 are recommended.
4. For steel framing less than 0.0329 inch (0.835 mm) thick, attach sheathing with steel drill screws complying with ASTM C 1002.
5. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, attach sheathing with drill screws complying with ASTM C 954.
6. For wood framing, attach with screws of type and spacing as recommended by sheathing manufacturer.

2.12 INSULATION

1. Refer to Section 07 21 16 – Batt and Blanket Insulation for interior walls and partitions.

2.13 DUST BARRIER

1. Minimum 0.152 mm (6 mil) polyethylene, CAN/CGSB-51.33-M, Type 2.

2.14 SPONGE TAPE:

1. Self-sticking adhesive on 1 side, closed cell neoprene sponge tape, Perma-Stik 1220X by Jacobs and Thompson Inc.

PART 3 EXECUTION

3.1 EXAMINATION

1. Attend the site and review all conditions affecting the work.
2. Examine substrate framing and blocking for compliance with applicable requirements, installation tolerances and other conditions affecting installation of gypsum board.
3. Do not supply or install gypsum board products to the site if propane or natural gas temporary heating is in use and not direct vented to building exterior.
4. Measure temperature and humidity at all installation locations and do not install products where conditions will not support optimum outcome for installation.
5. Report unsatisfactory conditions found to the consultant and the contractor.
6. Do not proceed until unsatisfactory conditions have been corrected.

7. Beginning of installation shall indicate acceptance of substrate conditions.
8. Examine structure and installation conditions and develop installation criteria to allow for building movement and wind load stresses in the field as applicable to this section.
9. Review sealant joint requirements and allow appropriate joint width in accordance with sealant manufacturer's literature for all acoustic conditions including demising walls between residential units and other spaces.
10. Provide adequate ventilation to eliminate excessive moisture before commencing and during work to ensure proper drying of joint filler and adhesive. Do not force dry adhesive and joint treatment.

3.2 PROTECTION

1. Ensure that spaces intended for installation or storage of gypsum board products and all accessories are clean, dry and have environmental conditions meeting this specification.
2. Ensure that work that may impede the work of this section or that could cause damage to materials provided by this section has been completed in the areas designated for the work of this section.

3.3 PREPARATION

1. Clean surfaces thoroughly prior to installation.
2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.4 INSTALLATION - GENERAL

1. The work shall be performed by qualified skilled personnel ensuring proper equipment provided in order to expedite the project in an efficient professional manner.
2. Examine gypsum panels in accordance with GA 231. Inspect all gypsum board products and accessories for damage or mould or other deleterious conditions. Do not install damaged products or products exhibiting mould or other deleterious characteristics.
3. Installation shall conform to CAN/CSA-A82.31-M, except as otherwise specified herein.
4. Install in accordance with manufacturer's written instructions, ASTM C 840, GA 216, ASTM C 1280, GA-253 and OBC or testing authority requirements as applicable to assembly. Install miscellaneous framing required to meet project requirements and ASTM C840 as required.
5. All boards shall be applied horizontally in all cases for single layer assemblies and the top or finished surface board in multiple layer assemblies. Underlying layers in a multiple layer gypsum panel installation may be installed vertically.
6. Tapered long edges of boards shall touch adjacent paper edges without forcing in all cases.
7. Co-operate with mechanical, electrical and other trades to accommodate fixtures, fittings and other items in gypsum board areas.
8. Cut boards at penetrations, edges, and other obstructions of work and fit tightly against abutting construction, unless otherwise indicated.
9. Fit gypsum board tight to service penetrations in all cases including, but not limited to, electrical conductors, electrical device boxes, fire alarm components, security, low voltage devices and conductors, conduits, plumbing, ductwork or penetrations by structural elements.
10. Fit gypsum board tightly to rough openings required for access doors and panels.
11. Install boards with a minimum 3/8-inch (10 mm) setback where non-load-bearing construction abuts structural elements or use increased setback if larger or deflection space is specified on drawings.
12. Install boards with a 1/4-inch (6 mm) setback where they abut masonry or similar materials that might retain moisture, to prevent wicking.
13. Install boards with setback at floor juncture to permit acoustical sealant application.
14. Allow no joints greater than 1/8 inch (3 mm).
15. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevents exterior moisture from passing through completed exterior wall assembly.

16. Apply fasteners such that screw heads bear tightly against face of sheathing boards but do not cut into facing.
17. Do not bridge building expansion joints with sheathing; cut and space edges to match spacing of structural support elements.
18. Abut ends of boards over centre of studs (stud flanges for metal studs) and stagger end joints of adjacent boards not less than one stud spacing.
19. Screw-fasten board at perimeter and within field of board to each stud.
20. Space fasteners approximately 8 inches (200 mm) on centre (or tighter spacing if recommended by manufacturer for specific application or as required for fire rated assemblies) and set back a minimum of 3/8 inch (10 mm) from edges and ends of boards.
21. Treat board joints, when required by local building code or exterior finish system, per manufacturer's written instructions.
22. Install casing bead and sponge tape where gypsum board abuts materials other than itself and acoustic tile ceilings including at exterior door and window frames, where juncture is not concealed with trim; or elsewhere where indicated on Drawings. Unless indicated otherwise, use tape 3 mm (1/8") narrower than casing bead to provide recess at exposed side. Compress tape by 25%.
23. If gypsum board abuts another gypsum board surface and joint is shown not to be taped and filled or otherwise covered, make juncture same as above.
24. Install sponge tape between gypsum board partition or furring framing, where such framing abuts exterior door or window frame.
25. Install sponge tape between floor and gypsum board partition track. Tape shall be either full width or 1 strip 9.5 mm (3/8") wide on each side of framing member.

3.5 SINGLE LAYER GYPSUM BOARD:

1. Loosely butt gypsum board joints together and neatly fit.
2. Do not place butt ends against tapered edges.
3. Maximum allowable gap at end joints: 1/8 inch.
4. Stagger joints on opposite sides of partitions by at least one stud space.
5. Apply ceiling boards first where gypsum board ceilings and wall occur.
6. Cut openings in gypsum board to fit electrical outlets, plumbing, light fixtures and piping snugly and small enough to be covered by plates and escutcheons. Cut both face and back paper.
7. Screw board in place securely with fasteners spaced according to manufacturer's recommendations, no more than 12" on centre spacing for field of each board and 8" on centre spacing between fasteners for perimeter of each board.
8. Space fasteners near vertical partitions to allow deflection of stud tracks without splitting ceiling and wall juncture.

3.6 GYPSUM BOARD - DOUBLE LAYER

1. Lay out work to minimise end joints on face layer; to offset parallel joints between face and base layers by at least 250 mm (10").
2. Base Layer:
 1. Base layer shall be as indicated and applied at right angles to framing members (long dimension perpendicular to wall studs, for example). Plan base layer installation to permit face layer application with long dimension perpendicular to framing direction and to achieve minimum possible number of joints and to assure specified 10" separation of joints in base from those within face layer.
 2. Secure base layer with screws spaced 300 mm (12") o/c to each member in field and 8" on centre for screws at perimeter of boards.
 3. Perimeter screws shall not be more than 13 mm (1/2") from edges and ends shall be opposite screws on adjacent boards.

4. Surface of erected base layer shall be straight, plumb or level, and without protrusions before face layer is applied.
5. Apply two screws 2" on centre for each fastener location for boards applied to ceiling assembly.
3. Face Layer:
 1. Apply face layer at right angles to base layer (with long edge perpendicular to framing direction) with adhesive.
 2. Apply adhesive with notched spreader to leave 10 mm x 13 mm (3/8" x 1/2") ribbons, 38 mm (1-1/2") apart over entire back side of face layer.
 3. Erect board immediately after spreading adhesive.
 4. Supplement adhesive with screw fasteners installed 12" on centre in board field and 8" on centre at edges of each board.
 5. Provide temporary support for board, as required, until adhesive bond has fully developed.
4. Joints:
 1. Finish joints in face layers only, unless otherwise required to achieve fire resistant ratings indicated, as hereinafter specified.

3.7 TILE BACKER BOARD INSTALLATION:

1. Install as indicated to comply with ANSI A108.11 and in accordance with manufacturer's instructions.
2. Ensure that fire rated assembly is continuous and completed with one layer of tape and finish (Level 2) behind tile backer prior to installation of tile backer.
3. Complete plumbing rough-in before boards are erected.
4. Separate board from rough-in and fixtures and fill space as recommended by manufacturer.
5. Securely fasten boards to substrate as required.
6. Follow manufacturer's instructions for treatment of edge terminations.
7. At joints and corners, embed fiberglass tape in skim coat of mortar.
8. Use alkali resistant mesh tape and latex-fortified joint filler with adhesive as recommended by manufacturer.
9. Apply tile backer board within Washrooms where wall tile is shown on drawings.

3.8 CEILINGS:

1. Install gypsum base sheets with long direction at right angles to furring with end joints occurring over joists or furring.
2. Stagger end joints.
3. Install ceiling boards prior to adjoining partition boards where feasible.
4. Fasten at not less than 12 inches on center.
5. Double layer applications:
 1. Apply base layer prior to base layer application on adjoining partitions; apply face layers in same sequence.
 2. Apply gypsum base layer and face layer with long dimension perpendicular to supports. Offset joints of face layer at least 10 inches from base layer joints.
 3. Fasten both base and face layers separately to supports.
 4. Stagger and space fasteners in accordance with gypsum base manufacturer's instructions.

3.9 FIRE RATED CONSTRUCTION

1. Provide fire rated enclosures, separations, and assemblies as shown conforming to requirements of authorities having jurisdiction.
2. Fit gypsum board tight to service penetrations in all cases including, but not limited to, electrical conductors, electrical device boxes, fire alarm components, security, low voltage devices and conductors, conduits, plumbing, ductwork or penetrations by structural elements.
3. Fit gypsum board tightly to rough openings required for access doors and panels.

4. Apply fire rated sealant (fire caulking) at all penetrations and intersection of gypsum board and underside of structure for rated assemblies unless firestop or fire damper are installed if this section is assigned responsibility for fire rated sealants.

3.10 SOUND ATTENUATION

1. Install partitions with sound attenuation batts in locations indicated on Drawings to meet required minimum STC rating for assembly or installed where noted and no STC rating applies (washrooms in every case).
2. Gypsum board shall be applied on both sides of sound-attenuated partitions. Follow manufacturers' details and recommendations.
3. Apply minimum 10 mm (3/8") diameter bead of acoustic sealant continuously around periphery of each face of partition to seal gypsum board/structure junction where partitions abut fixed building components.
4. Seal full perimeter of cut-outs around electrical boxes, ducts or similar penetration in partitions where perimeter sealed with acoustic sealant.
5. Insulation
 1. Install mineral fibre batts as specified in Section 072116.
 2. Install sound attenuation blankets in sound rated partitions and all floor joist ceilings where indicated.
 3. Completely fill space between studs and framing to full height of partition wall or full area of ceiling.
 4. Fit carefully behind electrical outlets and other Work penetrating sound-rated construction.
6. Gypsum Board:
 1. Install gypsum board same as for non-acoustic interior partitions and ceilings.
 2. Coordinate with installation of perimeter sealants.
7. Acoustical Sealant:
 1. At partition walls, provide continuous beads of acoustic sealant at juncture of both faces of runners with floor and ceiling construction, and wherever gypsum board abuts dissimilar materials, prior to installation of gypsum board.
 2. At ceilings, provide continuous beads of sealant wherever gypsum board abuts dissimilar materials.
 3. Provide continuous bead of sealant behind faces of control joints prior to installation of control joint accessories.
 4. After installation of gypsum board base layers, cut face layer sheets ½ inch less than floor-to-ceiling height and position with 1/4 inch open space between gypsum board and floor, ceiling and dissimilar vertical construction. Fill 1/4 inch open space with continuous sealant beads after installation of face layer.
 5. At openings and cutouts, fill open spaces between gypsum board and fixtures, cabinets, ducts and other flush or penetrating items, with continuous bead of sealant.
 6. Seal sides and backs of electrical boxes to completely close off openings and joints.
8. Sound Flanking Paths:
 1. Where sound-rated partition walls intersect non-rated gypsum board partition walls, extend sound-rated construction to completely close sound flanking paths through non-rated construction.
 2. Seal joints between face layers at vertical interior angles of intersecting partitions.

3.11 ACCESSORY INSTALLATION

1. Trim:
 1. Use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports, unless otherwise recommended by trim manufacturer.
 2. Install metal corner beads at external corners.
 3. Install metal casing bead trim whenever edge of gypsum board would otherwise be exposed or semi-exposed.

4. Use ½ bead details where indicated.
2. Control Joints:
 1. Install control joints at junction of gypsum board partitions with walls or partitions of other finish material.
 2. Install control joints within long runs of partitions, ceilings or soffits at approximately 30'-0" on center or as indicated.
 3. Where gypsum board is vertically continuous, as at stairwells, provide horizontal control joints at each floor level.
3. Special Trim: Install as indicated on Drawings and in accordance with manufacturer's instructions.

3.12 ACCESS DOORS:

1. Build-in access doors required by Mechanical and Electrical Divisions where access is required through any gypsum board installation in accordance with manufacturer's recommendations, to match and blend with surrounding surfaces.

3.13 JOINT TREATMENT AND FINISHING

1. All glass fiber mat gypsum board shall be finished using level 5 full skim coat finish in all cases. This provision applies to all new gypsum board walls and ceilings.
2. Apply level 5 finish over all existing vinyl wall covering which will receive new paint finish. This provision applies for nearly all walls within the Oncology Department.
3. General: Comply with ASTM C 840, GA 214 and GA 216.
4. Do filling either manually, using tools of trade, or by mechanical taping and filling machine of proven efficiency.
5. Apply joint filler, tape and topping cement according to manufacturer's directions.
6. Finished work shall be smooth, seamless, plumb, true and flush, having square, neat corners.
7. Drive home fasteners protruding above panel surface. Fill fastener depressions.
8. Finish level is derived from Gypsum Association Manuals.
9. Finish levels apply as follows:
 1. Level 1:
 1. Plenums, service corridors and work above ceilings and not exposed to view during normal use of the room or space.
 2. Attic fire stops or smoke seals not exposed to view from finished spaces.
 2. Level 2:
 1. Areas of water resistant gypsum backing board under tile.
 2. Remove tool marks and ridges.
 3. Level 3:
 1. Areas to receive heavy or medium textured coatings; heavy-grade wall coverings. Note: Textured coatings are not applied to ceilings in any room or space for this project.
 4. Level 4- modified:
 1. Areas to receive flat sheen paint finish; light textured coatings; lightweight wall coverings.
 2. Applies to all areas intended to be finished with paints having a gloss level of G2 through G7, inclusive as specified under section 09900 (velvet, eggshell, satin, semi-gloss, gloss and high gloss sheen paint) or where critical lighting conditions occur including raking light from all windows.
 3. Apply to all gypsum board surfaces, except where another finish level is indicated or as noted under Level 5 Finish below.
 4. Modification to level 4 standard finish: ensure final coating of compound is extended for a minimum total width of 18" beyond each side of centre of joint in all cases.
 5. Level 5:

- 1. Apply Level 5 finish to all new fiber glass mat gypsum board panels in all areas and all areas patched within existing gypsum board assemblies or patched within new gypsum board assemblies during the course of the work.**
 - 2. Apply level 5 finish over all existing walls from which existing wall covering had been removed.**
10. Joint Pre-fill:
 1. Use setting-type joint compound. Mix joint compound according to manufacturer's directions.
 2. Fill joints between boards flush to top of eased or beveled edge.
 3. Fill joints of gypsum board above suspended ceilings in fire rated partitions.
 4. Wipe off excess compound and allow compound to harden.
11. Level 1 Finish - Taping:
 1. Butter taping compound into inside corners and all joints.
 2. Pre-fill tapered joints.
 3. Center tape over joints and press down into fresh compound.
 4. Remove excess compound.
 5. Tape joints of gypsum board above suspended ceilings and for all fire rated assemblies in accordance with the requirements for the rated assembly.
 6. Apply joint compound over butt joints and embed tape in manner similar to tapered joint. Provide sufficient quantity of compound under the tape to ensure adequate bond.
 7. Apply coat of joint compound to corner and casing beads.
 8. Fold tape to form 90 degree angle for interior corners. Apply joint compound to both sides of corner. Embed in taping compound.
12. Level 2 Finish - First coat:
 1. Use all-purpose drying-type compound, latex fortified for all joints.
 2. Immediately after bedding tape, apply skim coat of compound and allow to dry completely in accordance with manufacturer's instructions.
 3. Apply first coat of compound over flanges of trim and accessories, and over exposed fastener heads and finish level with board surface.
13. Level 3 Finish - Second coat:
 1. After first coat treatment is dried, apply second coat of compound over tape and trim, feathering compound 6 inches beyond edge of first coat.
14. Level 4 Finish - Third coat:
 1. After second coat has dried, sand surface lightly and apply thin finish coat to joints, fasteners and trim, feathering compound at least 8 inches beyond edge of second coat. Total width of compound from each side of centre of joint is 18" accumulated.
 2. Allow third coat to dry. Apply additional compound and touch-up and sand to provide surface free of visual defects, tool marks and ridges, ready for application of finish.
15. Level 5 Finish - Skim coat:
 1. Apply skim coat of topping or all-purpose drying-type compound over exposed surfaces of gypsum board according to manufacturer's directions.
 2. Apply additional skim coating or topping of compound over cured, initial application and apply subsequent applications of compound until walls and ceilings can be made flat and smooth for application of finishes.
 3. After each skim coat has dried, touch-up and sand to provide surface free of visual defects, tool marks, and ridges, and ready for application of finish.
16. For New Fiberglass Mat Faced Gypsum Board: Treat fastener heads and joints with setting-type joint compound.
 1. For joints to be covered with ceramic tile, apply alkali resistant mesh tape and joint compound bedding coat and skim coat only; do not apply finish coats.

2. Do not crown joints or leave excess compound on panels. Remove tool marks and ridges.
3. For fastener heads to be covered with ceramic tile, apply one coat of joint compound.
4. For painted surface, finish all joints to Level 4 Finish.
17. Cementitious Backer Board: Prepare and finish joints in accordance with manufacturer's instructions and finish suitable for ceramic tile installation as described herein.

3.14 JOINT COMPOUND:

1. Fill and sand filled joints, edges, corners and openings to produce surface ready to receive veneer finish.
2. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.
3. Allow joint compound to completely set before applying veneer plaster or level 5 finish.

3.15 TRIM:

1. Use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports, unless otherwise recommended by trim manufacturer.
2. Install metal corner beads at external corners and ½ corner beads for exposed suspended ceiling edges.
3. Install metal casing bead trim whenever edge of gypsum base would otherwise be exposed or semi-exposed, and where gypsum base terminates against dissimilar material.
4. Install J trims where indicated or ½ bead where noted in details or required by 3.16.2 above.

3.16 CONTROL JOINTS:

1. Install where indicated and specified.

3.17 ADJUSTMENT, CUTTING AND PATCHING

1. Do all cutting, patching and making good as required by installation of work of other Sections and co-operate closely with these Sections to assure satisfactory finish.
2. Correct damage and defects which may telegraph through finish Work.
3. Leave Work smooth and uniform.

3.18 FINAL CLEANING:

1. Interim and final cleaning shall be performed in accordance with the provisions of Division One sections.
2. Remove all labels and other marks prior to painting.
3. Remove excess sealant and joint compound from frames, floors, walls, ceiling and all other building components with appropriate cleaning methods recommended by compound or sealant manufacturer as applicable.
4. Vacuum dust resulting from sanding of joint compound.
5. Remove cut debris, fasteners, etc. not used during installation.
6. Ensure that all touch-up patching and sanding are completed all that all adjacent materials affected by the work, whether interior or exterior, are cleaned in a manner satisfactory to the Contractor, Consultant and Owner.
7. Remove all masking and tarps at completion of touch-up patching and sanding.
8. Clean all tracks and grooves associated with windows and doors of debris or dust.
9. Refer to Division 1 for other notes regarding project closeout.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 06 40 00 Millwork, Fine Carpentry, Cabinetry and Plastic Laminate
- .3 Section 07 21 16 Batt Insulation
- .4 Section 07 27 10 Air Barrier and Transition Membrane
- .5 Section 07 84 00 Fire Stopping
- .6 Section 07 92 00 Joint Sealants
- .7 Section 08 11 00 Steel Doors and Frames
- .8 Section 08 11 16 Aluminum Doors and Frames
- .9 Section 08 31 00 Access Doors Mechanical and Electrical
- .10 Section 08 80 00 Glazing
- .11 Section 09 22 17 Metal Framing Ceiling and Bulkhead
- .12 Section 09 21 16 Gypsum Board Assemblies
- .13 Section 10 21 14 Toilet Partitions
- .14 Section 10 28 10 Bathroom Accessories
- .15 Sections of mechanical and electrical work.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM C645-11a, Standard Specification for Non-structural Steel Framing Members.
 - .2 ASTM C754-11, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 - .3 ASTM A924 General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 - .4 ASTM A568 Steel Sheet, Carbon, and High-Strength, Low Alloy, Hot Rolled and Cold Rolled.
 - .5 ASTM A792 Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .2 CAN/CGSB-7.1M Cold Formed Steel Framing Components
- .3 CAN/CGSB-19.21 Sealing and Bedding Compound Acoustical.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.
 - .1 MPI #26, Primer, Galvanized Metal, Cementitious.
- .6 ULC Fire Resistance Directory
- .7 CAN/ULC-S101-M89 Standard Methods of Fire Endurance Tests of Building Construction Materials.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for metal framing and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DESIGN CRITERIA

- .1 Partitions that are designated as Fire Separation with Fire Resistance Ratings shall have assemblies that conform to ULC or OBC SB-3 listed design number exactly as indicated within the specified standard.
- .2 Select interior studs with maximum deflection of L/360 at lateral force of 6.3 psf (300 Pa) for maximum height indicated and provide bracing required to restrict deflections to limit stated.
- .3 Select studs for horizontal spacing of 16" (400 mm) or 24" (600mm) as stipulated on drawings.
- .4 Select studs for application of one layer or two layers gypsum board where indicated.
- .5 Design stud and track connections to accommodate vertical deflection movement of the structure without imposing axial loads onto the framing.

- .6 Provide continuous horizontal bridging channels recommended by stud manufacturer to resist applied loads.
- .7 Provide additional framing members required to reinforce and frame openings in partitions.
- .8 Install acoustical cavity insulation, acoustical gasket, and acoustical sealant when assemblies indicated are required to achieve an STC rating specified. Refer also to section 07 92 00 Joint Sealants.

1.5 SYSTEM DESCRIPTION

- .1 Metal framing components manufactured by Bailey Metal Products Limited, One Caldari Road, Concord Ontario L4K 3Z9 1-800-668-2154 or by Mantane Construction Products Limited 1-800-665-2013. Alternative manufacturers approved by written addenda.

1.6 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations.
 - .2 Store and protect metal framing from exposure to water, snow and distortion through damaging impacts.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return to supplier pallets, crates, padding as specified in Construction Waste Management Plan in accordance with Section 01 74 21 Construction Waste Management and Disposal.
- .6 Segregate for recycling all waste metal and metal packaging material.

Part 2 Products

2.1 MATERIALS

- .1 Non-load bearing channel stud framing: to ASTM C645, stud size shown on drawings; roll formed from hot dipped galvanized steel sheet, for screw attachment of gypsum board. Stud widths shall be selected from 40 mm (1-5/8"), 65mm (2.5"), 92mm (3-5/8") or 152 mm (6").
- .2 Steel framing members shall include factory pre-punched cut outs for services and channel bridging placed at 460 mm on centre. Other incidental dimensions required are shown on drawings.
- .3 Refer to drawings for stud designations and required shapes and sizes. Products specified represent the minimum standard required. This section shall select products with properties that exceed the capacity or properties of products specified if situation warrants this.
- .4 Floor and top tracks: to ASTM C645, in widths to suit stud sizes; flange height varies.
- .5 For partitions extended to underside of structural floor or roof deck: Top track shall be of same material as studs and sized to suit site conditions or as stipulated on drawings. Leg length of top track to be long leg 50 mm (2") type, fixed to permit deflection in structure of 20 mm (0.75") minimum in all cases or as noted on drawings. Nest standard top track within long leg track.
- .6 Bottom track shall be of same material as studs and sized to suit stud. Leg length of bottom track to be as required by partition assembly.
- .7 Metal channel stiffener: 38mm x 13mm x 1.4 mm thick cold rolled steel, coated with rust inhibitive coating. Employ stiffener if partition stud design selected by this section warrants it.

- .8 Acoustical sealant: in accordance with Section 07 92 00 Joint Sealants.
- .9 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self-adhesive on one face, lengths as required.
- .10 Fasteners to secure metal framing together shall be No. 8 x 9/16" Wafer Head Speed Tec Framing Screw or equivalent.
- .11 Drywall Furring Channels, roll formed from 0.035" (0.89mm) thick cold formed galvanized steel with knurled face to accept screw attachment of gypsum board.
- .12 Resilient channel roll formed from 0.018" (0.46mm) thick cold formed galvanized steel or equivalent.

2.2 SPECIAL METAL FRAMING SHAPES

- .1 Hand-bendable, ready to shape, Radius Track products:
 - .1 20-ga. base metal thickness, meet or exceed ASTM A653 and ASTM A653 coating designation.
 - .2 Sections:
 - .1 Ready Track, 25 ga sizes: 2-1/2", 3-1/2", 3-5/8". 20 ga sizes: 4", 5-1/2", 6".
 - .2 Ready Angle.
 - .3 Ready Hat.
- .2 Shaft Wall Studs:
 - .1 CH System is produced under license and control of USG Corporation. Select components and base metal thickness to suit design requirements. Refer to "CGC Shaft Wall Systems SA-926" manual. Product basic metal framing components are as follows:
 - .1 CGC Steel J-runner (JR).
 - .2 CGC Steel C-H Stud (CH).
 - .3 CGC Steel Jamb Strut (JS).
 - .4 CGC Steel E Stud (ES).

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for non-structural metal framing application in accordance with manufacturer's written instructions.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation following rectification of unacceptable conditions and subsequent receipt of Consultant's written notice to proceed.

3.2 ERECTION

- .1 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.
- .2 Install damp proof course under stud shoe tracks of partitions on slabs on grade.
- .3 Place studs vertically at 400 mm on centre and not more than 50 mm from abutting walls, and at each side of openings and corners.
 - .1 Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .4 Erect metal studding to tolerance of 1:1000.
- .5 Attach studs to bottom and top track using screws. Fix top track and studs to permit movement.
- .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 at each side of door and sidelight openings extending from concrete floor to underside of open web steel joist bottom chord and securely fasten to joist.
 - .1 Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.

- .2 Install diagonal brace concealed within ceiling assembly, to provide rigidity to partitions assemblies. Braces shall be installed in two directions bracing full height studs to bottom chords of open-webbed steel joists.
- .3 Where studs are erected to make contact with bottom chords of open-webbed joists and do not align with joist chords, install cross members of steel framing secured to joist chords and providing a fastening point for vertical studs or connection cross braces.
- .9 Erect track at head of door/window openings and sidelight/window openings to accommodate intermediate studs.
 - .1 Secure track to studs at each end, in accordance with manufacturer's instructions.
 - .2 Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .10 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .11 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, fire extinguisher cabinets attached to steel stud partitions.
- .12 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .13 Extend partitions above ceiling height except where noted otherwise on drawings. Some partitions are extended to underside of steel deck.
- .14 Maintain clearance between top tracks under beams and steel joists except as noted, to avoid transmission of structural loads to studs:
 - .1 Use 50 mm leg ceiling tracks and secondary top track with track slip joint.
- .15 Install continuous insulating strips to isolate studs from uninsulated surfaces.
- .16 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions (partitions labeled with STC ratings).
- .17 Construct single-sided chase walls where indicated.
- .18 Install acoustical sealant and/or insulating gasket under tracks around perimeter of partitions that are fire rated or that contain batt insulation.
- .19 Finished work to be rigid, secure, square, level, plumb and erected to maintain dimensions and contours.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .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 11 Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 Construction Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by non-structural metal framing application.

END OF SECTION

PART 1 General

1.1 WORK INCLUDED

- .1 Provide labor, materials, services and equipment to complete installation of the metal framing including:
 - .1 Carrying channel.
 - .2 Furring channel.
 - .3 Resilient furring channel.
 - .4 Ceiling hanger system.
 - .5 Armstrong Metal Suspension System, Drywall.
- .2 This Section permits suspension of gypsum board ceiling and bulkheads using traditional carrying channels and suspension wire with furring channels wired to the carrying channels or purposed-made light-gauge metal framing systems for flat ceiling and bulkhead construction such as Armstrong Canada Drywall Grid System.

1.2 RELATED WORK

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 27 10 Air Barrier, Transition Membrane
- .3 Section 07 92 00 Joint Sealants
- .4 Section 07 84 00 Firestopping and Smoke Seals
- .5 Section 08 31 00 Access Doors
- .6 Section 09 21 16 Gypsum Board Assemblies
- .7 Section 09 22 16 Non-Structural Metal Framing
- .8 Mechanical and Electrical Divisions

1.3 REFERENCES

- .1 ASTM A568 Steel Sheet, Carbon, and High-Strength, Low Alloy, Hot Rolled and Cold Rolled.
- .2 ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- .3 ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- .4 ASTM A792 Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .5 ASTM A924 General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .6 ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability".
- .7 ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
- .8 ASTM C645 Nonstructural Steel Framing Members.
- .9 ASTM C754 Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .10 ASTM C1002 Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases
- .11 ASTM C 1858 Standard Practice for Design, Construction, and Material Requirements for Direct Hung Suspended T-bar Type Ceiling Systems Intended to Receive Gypsum Panel Products in Areas Subject to Earthquake Ground Motions
- .12 ASTM E 119 Standard Test Method for Fire Tests of Building Construction and Material
- .13 ASTM D 610 Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces
- .14 ASTM E 119 Standard Test Method for Fire Tests of Building Construction and Material
- .15 CAN/CGSB-7.1M Cold Formed Steel Framing Components.
- .16 CISCA (Ceilings & Interior Systems Construction Association) – *Ceilings Systems Handbook*
- .17 ESR-1289 ICC-ES Evaluation Report
- .18 ULC Fire Resistance Directory
- .19 CAN/ULC-S101-M89 Standard Methods of Fire Endurance Tests of Building Construction Materials.

1.4 QUALITY ASSURANCE

- .1 Firm performing installation to have minimum three years experience in installation of steel stud framing systems, supported by written certification by Bailey Metal Products Limited prior to award of contract.
- .2 All accessory components from other manufacturers shall conform to ASTM standards.
- .3 Fire Resistance Ratings: As indicated by reference to design designations in UL Fire Resistance Directory, for types of assemblies in which drywall ceilings function as a fire protective membrane and tested per ASTM E 119. Installation in accordance with the UL Design being referenced.
- .4 Coordination of Work:
- .5 Coordinate drywall furring work with installers of related work including, but not limited to acoustical ceilings, building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.
- .6 All work above the ceiling line must be completed and wet piping dry-tested prior to installing the drywall sheet goods. There should be no materials resting against or wrapped around the suspension system, hanger wires or ties.

1.5 DESIGN CRITERIA

- .1 Select Furring Channel and Carrying Channel system and span lengths to support specified loads with maximum deflection of L/360.
- .2 Ceiling hanger system including hangers and connectors to structure to safely support weight of framing system, gypsum panels, lighting, mechanical ductwork and equipment and mineral fiber insulation.
- .3 Secure drywall furring channel system directly to carrying channel framing system.
- .4 Use Resilient furring channels and/or acoustical cavity insulation where indicated to achieve acoustical sound control performance of minimum STC ratings where indicated.

1.6 SUBMITTALS

- .1 Product Data: Submit manufacturer's technical literature.
- .2 Samples: 8-inch long samples of suspension system components, including main runner, cross tees and angle molding.
- .3 Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.

PART 2 Products

2.1 SYSTEM DESCRIPTION

- .1 Interior framing for suspended ceilings, bulkheads, etc. for application of gypsum board as manufactured by Bailey Metal Products Limited, One Caldari Road, Concord Ontario L4K 3Z9 1-800-668-2154 or by Mantane Construction Products Limited 1-800-665-2013.
- .2 Alternative manufacturers may be acceptable provided that the specifications and details are met and approval for use is issued by the architect via addenda.
- .3 Proprietary suspension system for flat gypsum board ceilings and bulkheads using light-gauge metal sections for cross Tee, main Tee, Cross Channels, perimeter mouldings, suspension wire, anchors in underside of floor slab above.
 - .1 Knurled face for ease of screw installation.
 - .2 Heavy-duty materials for maximum rigidity and screw grip.
 - .3 0.020" metal thickness.
 - .4 Cross-tees feature staked-on end tabs to facilitate tightness, ease of installation
 - .5 G40 hot-dipped galvanization as standard galvanization.
 - .6 Acceptable products are equivalent to the following:
 - .1 USG Drywall Suspension System - flat, suspended gypsum board framing system.
 - .2 Armstrong World Industries, Drywall/Stucco/Plaster Flat Ceiling Suspension System.

- .3 Certainteed 1.5" Drywall Suspension System
- .4 Accessories for each proprietary system.
 - .1 Anchors into underside of sheet steel roof deck.
 - .2 Design for system including selection of anchors, tie wire and other features supporting the suspension system.

2.2 MATERIALS

- .1 Materials for fire rated assemblies to conform to the requirements of the specified listing.
- .2 Hanger wire shall be 9ga – 0.144" (3.66mm), 3/16" (4.76mm) or 1/4" (6.35mm) diameter selected by the system installer to meet or exceed the requirements of CAN/CSA S136-M89 for in service loads imposed by the design shown.
- .3 Carrying channels shall be minimum 2.5" (63.5mm) deep with 0.50" (12.7mm) or 0.75" (19.1mm) flanges roll formed from 0.045" (1.14mm) or 0.057" (1.45mm) galvanized steel selected by the system installer to meet or exceed the requirements of CAN/CSA S136-M89 for in service loads imposed by the design shown.
- .4 Drywall Furring Channels for screw attachment of gypsum board shall be roll formed from 0.018" (0.46mm) or 0.035" (0.89mm) thickness cold formed galvanized steel selected by the installer to meet or exceed the requirements of CAN/CSA S136-M89 for in service loads imposed by the design shown
- .5 Resilient channel roll formed from 0.018" (0.46mm) thick cold formed galvanized steel.
- .6 Method used to fasten hangers, rods, framing, to the underside of the existing structure shall be selected by the system installer to support loads imposed by the system and all mechanical and electrical devices or equipment shown.
- .7 Tie wire to be No. 12 IWG 0.065" (1.65mm) zinc coated annealed steel wire or equivalent.
- .8 Fasteners to secure metal framing together to be No. 8 x 9/16" Wafer Head Speed Tec Framing Screw or equivalent.
- .9 Anchors into sheet metal deck (underside of roof suspension):
 - .1 Stainless steel sleeve anchors selected for diameter and embedded depth to support ceiling suspension system according to suspension design selected by this Section;
 - .2 Minimum 9mm anchor diameter (3/8").
 - .3 Embedded minimum 32mm (1.25") or deeper as indicated by design and suspension conditions;
 - .4 Acceptable Materials:
 - .1 Red Head Dynabolt, Type 18-8 stainless steel; head selected according to design of system.
 - .1 Hilti HLC series, Type 18-8 stainless steel; head selected according to design of system.

2.3 PROPRIETARY GYPSUM BOARD SUSPENSION SYSTEMS:

- .1 Armstrong, USG and others:
- .2 Provide product data sheets, design manual and installation instructions with the anchorage pattern, main T and sub-T members, suspension wire specification and accessories. Acceptable product components are as follows; Armstrong System used as basis of design; final product selected by this Section based on site conditions, and loading applied:
 - .1 Structural Classification:
 - .1 Main Beam shall be heavy duty per ASTM C 635.
 - .2 Classification can require wires to be closer together for additional loading when used to support double layer gypsum, verticals, slopes, circles, soffits, canopies, and step conditions which call for loading or unusual designs and shapes in drywall construction.
 - .1 Deflection of fastening suspension system supporting light fixtures, ceiling grilles, access doors, verticals and horizontal loads shall have a maximum deflection of 1/360 of the span.
- .5 Components:

- .1 Main Beam: Shall be double-web construction (minimum 0.0179 inch prior to protective coating, ASTM C645), hot dipped galvanized (per ASTM A653).
 - .1 **HD8906/HD890610**: 1-11/16 inch web height, 1-1/2 inch flange, available with G40 or G90 hot dipped galvanization.
- .2 **HD8906HRC**: 1-11/16 inch web height, 1-1/2 inch flange, available with G40 or hot dipped galvanization. (61% Recycle content, 53% Post Consumer, 8% Pre-Consumer).
- .3 **HD8906IIC**: 1-11/16 inch web height, 1-1/2 inch flange, available with G40 or G90 hot dipped galvanization (to be used with IIC Sound Clip).
- .4 **HD7940**: Metric, 43mm web height, 38mm flange, rout spacing 150mm O.C. available with G40 or G90 hot dipped galvanization.
- .5 **7940**: Metric, 43mm web height, 38mm flange, rout spacing 150mm O.C. available with G40 or G90 hot dipped galvanization.
- .2 Primary Cross Tees: Shall be double-web steel construction (minimum 0.0179 inch prior to protective coating, ASTM C645), hot dipped galvanized (minimum G40 or G90 per ASTM A653)
 - .1 **XL8945P**: 48 inch, web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange
- .6 **XL8945PHRC**: 48 inch, web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange. (61% Recycle content, 53% Post Consumer, 8% Pre-Consumer).
- .7 **XL8965**: 72 inch, web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange.
- .8 **XL8965HRC**: 72 inch, web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange. (61% Recycle content, 53% Post Consumer, 8% Pre-Consumer).
- .9 **XL8947**: 50 inch, web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange. (For Type-F 2'x4' light fixture compatibility)
- .10 **XL7936G90**: 36 inch web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange.
- .11 **XL7930**: Metric 1200mm, web height 38mm with rectangular bulb and pre-finished 38mm knurled flange Routs 450mm, 600mm, 750mm.
- .12 **XL7925**: Metric 900mm, web height 38mm with rectangular bulb and pre-finished 38mm knurled flange
- .13 **XL7920**: Metric 600mm, web height 38mm with rectangular bulb and pre-finished 38mm knurled flange
- .3 Framing Angles:
 - .1 **LAM-12**: 12 foot Locking Angle Molding, 1-1/4 inch x 1-1/4 inch with pre-engineered locking tabs punched 8 inches on center, knurled surface, screw stop hem, pre-punched holes in top flange, 4" O.C., .018 mil. 25g.
- .14 **LAM-12HRC**: 12 foot Locking Angle Molding, 1-1/4 inch x 1-1/4 inch with pre-engineered locking tabs punched 8 inches on center, knurled surface, screw stop hem, pre-punched holes in top flange, 4" O.C., .018 mil. 25g. (61% Recycle content, 53% Post Consumer, 8% Pre-Consumer).
- .15 **KAM -12**: 12 foot Knurled Angle molding, 1-1/4 inch x 1-1/4 inch, knurled surface, screw stop hem, pre-punched holes in top flange, 4" O.C., .018 mil. 25g.
- .16 **KAM -12HRC**: 12 foot Knurled Angle molding, 1-1/4 inch x 1-1/4 inch, knurled surface, screw stop hem, pre-punched holes in top flange, 4" O.C., .018 mil. 25g. (61% Recycle content, 53% Post Consumer, 8% Pre-Consumer).
- .17 **KAM-10**: 10 foot Knurled Angle molding, 1-1/4 inch x 1-1/4 inch, knurled surface, screw stop hem, pre-punched holes in top flange 4" O.C., .018 mil. 25g.
- .18 **KAM1510B**: 10 foot Knurled Angle molding, 1-1/2 inch x 1-1/2 inch, knurled surface, screw stop hem, pre-punched holes in top flange 4" O.C., .018 mil. 25g

- .19 KAM1512B: 12 foot Knurled Angle molding, 1-1/2 inch x 1-1/2 inch, knurled surface, screw stop hem, pre-punched holes in top flange 4" O.C., .018 mil. 25g
- .20 KAM151020: 10 foot Knurled Angle molding, 1-1/2 inch x 1-1/2 inch, knurled surface, screw stop hem, pre-punched holes in top flange 4" O.C., .033 mil. 20g
- .21 KAM151020E: 10 foot Knurled Angle molding, 1-1/2 inch x 1-1/2 inch, knurled surface, screw stop hem, pre-punched holes in top flange 4" O.C., .028 mil. 22g
- .22 KAM151220E: 12 foot Knurled Angle molding, 1-1/2 inch x 1-1/2 inch, knurled surface, screw stop hem, pre-punched holes in top flange 4" O.C., .028 mil. 22g
- .23 KAM21025: 10 foot Knurled Angle molding, 2 inch x 2 inch, knurled surface, pre-punched holes in top flange 4" O.C., .018 mil. 25g.
- .24 KAM21020: 10 foot Knurled Angle molding, 2 inch x 2 inch, knurled surface, pre-punched holes in top flange 4" O.C., .028 mil. 22g.
- .25 KAM21020G90: 10 foot Knurled Angle molding, 2 inch x 2 inch, knurled surface, pre-punched holes in top flange 4" O.C., .028 mil. 22g. G90 hot dipped galvanized.
- .26 KAM20120EQ: 10 foot Knurled Angle molding, 2 inch x 2 inch, knurled surface, pre-punched holes in top flange 4" O.C., .028 mil. 22g.
- .27 SC151220E: 12 foot SimpleCurve Notched Knurled Angle Molding, 1-½ inch x 1-½ inch, screw stop hem, .028 mil. 22g.
- .28 SC1512: 12 foot SimpleCurve Notched Knurled Angle Molding, 1-½ inch x 1-½ inch, screw stop hem – .018 mil. 25g.
- .29 SC21220EQ: 12 foot SimpleCurve Notched Knurled Angle Molding, 2 inch x 2 inch, screw stop hem – .028 mil. 22g.
- .30 SC21225: 12 foot SimpleCurve Notched Knurled Angle Molding, 2 inch x 2 inch, screw stop hem – .018 mil. 25g.
- .31 7838: Hot dipped galvanized (minimum G40), unhemmed channel molding, ¾ inch x 1-9/16 inch x 1-1/4 inch flange.
- .32 7858: Reverse angle molding (minimum G40), unhemmed channel molding, 144 inch x 15/16 inch x 1-9/16 inch.
- .4 Transition Molding: Drywall to Acoustical ceiling. Pre-Painted Armstrong Global White integral acoustical flange and drywall taping flange, hot dipped cold rolled steel.
 - .1 7901: 120 inch with 3/8 inch reveal and 9/16 inch acoustical flange.
- .33 7902: 120 inch with 3/8 inch reveal and 15/16 inch acoustical flange.
- .34 7903: 120 inch with 1 inch acoustical flange.
- .35 7904: 120 inch with 15/16" flush horizontal flange.
- .36 7904PF: 120 inch with 15/16" flush horizontal flange. (With Protective Film)
- .37 7905: 120 inch with 9/16" flush horizontal flange.
- .38 7905PF: 120 inch with 9/16" flush horizontal flange. (With Protective Film)
- .39 7906: 120 inch "F" Flush vertical transition
- .40 7907: 120 inch with 9/16" tegular horizontal flange.
- .41 7908: 120 inch with 9/16" tegular horizontal flange.
- .5 Accessories / Clips:
 - .1 MBAC: Main Beam Adapter Clip
- .42 IIC: Sound Isolation Clip (for use with HD8906IIC Main Runner)
- .43 DWACS, DW50, DW58: Drywall Attachment Clip for transitions to acoustical ceilings
- .44 DW58LT: Transition Clip for 5/8" drywall with Locking Tabs.
- .45 DW50LT: Transition Clip for 5/8" drywall with Locking Tabs.
- .46 MBSC2: Main Beam Spacer Clip.
- .47 GSC9: Adjustable Grid Spacer Clip, 9 inch.
- .48 GSC12: Adjustable Grid Spacer Clip, 12 inch.

- .49 GSC14: Adjustable Grid Spacer Clip, 14 inch.
- .50 DW30C: 30 degree, Drywall Angle Clip
- .51 DW45C: 45 degree, Drywall Angle Clip
- .52 DW60C: 60 degree, Drywall Angle Clip
- .53 DW90C: 90 degree, Drywall Angle Clip
- .54 XTAC: Cross Tee Adapter Clip.
- .55 DDC: Double Drywall Clip.
- .56 DLCC: Direct Load Ceiling Clip.
- .57 DWC: Drywall Clip.
- .58 RC2: Radius Clip required to cover all pre-cut facets, including those not being clipped.
- .59 QSUTC: Uptight Clip.
- .6 Framing screws for mechanical fastening metal components shall be galvanized 7/16" pan head or wafer head Phillips drive with sharp point or self-drilling points depending on the metal to be fastened.

2.4 SPECIAL FRAMING MEMBER SHAPES

- .1 Hand-bendable, ready to shape, Radius Track products:
 - .1 20-ga. base metal thickness, meet or exceed ASTM A653 and ASTM A653 coating designation.
 - .2 Sections:
 - Ready Track, 25 ga sizes: 2-1/2", 3-1/2", 3-5/8". 20 ga sizes: 4", 5-1/2", 6".
 - Ready Angle.
 - Ready Hat.

PART 3 Execution

3.1 GENERAL INSTALLATION

- .1 Fabrication and erection shall conform to the profiles, shapes and assemblies shown on drawings.
- .2 Provide necessary studs, framing and furring systems to provide appropriate support for gypsum board in accordance with good industry practice.
- .3 Provide cooperation to other trades to accommodate mechanical and electrical items and any other work required to be incorporated into or coordinated with the ceiling and bulkhead framing systems.

3.2 INSTALLATION OF FRAMING FOR CEILINGS AND BULKHEADS FOR APPLICATION OF GYPSUM BOARD.

- .1 Erect framing for fire rated assemblies in accordance with requirements of listing.
- .2 Install suspension system and panels in accordance with the manufacturer's instructions, in compliance with ASTM installation standard, and with applicable codes as required by the authorities having jurisdiction.
- .3 Arrange hangers for suspended ceilings to provide support independent of walls, columns, pipes, ducts and install plumb.
- .4 Securely attach hangers to existing structure using means that ensure the suspension system will effectively use hanger strength.
- .5 Space hangers 24" (600mm), 36" (900mm), or 48" (1200mm) maintaining 48" the maximum, spacing measured in any direction, such that hangers are not more than 6" (150mm) distant from boundary walls, interruptions of continuity and changes in plane or direction.
- .6 Run Carrying Channels in opposite direction to structural framing members.
- .7 Space Carrying Channels at 48" (1200mm) centres maximum.
- .8 When staggered splices are necessary, lap members at least 8" (200 mm) and wire each end with minimum of two (2) loops of tie wire.
- .9 Install Furring Channels perpendicular to carrying channels at 12" (300mm), 16" (400mm), or 24" (600mm) on centre with 24" as the maximum distance between furring channels measured in any direction to the nearest adjacent channel, while also maintaining no greater than 6" (150mm) distance

from perimeter, interruptions in continuity and changes in plane or direction. Secure Furring Channels to carrying channel with two strands of tie wire.

- .10 Install Resilient Furring Channels perpendicular to carrying channels maximum 24" (600mm) on centre or as indicated and not more than 6" (150mm) from perimeter. Secure to framing with sheet metal framing screws. End joints to be staggered and aligned over framing and each end fastened to framing.
- .11 Finished work to be rigid, secure, square, level, plumb and erected to maintain dimensions and contours shown on drawings.

3.3 PROPRIETARY GYPSUM BOARD SUSPENSION SYSTEM

- .1 To secure to metal clips, concrete inserts, steel bar joist or steel deck, use power actuated fastener, or insert. Coordinate placement for hanger wire spaced as required for expected ceiling loads and layout.
- .2 Install hanger wire as required with necessary on center spacing to support expected ceiling load requirements, following local practices, codes and regulations. Provide additional wires at light fixtures, grilles, and access doors where necessary. A pigtail knot shall be used with three tight wraps at top and bottom fastening locations.
- .3 Add additional wire as needed when using compatible clips and accessories.
- .4 Control Joints: Roll formed zinc alloy, aluminum, or plastic as required for expansion and contraction as shown on drawings.
- .5 Expansion Joints: Roll formed zinc alloy, aluminum, or plastic as required for expansion and contraction as shown on drawings.
- .6 Main beams shall be suspended from the overhead construction with hanger wire, spaced as required for expected ceiling loads, along the length of the main beams.
- .7 Install cross tees at on center spacing as specified by the drywall manufacturer. Typical drywall cross tee spacing:
 - .1 16 inches on center with 5/8 or 1/2 inch gypsum board
 - .2 24 inches on center with 5/8 inch gypsum board.
- .8 Use channel molding or angle molding to interface with Drywall Grid System to provide perimeter attachment or to obtain drop soffits, verticals, slopes, etc.
- .9 To suspend a second ceiling beneath a drywall ceiling, without breaching the integrity of the upper ceiling, use the Drywall Clip. To form a transition from a drywall ceiling to an acoustical ceiling, use the Drywall Transition Clips spaced as required for expected loads.
- .10 For light fixtures (Type G, Type F) use secondary framing cross tees as required to frame opening.
- .11 Single cross tees in a route hole to be secured by 7/16 inch framing screw or alternative methods.
- .12 Install main beams and cross tees at the on center spacing required for ceiling loading, and location of in-ceiling services.
- .13 Install additional bracing required by design of the system.

END OF SECTION

Part 1 General:

1.1 GENERAL REQUIREMENTS

- .1 Conform to Sections of Division 1 as applicable.

1.2 RELATED WORK

- .1 Section 03 00 00 Cast-in-Place Concrete
- .2 Section 06 10 00 Rough Carpentry
- .3 Section 06 40 00 Millwork, Fine Carpentry, Cabinetry and Plastic Laminate
- .4 Section 07 92 00 Joint Sealants
- .5 Section 09 21 16 Gypsum Board Assemblies
- .6 Section 09 22 16 Non-Structural Metal Framing
- .7 Section 09 65 19 Vinyl Tile and Plank and Millwork Wall Base

1.3 SECTION INCLUDES

- .1 Porcelain tile flooring with coloured grout.
- .2 Porcelain and mosaic tile with coloured grout for application to walls.

1.4 REFERENCE STANDARDS

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C50 - Standard Specification for Portland Cement.
 - .2 ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
 - .3 ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
 - .4 ASTM C241 - Test Method For Abrasion Resistance of Stone Subjected to Foot Traffic.
 - .5 ASTM C503 - Specification for Marble Building Stone (Exterior).
 - .6 ASTM C615 - Specification for Granite Dimension Stone.
 - .7 ASTM C629 - Specification for Slate Dimension Stone.
 - .8 ASTM C847 - Standard Specification for Metal Lath.
 - .9 ASTM C1028 - Test method for Determining the Static Coefficient of Friction or Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull meter Method.
 - .10 ASTM D4397 - Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
- .2 American National Standards Institute (ANSI)
 - .1 ANSI A108.1A, 1999 - Specifications for Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar.
 - .2 ANSI A108.1B, 1999 - Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
 - .3 ANSI A108.1C, 1999 - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar -or- Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
 - .4 ANSI A108.4, 1999 - Specifications for Ceramic Tile Installed with Organic Adhesives or Water-Cleanable Tile Setting Epoxy Adhesive.
 - .5 ANSI A108.5, 1999 - Specifications for Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
 - .6 ANSI A108.6, 1999 - Specifications for Ceramic Tile Installed with Chemical-Resistant, Water-Cleanable Tile-Setting and -Grouting Epoxy.
 - .7 ANSI A108.8, 1999 - Specifications for Ceramic Tile Installed with Chemical-Resistant Furan Mortar and Grout.

- .8 ANSI A108.9, 1999 - Specifications for Ceramic Tile Installed with Modified Epoxy Emulsion Mortar/Grout.
- .9 ANSI A108.10, 1999 - Specifications for Installation of Grout in Tilework.
- .10 ANSI A118.1, 1999 - Standard Specification for Dry-Set Portland Cement Mortar.
- .11 ANSI A118.3, 1999 - Chemical-Resistant, Water-Cleanable, Tile-Setting and -Grouting Epoxy and Water-Cleanable Tile-Setting Epoxy Adhesive.
- .12 ANSI A118.4, 1999 - Latex-Portland Cement Mortar.
- .13 ANSI A118.5, 1999 - Chemical-Resistant Furan Mortar and Grout.
- .14 ANSI A118.6, 1999 - Standard Ceramic Tile Grouts.
- .15 ANSI A118.7, 1999 - Polymer Modified Cement Grouts
- .16 ANSI A118.8, 1999 - Modified Epoxy Emulsion Mortar/Grout.
- .17 ANSI A118.9, 1999 - Test Methods and Specifications for Cementitious Backer Units
- .18 ANSI A118.10, 1999 - Load bearing, Bonded, Waterproof Membranes for Thinset Ceramic Tile and Dimensional Stone.
- .19 ANSI A118.11, 1999 - Exterior Grade Plywood (EGP) Latex-Portland Cement Mortar.
- .20 ANSI A136.1, 1999 - Organic Adhesives for Installation of Ceramic Tile.
- .21 ANSI A137.1, 1988 - Specifications for Ceramic Tile.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CGSB 71-GP-22M-86, Adhesive, Organic, for Installation of Ceramic Wall Tile.
 - .3 CAN/CGSB-75.1-M88, Tile, Ceramic.
- .4 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A5/A8/A362-93, Portland Cement/Masonry Cement/Blended Hydraulic Cement.
 - .2 CAN/CSA ISO 14040-97, Environmental Management - Life Cycle Assessment Principles and Framework.
- .5 Terrazzo Tile and Marble Association of Canada Standards.

1.5 PERFORMANCE REQUIREMENTS - FLOOR TILE

- .1 Static Coefficient of Friction: Tile on walkway surfaces shall be provided with the following values as determined by testing in conformance with ASTM C 1028.
 - .1 Level Surfaces: Minimum of 0.77 (Wet) and 0.62 (dry).

1.6 QUALITY ASSURANCE

- .1 Maintain one copy each of all Referenced standards and specifications on site. Include the TTAM Handbook, ANSI A108 Series, ANSI A118 Series ANSI A136.1 and ANSI A137.1 and others as specified under paragraph References.
- .2 Installer Qualifications: Company specializing in performing the work of this section with minimum 5-years' experience.
- .3 Single Source Responsibility:
 - .1 Obtain each type and color of tile from a single source.
 - .2 Obtain each type and color of mortar, adhesive and grout from the same source.

1.7 SUBMITTALS

- .1 Submit colour charts illustrating full range of available colours for preliminary selection prior to submission of samples.
- .2 Submit duplicate full-size tiles or 100 x 100 mm samples for tiles smaller than 100mmx100mm, for each colour, texture, size, and pattern of tile in accordance with Section 01330 – Submittals.
- .3 Submit product data and MDS Sheets for all adhesives and grout.

- .4 Submit colour samples of grout together with tile samples.
- .5 Provide maintenance materials in accordance with Section 01 33 00 Submittals and 01 00 00 – General Requirements.
- .6 Submit closeout materials in accordance with sections of division one including floor maintenance data.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to Site with manufacturer's original labels intact. Do not remove wrappings until ready for use.
- .2 Protect adhesives and liquid additives from freezing or overheating in accordance with manufacturer's instructions.
- .3 No outside storage permitted.
- .4 Store in clean, dry area and elevated off ground and in an area free of other construction activity.
- .5 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 degrees C. for 48 hours before, during installation. Maintain same temperature after installation.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install adhesives in an unventilated environment.
- .2 Maintain ambient and substrate temperature of 50 degrees F (10 degrees C) during installation of mortar materials.

1.10 MAINTENANCE MATERIALS

- .1 Provide minimum 16 spare 12"x24" tiles and retain 1/2 tile cut-offs for maintenance use. Store where directed. Maintenance material to be of same production run as installed material.

Part 2 Products

2.1 TILE

- .1 General: Provide tile that complies with ANSI A137.1 for types, compositions and other characteristics indicated. Provide tile in the locations and of the types colours and pattern indicated on the Drawings and identified in the Schedule and the end of this Section. Tile shall also be provided in accordance with the following:
- .2 Factory Blending: For tile exhibiting colour variations within the ranges selected under Submittal of samples, blend tile in the factory and package so tile taken from one package shows the same range of colours as those taken from other packages.
- .3 Mounting: For factory mounted tile, provide back or edge mounted tile assemblies as standard with the manufacturer, unless otherwise specified.
- .4 Factory Applied Temporary Protective Coatings: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by pre-coating with a continuous film of petroleum paraffin wax applied hot. Do not coat unexposed tile surfaces.

2.2 VESTIBULE PORCELAIN FLOOR TILE:

- .1 Ceramic Tile Legend on drawings:
 - .1 Floor Tile Types with drawing legend "FTL-01".
- .2 Locations: Entry Vestibules, as marked on drawings.
- .3 Comply with ANSI A137.1, and as follows:
 - .1 Moisture absorption to ENISO 10545-3 less than 0.5 percent.
 - .2 Frost Resistance to ISO 10545-12 1995, no damage after 100 cycles.
 - .3 Thickness: 1/2 inch (13 mm).
 - .4 Edges: Square.

- .5 Coefficient of Friction Conforming with ASTM C1028-7:2006 - Equal to or exceeding ASTM >0.50 and ADA >0.60.
- .6 Co-efficient of friction: Conforming to ASTM C1028-7:2006
- .7 Breaking Strength: EN ISO 10545-4 Minimum 1300N or 355N/mm²
- .8 Surface Finish: Smooth/Abrasive
- .9 Chemical and stain resistance conforming to EN ISO 10545-14/13, minimum class 3, UB Min.
- .10 Surface Type: Matte.
- .4 Acceptable Materials Ceramic Floor tile:
 - .1 Ceramic Tile - (FTL-01)
 - .1 Olympia Tile, Regal Series, Flamed Texture, 30 cm x 60 cm; colour – selected by architect from standard range.
 - .2 Acceptable Grout Colour: Matching Mapei grout colour from standard range.

2.3 ADHESIVE:

- .1 Floor Tile Adhesive to conform to ANSI A136.1, thinset bond type; use Type I in all washrooms.
 - .1 Ardex X77 Microtec Fiber Reinforced Tile and Stone Mortar.
 - .2 Flextile 5400 Maxiflex Superior Grade, Polymer-Modified, Thin Set Mortar.
 - .3 Mapei Large Tile and Stone Mortar, Premium, Polymer-Enriched, Thin Set Mortar.

2.4 GROUT:

- .1 Thin set system grout, 100% solids, two-component, epoxy grout for all tile applications.
 - .1 Flextile 1600 RSG Premium Rapid Set Polymer Modified Sanded Grout manufactured by Flextile. Grout preparation to manufacturer's instructions.
 - .2 Colour from standard range tinted to match tile.
 - .3 Submit grout colour samples to architect for review prior to installation.

2.5 DIVIDER STRIPS:

- .1 Colour plastic with depth to suit tile thickness.

2.6 TILE AND GROUT SEALER:

- .1 Apply to all ceramic tile installed after grout installation has cured; apply in accordance with manufacturer's instructions.
- .2 Aqua Mix Seal and Finish Low Sheen.

2.7 WALL-MOUNTED CERAMIC TILE

- .1 The following wall mounted ceramic tiles are designated as "Wall Tiles" with the abbreviation "WTL-XX" where "XX" refers to the particular make and colour of tile. The Owner may elect to select any of the wall tiles specified and therefore, the Contract Price will include all listed tiles.
 - .1 WTL-01 – Glass Mosaic Wall tile types with drawing legend "WTL-01":
 - .1 Olympia Tile, Mythos Series Glass Mosaic, 25 mm x 25 mm nominal dimensions. Matching Mapei white grout.
 - .2 Olympia Tile, Niebla Series Glass Mosaic, 25 mm x 25 mm nominal dimensions. Matching Mapei white grout.
 - .3 Olympia Tile, Linen Series Glass Mosaic, 50 mm x 150 mm nominal dimension. Matching Mapei white grout.
 - .2 WTL-02 - Wall tile types with drawing legend "WTL-02":
 - .1 Stone Tile, Switch Mosaic, Switch Blue, Switch Dark Blue and Switch Grey, blend; matte, 10 cm x 11 cm x 0.8 cm. Matching Mapei grout from standard range.

Part 3 Execution

3.1 EXAMINATION

- .1 Provide adequate ventilation to eliminate excessive moisture before commencing and during work to ensure proper drying of adhesive and grout. Do not force dry adhesive and grout.
- .2 Examine substrate for compliance with applicable requirements, installation tolerances and other conditions affecting installation of tile. Do not proceed until unsatisfactory conditions have been corrected. Beginning of installation shall indicate acceptance of substrate conditions. Verify that wall surfaces are free of substances which would impair bonding of setting materials, smooth and flat within tolerances specified in ANSI A137.1, and are ready to receive tile.
- .3 Verify that required floor-mounted services, devices and utilities are in correct location.

3.2 PREPARATION

- .1 Ensure site and substrates that will receive tile finish are in compliance with environmental conditions required by tile manufacturer.
- .2 Layout work to minimize waste materials and cutting.
- .3 Plan installation of control and movement joints.
- .4 Confirm that layout adjustments are satisfactory to contractor and consultant prior to applying tile.

3.3 INSTALLATION - GENERAL

- .1 Do tile work in accordance with Installation Manual 200, "Ceramic Tile" and Stone Tile, produced by Terrazzo Tile and Marble Association of Canada (TTMAC), except where specified otherwise.
- .2 Install base tiles first to establish level top line for wall tile.
- .3 Apply tile to clean and sound surfaces.
- .4 Fit tile around corners, fitments, fixtures and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even.
- .5 Maximum surface tolerance 1:800.
- .6 Make joints between tile uniform and approximately 10mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
- .7 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .8 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .9 Make internal angles square, external angles rounded.
- .10 Allow minimum 24 hours after installation of tiles, before grouting.
- .11 Clean installed tile surfaces after installation and grouting cured.
- .12 Apply 3 coats of tile and grout sealer recommended by manufacturer after final cleaning.
- .13 Install tile and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCA Handbook recommendations.
- .14 Lay tile to pattern stipulated herein. Arrange pattern so that a full tile or joint is centered on each wall and that no tile less than 1/2 width is used. Do not interrupt tile pattern through openings.
- .15 Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- .16 Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
- .17 Form internal angles square and external angles bull-nosed.
- .18 Install waterproofing and uncoupling mat where indicated.
- .19 Install control and movement joints where indicated.
- .20 Sound tile after setting. Replace hollow sounding units.
- .21 Keep expansion joints free of adhesive or grout. Apply sealant to joints.
- .22 Allow tile to set for a minimum of 48 hours prior to grouting.
- .23 Grout tile joints.

.24 Apply sealant to junction of tile and dissimilar materials including tub and shower lip junction and around service penetrations.

.25 Apply continuous trims to exposed edges of tile, brushed chrome or satin aluminum or satin stainless steel.

3.4 INSTALLATION - FLOORS - THIN-SET METHODS

.1 Apply tile using specified adhesives.

.2 Where waterproofing membrane is indicated, install in accordance with manufacturer's instructions.

.3 Where epoxy bond coat and grout are indicated, install in accordance with manufacturer's instructions.

3.5 CLEANING

.1 Clean tile and grout surfaces and apply sealer.

3.6 PROTECTION OF FINISHED WORK

.1 Do not permit traffic over finished floor surface for 72 hours after installation.

.2 Cover floors with kraft paper and protect from dirt and residue from other trades.

.3 Where floor will be exposed for prolonged periods cover with plywood or other similar type walkways

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 09 21 23 Gypsum Board Assemblies
- .3 Section 09 22 16 Non-Structural Metal Framing and Furring
- .4 Section 09 22 17 Metal Framing Ceiling and Bulkhead
- .5 Electrical and Mechanical Systems Sections

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM C423-02a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - .2 ASTM E1264-98, Standard Classification for Acoustical Ceiling Products.
 - .3 ASTM E1477-98a(2003), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
 - .4 ASTM C635/C635M-07, Standard Specifications for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
 - .5 ASTM C636/C636M-08, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.
- .3 CSA International
 - .1 CSA C22.2 No.9.0-96(R2011), General Requirements for Luminaires.
 - .2 CAN/CSA-C22.2 No.74-96(R2010), Equipment for Use with Electric Discharge Lamps.
 - .3 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
- .4 Ceiling Systems Installation Handbook (CISCA)
- .5 American National Standard Institute (ANSI)/Illuminating Engineering Society of North America (IESNA)
 - .1 ANSI/IESNA RP-1-[04], American National Standard Practice for Office Lighting.
- .6 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-2003, Surface Burning Characteristics of Building Materials and Assemblies.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for ceiling assemblies and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit samples of integrated ceiling components as follows:
 - .1 Duplicate full size samples of acoustical panel.
 - .2 One representative model of each different trim component of ceiling suspension system.
- .4 Warranty:
 - .1 Submit manufacturer's warranty for suspension system and panels for inclusion within project manual as part of closeout submissions.

1.4 WARRANTY

- .1 Provide 15-year warranty for manufacturer's defects, including, but not limited to, warp, sag, chalking, peeling, and fading for suspension system and ceiling panels.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- .1 Extra Stock Materials:
 - .1 Submit maintenance materials in accordance with Section 01 78 00 Closeout Submittals.

- .2 Supply and deliver 1 carton of at least 6 m of metal suspension main "T's" and 6 cross "T's".
- .3 Deliver two unopened packages of ceiling tiles.
- .4 Retain on site any partially used packages of tile and unused cut tiles of ½ full tile size or larger.
- .5 Supply maintenance materials of same production run as installed materials.
- .6 Store maintenance materials where directed by Departmental Representative. Identify contents of cartons.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Store extra materials required for maintenance, where directed by Departmental Representative.
- .4 Storage and Handling Requirements:
 - .1 Store materials indoors within clean, dry, well-ventilated area.
 - .2 Store and protect ceiling assembly materials using means that will prevent damage or blemishing of any kind.
 - .3 Replace defective or damaged materials with new.
 - .4 Do not use ceiling panels or suspension system components that differ in colour from the balance of materials received. Reject materials so identified and replace with materials from same dye lot as balance of materials.
- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction /Demolition Waste Management and Disposal.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal paper, rigid plastic, corrugated cardboard and boxboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).
 - .4 Separate for recycling and place in designated containers steel waste in accordance with Waste Management Plan.
 - .5 Handle and dispose of hazardous materials in accordance with CEPA regulations.
 - .6 Ensure emptied containers are sealed and stored safely.
 - .7 Fold metal banding, flatten and place in designated area for recycling.

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Permit wet work to dry before beginning to install.
- .2 Ensure that painting work and gypsum board finishing work is completed.
- .3 Ensure that services above suspended ceilings are completed and piping and ductwork are insulated as specified.
- .4 Maintain uniform minimum temperature of 15 degrees C and minimum humidity of 20% before and during installation.
- .5 Store materials in work area 48 hours prior to installation.
- .6 Store materials within building, in dry, well-ventilated area.
- .7 Reject damaged material regardless of cause of damage and replace with new.
- .8 Report conditions unsuitable for installation and do not commence work until unsuitable conditions are rectified. Commencement of installation indicates acceptance of site conditions.

Part 2 Products

2.1 DESCRIPTION

- .1 Suspended ceiling system incorporating acoustical, lighting, air distribution, as integral part of system.

- .2 Suspended, pre-finished steel grid system and acoustic panels for standard installations in corridors, dining rooms, lounges and other spaces.

2.2 DESIGN AND PERFORMANCE REQUIREMENTS

- .1 Design integrated ceiling system to provide:
 - .1 Noise reduction coefficient (NRC) 0.95.
 - .2 Maximum deflection: 1/360th of span to ASTM C635/ASTM C635M deflection test.
 - .3 Exposed tee bar grid components:
 - .1 Shop painted satin sheen, white.
 - .2 Components die cut.
 - .3 Main tee with double web, rectangular bulb and 25 mm rolled cap on exposed face.
 - .4 Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.
 - .5 Designed to support 610 mm x 610 mm x 15.8mm (24" x 24") and 610mm x 1220mm (24"x48") lay-in panels.
 - .6 24mm (15/16") width, exposed "T" system.
- .2 Design suspension system to accommodate movement caused by thermal expansion or contraction.
- .3 Design and space hangers and carrying members to support entire ceiling system, including lighting fixtures, diffusers and equipment openings in locations indicated on Drawings.
 - .1 Provide written confirmations to Divisions 15, Mechanical and 16, Electrical, when requested by Consultant, that suspended ceiling is capable of supporting additional weight of mechanical and electrical fixtures specified in Division 15, Mechanical and Division 16, Electrical.
 - .2 Hanger wire:
 - .1 Galvanized soft annealed steel wire:
 - .2 3.6 mm diameter for access tile ceilings.
 - .3 Hanger inserts: purpose made.
 - .4 Accessories: splices, clips, wire ties, retainers and wall moulding set flush to underside of grid components. Provide other components recommended by system manufacturer for installation illustrated on drawings.

2.3 MATERIALS - SUSPENSION SYSTEM:

- .1 **Basic Steel Material and Finish:**
 - .1 Commercial quality cold rolled steel 0.179" (26 ga) thick,
 - .2 Galvanized to zinc coating designation Z275.
 - .3 Exposed surfaces of metal products shall be factory finished with satin white enamel.
- .2 **Hangers:** Min 0.1084" (12 gsg) overall thickness galvanized steel wire to zinc coating designation Z275.
- .3 **Main Tee Splices:** Designed to lock lengths of main tees together so that joined lengths of tee function structurally as single unit with tee faces at joint perfectly aligned and presenting tight seam.
- .4 **Edge Moulding:** Materials and finish to match tees.
- .5 **Fasteners:** Galvanised and selected to suit loading conditions.
- .6 Labelling by Underwriters' Laboratories of Canada.
- .7 Acceptable Materials:
 - .1 Armstrong Prelude XL 15/16" exposed face width.

2.4 MATERIALS - ACOUSTIC PANEL UNITS:

- .1 Acoustic units for suspended ceiling system:
 - .1 To CAN/CGSB-92.1, Type iii.
 - .2 Texture: Fine texture/smooth.
- .2 Fire Performance: Class A.
- .3 Warranty: 30-year.
- .4 Articulation Class: 190.

- .5 Flame spread rating of 25 or less in accordance with CAN/ULC-S102.
- .6 Smoke developed 50 or less in accordance with CAN/ULC-S102.
- .7 Noise Reduction Coefficient (NRC) designation of 0.95.
- .8 Light Reflectance: 88%.
- .9 Edge type: 15/16" square.
- .10 Colour white.
- .11 Shape: flat.
- .12 Acceptable Standard Acoustic Panel Materials - for all areas are equal to:
 - .1 Armstrong Optima square edge lay-in, product number 3114PB - Size 610 mm x 610 mm x 25mm thick, and
 - .2 Armstrong Optima Square lay-in, product number 3115PB - 610 mm x 1220 mm x 25mm thick.
 - .3 Optima tiles shall be used for all suspended acoustic tile applications.

Part 3 Execution

3.1 EXAMINATION

- .1 Establish through consultation with Contractor that suspended grid system may be installed and that other trades are at an appropriate stage of the work for this to occur.
- .2 Do not erect ceiling suspension system until anchors, blocking, sound or fire barriers, electrical and mechanical work above ceiling are completed.
- .3 Verify that gypsum board, painting and other finishing work had advanced to a stage appropriate for the work of this Section.
- .4 Verify that flooring, if installed, is appropriately protected with due consideration for access aids, lifts, ladders and other means employed to install the work of this section.
- .5 Notify Consultant and Contractor of all conditions found inappropriate for installation work conducted by this Section.
- .6 Do not proceed with installation prior to completion of any remedial work and following subsequent receipt of Consultant's written consent to proceed.
- .7 Commencement of installation indicates acceptance of conditions found on site.
- .8 Do not install panels within the suspended grid system unless Contractor had verified in writing, that all persons who must review services, fire rated assemblies and work occurring above T-bar system had been reviewed.
- .9 Do not install acoustic panels within the suspension grid system until Contractor has verified that all work above suspended ceiling is completed.

3.2 INSTALLATION

- .1 Install integrated ceiling suspension system to ASTM C636 with hangers supported from building structural members at indicated heights.
- .2 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees. Install supporting inserts for hangers of suspended ceiling system into structure above.
- .3 Install acoustic ceilings using tradesmen skilled in this class of work, in strict accordance with manufacturer's instructions and as specified herein.
- .4 Neatly and symmetrically install suspended ceiling to true lines, evenly balanced to pattern indicated on Drawings or as directed.
- .5 Layout centre line of ceiling on centre of corridor to permit light fixture and solar tubes to align with centre of corridor.
- .6 Recessed items shall replace or be centred on acoustical panels, except where shown otherwise. Consult with Mechanical and Electrical Divisions to co-ordinate work. Provide additional supports where required.
- .7 Ensure suspended system is co-ordinated with location of related components.
- .8 Establish ceiling elevation using laser. Install wall mould to provide correct ceiling height.

- .9 Use longest practical lengths of tees, furring and running channels to minimize joints. Make joints square, tight, flush and reinforced with concealed splines. Assemble framework to form a rigid and interlocking system.
- .10 Interlock cross member to main runner to provide rigid assembly.
- .11 Use corner moulding along external edges at ceiling steps.
- .12 Finished ceiling system to be square with adjoining walls and level within 1:1000.
- .13 Frame at openings for light fixtures, solar tubes, air diffusers, fire detectors and at changes in ceiling heights.
- .14 Install electrical light fixtures and air diffusers to manufacturer's instructions. Provide stabilizing reinforcement in accordance with manufacturer's instructions.
- .15 Install acoustic units, fire detectors, light fixtures and HVAC diffusers within suspension system.
- .16 Ensure ceiling is free of finger marks. Apply paint to surfaces exhibiting minor damage using paint, supplied by manufacturer, mixed to match tile supplied job site.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .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 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 – Construction Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by ceiling assemblies installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 06 41 00 Cabinetry and Millwork
- .3 Section 09 21 16 Gypsum Board Assemblies

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM F710, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - .2 ASTM F1869, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - .3 ASTM F2170, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - .4 ASTM F1700 – Class III, Type B embossed.
 - .5 ASTM 2055 Size and Tolerance (0.016 in/lin. Ft)
 - .6 ASTM 386 Thickness (3.0mm)
 - .7 ASTM F 1914 Residual Indentation average 8%
 - .8 ASTM F 137 Flexibility 25mm mandrel, no crack or break.
 - .9 ASTM F 2199 Dimensional Stability no change greater than 0.020 in/lin. Ft.
 - .10 ASTM 925 Resistance to Chemicals no change.
 - .11 ASTM F 1515 Resistance to Light less than 8 average maximum.
 - .12 ASTM F 1514 Resistance to Heat less than 8 average maximum.
 - .13 ASTM E662 Smoke Density less than 450.
 - .14 ASTM E648 Critical Radiant Flux Class 1 CRF greater than 0.45.
 - .15 ASTM 1028 Slip Resistance ADA Compliant.
 - .16 ASTM F 970 Static Density 2000 psi – 0.005in.
 - .17 ASTM F-2169 - Standard Specification for Resilient Stair Treads, Type 4 Class 2, Group 1 and 2.
- .2 Canadian Standards Association (CSA):
 - .1 CSA A126.1-M84 Vinyl Composition Floor Tile
- .3 Resilient Floor Covering Institute (RFCI)
 - .1 RFCI Standard Slab Moisture Test Method (Calcium Chloride Method).
- .4 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102.2, Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.

1.3 SYSTEM DESCRIPTION

1.4 PERFORMANCE REQUIREMENTS

- .1 Provide vinyl flooring materials and adhesives which have been manufactured and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.
- .2 Apply finished flooring below all millwork prior to installation of millwork.
- .3 Apply specified vinyl base along all millwork surfaces and toe-kick panels in contact with flooring.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for luxury resilient vinyl plank flooring and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Provide colour charts with full manufacturer's range of options

- .3 Provide maintenance materials and warranty.
- .4 Provide product literature for proposed adhesive.
- .5 Provide product literature for flooring base shown on schedules and specified herein.
- .6 This specification governs over drawings.

.3 Samples:

- .1 Submit duplicate full tile samples 300mm long x width of product for specified floor tiles, edge strips, feature strips for each product and application.

1.6 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials:

- .1 Provide maintenance materials for luxury resilient plank flooring, base and adhesive in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide 2m² of each colour, pattern and type flooring material required for this project for maintenance use.
- .3 Extra materials from same production run as installed materials.
- .4 Identify each container of floor tile and each container of adhesive.
- .5 Deliver to Departmental Representative, upon completion of the work of this section.
- .6 Store where directed by Departmental Representative.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in clean, dry, well-ventilated area indoors and permit acclimatisation all in accordance with manufacturer's recommendations.
 - .2 Store and protect specified materials from deleterious effects of weather, construction and temperature. Protect against damage of any kind.
 - .3 Replace defective or damaged materials with new.
 - .4 Review representative sample of each container of material and reject materials with evident flaws or differences in dye lot or finish.
 - .5 Review all material to ascertain that sufficient quantity is delivered to complete the work. Do not proceed with work if insufficient quantity is delivered to site. Rather, stop work and notify contractor, consultant, and departmental representative. Do not proceed with installation without written verification to do so.
- .4 Develop Waste Reduction Work plan related to Work of this Section.
- .5 Packaging Waste Management: remove for recycling as specified in Waste Reduction Work plan and Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.8 WARRANTY

- .1 Warrant work of this Section against defects and deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become evident during warranty period including, but not be limited to, buckling, opening of seams, bond failure and extensive colour fading, to satisfaction of Owner's Designee and at no expense to Owner.

1.9 SITE CONDITIONS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees C for 48 hours before, during and for 48 hours after installation.

- .2 Ensure humidity levels of spaces to receive tile are maintained at design levels for minimum 24 hours before installation.
- .3 Avoid high humidity, cold drafts and abrupt temperature change.

Part 2 Products

2.1 HOMOGENEOUS VINYL FLOOR TILES – LUXURY VINYL TILE 01 (LVT-01):

- .1 Acceptable Manufacturers and Products - full range of colours for each manufactured by Tarket/Johnsonite:
- .2 Size: 300mm x 610mm (12"x24") and 610mm x 610 mmm, (24"x24").
- .3 Thickness: 2.0 mm.
- .4 Mixed colour pattern of field and accent colours developed by architect.
- .5 Acceptable Products – all of which may be used:
 - .1 iQ Optima
 - .2 Johnsonite ID Freedom, Abstracts and Stones.
 - .3 Melodia 2.0
 - .4 Adhesive – Concrete sub floors: Recommended by flooring manufacturer.
- .6 Vinyl Base for LVT-01:
 - .1 Homogeneous Polyvinyl chloride (PVC).
 - .2 ASTM F-1861 Standard Specification for Resilient Wall Base, Types TP, Group 1, solid.
 - .3 **Johnsonite Millwork vinyl wall base:** Millwork, resilient profile wall base, 114.3 mm (4.5") height; variable thickness, Equinox MW"XX"R. Colour selected from standard range.
 - .4 Conforming to ASTM E 84/NFPA 253 Flame and Smoke Developed Class I, less than 450 and ASTM E 648 (NFPA 253) Critical Radiant Flux Class 1.
 - .5 Vinyl Base Adhesives:
 - .1 Porous Surfaces:
Tarkett 960 Cove Base Adhesive.
Application - 1/8" square notch trowel.
Coverage - 200 to 250 linear feet per US gallon.
 - .2 Non-porous Surfaces:
Tarkett 946 Contact Bond Adhesive.
Application - Brush or roller; coverage 144-215 sq. ft. per 1.44 US Gal.

2.2 HOMOGENEOUS VINYL FLOOR TILES – LUXURY VINYL TILE 02 (LVT-02):

- .1 Acceptable Manufacturers and Products - full range of colours for each manufactured by Tarket/Johnsonite:
- .2 Size: 300mm x 610mm (12"x24") and 610mm x 610 mmm, (24"x24").
- .3 Thickness: 2.0 mm.
- .4 Mixed colour pattern of field and accent colours developed by architect.
- .5 Acceptable Products – all of which may be used:
 - .1 iQ Optima
 - .2 Johnsonite ID Freedom, Abstracts and Stones.
 - .3 Melodia 2.0
 - .4 Adhesive – Concrete sub floors: Recommended by flooring manufacturer.
- .6 Vinyl Base for LVT-02:
 - .1 Homogeneous Polyvinyl chloride (PVC)
 - .2 ASTM F-1861 Standard Specification for Resilient Wall Base, Type TV, and Group 1, (solid).

- .3 Conforming to ASTM E 84/NFPA 255 Flame and Smoke Developed class B, less than 450 and ASTM E 548 NFPA 253 Critical Radiant Flux class 1.
- .4 4" height; 0.125" thickness, style CB coved profile (toe), inside and outside pre-moulded corners with 4" returns.
- .5 Acceptable Materials:
 - .1 Johnsonite Traditional Wall Base by The Johnson Rubber Co., Canada Ltd. Colour from Colour Match range, 30 options.
- .7 Vinyl Base Adhesives:
 - .1 Porous Surfaces:
 - .1 Johnsonite #960 Acrylic Cove Base Adhesive.
Application - 1/8" square notch trowel.
Coverage - approximately 250 linear feet of 4" Wall Base.
 - .2 Non-porous Surfaces:
 - .1 Johnsonite #945 Contact Bond Adhesive.
Application - Brush or roller.
Coverage - approximately 360 sq. ft./gallon.
- .8 Primers: Those recommended by applicable tile and base manufacturers which will produce good and permanent bond between subfloor and tile, and between wall surface and base.

2.3 CONCRETE SUB-FLOOR LEVELLING MATERIALS:

- .1 Mapei Planipatch, cement based polymer-modified patching compound for concrete sub-Fifloors.
- .2 Armstrong S-183 Fast-Setting Cement-Based Underlayment,
- .3 Armstrong S-184 Fast-Setting Cement-Based Patch and Skim Coat
- .4 Armstrong S-194 Fast-Setting Cement-Based Patch and Underlayment.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 All work shall be executed in accordance with manufacturer's instructions.
- .2 Submit manufacturer's installation instructions with sample submission.

3.2 INSPECTION

- .1 Ensure that substrate is permanently dry, free of grease, oil, paint, solvents, sealants, tars, gypsum board compound, dust, etc.
- .2 Ensure all substrates are sound and smooth, level or plumb, as required.
- .3 Inspect sub-floors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond.
- .4 Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.
- .5 Report to Consultant any irregularities detrimental to flooring application. Ensure that site of the installation has been maintained at a temperature of at least 18 degrees Celsius for at least 48 hours prior to commencing installation. Ensure that site will be maintained at minimum installation temperatures for a minimum of 48 hours during and after installation. Thereafter, ensure that temperature will remain at 13 degrees C.
- .6 The installation of vinyl tile, vinyl wall base shall not begin until the work of all other trades has been completed, especially overhead trades.
- .7 Failure to call attention to defects or imperfections will be construed as acceptance and approval of the sub-floor.

- .8 Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- .9 Johnsonite 965 Adhesive is porosity sensitive. Review substrate materials for porosity and follow manufacturer's instructions for each material present.

3.3 PREPARATION

- .1 Deliver materials including adhesives, to the site of the installation and facilitate acclimatizing in accordance with manufacturer's instructions prior to commencing installation. All tile and base shall be acclimatized for at least 48 hours at 18 degrees C or up to 38 degrees C. Retain temperature for duration of installation. Retain temperature after installation at 13 degrees C or higher.
- .2 Vacuum and subsequently clean with wet mops and vacuum concrete sub-floor free of dirt, loose material, dust and gypsum board compound. Remove from concrete surface oil residue, grease or other deleterious matter that will affect adhesion of flooring. Remove paint, varnish, release agents, sealers and waxes. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring.
- .3 Do not use organic solvents to remove chemical residues.
- .4 Fill all voids in concrete deeper than approximately ¼" with Mapei Plani Patch or Armstrong S-183 Fast-Setting Cement-Based Underlayment, S-184 Fast-Setting Cement-Based Patch and Skim Coat or S-194 Fast-Setting Cement-Based Patch and Underlayment as recommended by the flooring manufacturer and finish level.
- .5 Grind projections flush to top of adjacent concrete.
- .6 Remove smaller irregularities and fill depressions with non-shrinking latex compound.
- .7 For newly applied concrete levelling over existing concrete sub-floor, obtain contractors concrete moisture emission test data and ensure that test method met ASTM F2170 or ASTM F 1869. Do not proceed with installation unless results are within tolerance of adhesive specified.
- .8 Perform pH tests on concrete floors regardless of their age or grade level. All test results shall be documented and retained
- .9 Report any condition unacceptable for the installation to the General Contractor and do not commence installation until all conditions required for an optimal installation are satisfied.
- .10 Areas to receive wall base shall be clean, fully enclosed, weather-tight, and maintained at a uniform temperature of at least 65 F for 24 hours before, during, and after the installation is completed. The wall base and adhesives shall be conditioned in the same manner.
- .11 Floors and walls shall be clean, dry, free of dust, all paints, wallpaper, and all other foreign material, which may affect adhesive bonding.
- .12 Vacuum sub-floor in each area or room immediately prior to commencement of tile installation.

3.4 INSTALLATION – ADHESIVE AND TILES

- .1 Installation shall be executed in strict accordance with provisions of manufacturer's installation instructions.
- .2 Installation shall commence prior to installation of cabinets and other millwork in all spaces.
- .3 Review substrate porosity and confirm manufacturer's recommendations for adhesives for all substrates. Use square edge trowel or V notched trowel as applicable.
- .4 Commence by laying tiles loosely on floor. Cut and fit snugly before applying adhesive. Reject tiles having undue variations in colour, shade or texture.
- .5 Apply adhesive uniformly with approved notch-tooth spreader at manufacturer's recommended rate.
- .6 Scribe tiles tight with floor drains, columns, walls and permanent fixtures.

- .7 Lay out each area to be tiled symmetrically from its axis. Adjust starting line so width of border tile will be at least 1/2 tile. Distribute tiles having varying tones or texture evenly over entire floor area to avoid patches or streaks and to produce homogeneous blend. Reject tiles having undue variations, in colour, shade or texture.
- .8 Lay tile with joints flush, uniform, in moderate contact, in straight lines and as inconspicuous as possible. Lay tile with patterns of adjacent tiles parallel.
- .9 Roll tile with 150-lb. roller in both directions immediately after laying.
- .10 Cut tile around excessively heavy or fixed objects.
- .11 Install approved edging where floor tile terminates adjacent to dissimilar flooring material or at different finished floor height. Install thresholds at doorways.
- .12 Install expansion joint continuous at existing floor/building expansion joints.
- .13 Flooring Bases:
 - .1 Fill cracks and level irregularities of surface to which base are applied using filler approved by adhesive manufacturer to provide solid backing over entire area behind base.
 - .2 Cement cove base to vertical surfaces so that gaps do not occur behind base, so that front lip of base cove bears firmly and uniformly on floor surfaces and so that good and permanent bond is produced between base and surface to which it is applied.
 - .3 Cut the Wall Base to the required lengths using a straight edge and Exacto blade.
 - .4 Note: When butting wall base seams together, it may be necessary to square cut the factory edge if butt ends do not align.
 - .5 Apply adhesive to 80% of back of base leaving 6mm at top without adhesive to prevent oozing of adhesive over top of base.
 - .6 Position base on surface and roll with hand roller.
 - .7 For non-porous surfaces, 946 premium, contact adhesive shall be used and this cannot be realigned after contact is made. Review installation instructions from manufacturer.
 - .8 Position wall base on wall surface and roll with hand roller. Always roll back to starting point to prevent stretching the wall base.
 - .9 Clean-up: Remove wet adhesive with a water dampened cloth. If adhesive has dried, use a cloth dampened with mineral spirits.
 - .10 Outside Corners:
 - .1 Apply adhesive to pre-moulded outside corner units per manufacturer's instructions.

3.5 LUXURY VINYL TILE

- .1 The installation of vinyl tile, vinyl wall base and vinyl stair coverings shall not begin until the work of all other trades has been completed, especially overhead trades.
- .2 Adhesive and Tile
 - .1 Review substrate porosity and confirm manufacturer's recommendations for adhesives for all substrates. Use square edge trowel or V notched trowel as applicable.
 - .2 Commence by laying tiles loosely on floor. Cut and fit snugly before applying adhesive. Reject tiles having undue variations in colour, shade or texture.
 - .3 Apply adhesive uniformly with approved notch-tooth spreader at manufacturer's recommended rate.
 - .4 Lay out each area to be tiled symmetrically from its axis. Adjust starting line so width of border tile will be at least 1/2 tile. Distribute tiles having varying tones or texture evenly over entire floor area to avoid patches or streaks and to produce homogeneous blend. Reject tiles having undue variations, in colour, shade or texture.
 - .5 Lay tile with joints flush, uniform, in moderate contact, in straight lines and as inconspicuous as possible. Lay tile with patterns of adjacent tiles parallel.

- .6 Roll tile with 150-lb. roller in both directions immediately after laying.
- .7 Cut tile around excessively heavy or fixed objects.
- .8 Install approved edging where floor tile terminates adjacent to dissimilar flooring material or at different finished floor height. Install thresholds at doorways.
- .9 Install expansion joint continuous at existing floor/building expansion joints.

3.6 FINISHING AND CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .2 Leave Work area clean at end of each day.
- .3 At completion of work, clean flooring and base surfaces to flooring manufacturer's printed instructions.
- .4 Remove excess adhesive from floor, base and wall surfaces without damage.
- .5 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .6 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 – Construction Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION

- .1 Protect new floors from traffic following installation. Remove protection following substantial performance of contract.
- .2 Prohibit traffic on floor for 48 hours after installation.

END OF SECTION

PART 1 GENERAL:

1.1 RELATED WORK:

- .1 Section 05 12 10 Structural Steel for Buildings
- .2 Section 05 50 00 Metal Fabrications
- .3 Section 04 05 10 Masonry Procedures
- .4 Section 04 22 00 Concrete Unit Masonry
- .5 Section 06 10 00 Rough Carpentry
- .6 Section 06 20 00 Finish and Fine Carpentry
- .7 Section 06 40 00 Millwork, Cabinetry and Plastic Laminate
- .8 Section 08 11 00 Steel Doors and Frames
- .9 Section 08 31 00 Access Doors Mechanical and Electrical
- .10 Section 09 21 16 Gypsum Board Assemblies

1.2 DEFINITIONS:

- .1 For Work in this Section, "exposed to view" shall refer to surfaces that are within the line of vision of persons from any accessible viewpoint, both within and without the building and within cabinets, closets or shelving units in locations visible during normal use of such facilities.
- .2 "Preparation and finishing" shall mean scraping, brushing, descaling, sanding, washing, sealing, treatment of surfaces with chemicals, sealing, priming or other work required by each surface material that is to receive paint, to prepare them for the application of a minimum of three coats of finished paint to each surface in accordance with Premium Standard as defined by the Master Painters Institute specification manual referenced below.

1.3 REFERENCE STANDARDS:

- .1 Work specified herein shall be undertaken in accordance with the following standards and the direction provided in this section:
- .2 Preparation, materials, painting and finishing Work in this Section shall be in accordance with practices specified in CAN/CGSB 2-85.100-M81 and Architectural Woodwork Standard, AWS 2009 1st edition manual for wood surfaces.
- .3 American Society for Testing Materials (ASTM):
 - .1 ASTM D523-89 Test Method for Specular Gloss
- .4 Canadian General Standards Board:
 - .1 CAN/CGSB-1.100-M89 Interior Latex Type, Flat Paint
 - .2 CAN/CGSB-1.119-M89 Primer-Sealer, Wall, Interior Latex Type
 - .3 CAN/CGSB-1.138-93 Exterior Latex Type Flat Paint
 - .4 CAN/CGSB-1.175-M89 Polyurethane Interior Coating, Oil Modified, Clear, Gloss and Satin
 - .5 CGSB 1-GP-180Ma Coating, Polyurethane, Two-Package, Resistant to Chalking and Yellowing
 - .6 CAN/CGSB-1.188-M90 Emulsion Type Filler Masonry Block
 - .7 CAN/CGSB-1.195-M90 Interior Semi-gloss Latex Paint
 - .8 CAN/CGSB-1.209-93 Low Sheen Latex Interior Paint
 - .9 CAN/CGSB-1.198-92 Cementitious Primer (for Galvanised Surfaces)
 - .10 CGSB 85-GP-16M Painting Galvanised Steel
 - .11 CAN/CGSB-85.100-93 Painting
- .5 ECP Environmental Choice Program
 - .1 ECP-07-89 Water-borne Surface Coatings
 - .2 ECP-12-89 Solvent-borne Paints

- .6 OPCA Ontario Painting Contractors Association
- .7 The latest edition of the following reference standards shall govern all painting work:
 - .1 Architectural Painting Specification Manual by the Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List. (hereafter referred to as the MPI Painting MPI Architectural Painting Manual Guide Specification Revision – September 2012) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction herein considered the Ontario Painting Contractors' Association.
 - .2 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).
- .8 SSPC Steel Structures Painting Council, "Steel Structures Painting Manual, Vol. 2".
- .9 ULC Underwriters' Laboratories of Canada
 - .1 CAN/ULC-S102-M88 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

1.4 QUALITY ASSURANCE:

- .1 This Contractor shall have a minimum of five (5) years proven satisfactory experience and shall show proof before commencement of work that he will maintain a qualified crew of painters throughout the duration of the work. When requested, Contractor shall provide a list of the last three comparable jobs including, name and location, specifying authority / project manager, start / completion dates and value of the painting work.
- .2 Qualified journeypersons shall be engaged in painting and decorating work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyperson in accordance with trade regulations.
- .3 The painting contractor shall receive written confirmation of the specific surface preparation procedures and primers used for all fabricated steel items from the fabricator / supplier to ascertain appropriate and manufacturer compatible finish coat materials to be used before painting any such work.
- .4 Field Quality Control / Standard of Acceptance:
 - .1 All surfaces, preparation and paint applications shall be reviewed by the Consultant and the Owner and the Owner may elect to retain a painting quality evaluation specialist.
 - .2 Painted surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent:
 - .1 Brush / roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.
 - .2 Evidence of poor coverage at screw, nail or rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
 - .3 Damage due to touching before paint is sufficiently dry or any other contributory cause.
 - .4 Damage due to application on moist surfaces or caused by inadequate protection from the weather.
 - .5 Damage or contamination of paint due to blown contaminants (dust, spray paint, etc.).
 - .3 Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source and final lighting source (including daylight) for interior surfaces:
 - .1 Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm (39").
 - .2 Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm (39").
 - .3 Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.

- .4 When the final coat on any surface exhibits a lack of uniformity of colour, sheen, texture, and hiding across full surface area. .
- .5 Painted surfaces rejected by the Owner or his designees shall be made good at the expense of the Contractor. Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted. Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of corrective paint.

1.5 SUBMITTALS

- .1 Materials: Submit in writing list of proposed materials prepared by paint manufacturer, for approval at least 60 days before ordering materials. List shall bear manufacturer's official certification that materials listed meet or exceed requirements specified herein. Include materials information in Paint Materials Manual for project Closeout Documentation.
- .2 Submit request for colour selections at least 4 weeks prior to date that paint order must be made or date upon which material must be delivered to the site.
- .3 Submit two sets of Material Safety Data Sheets (MSDS) prior to commencement of work for review and for posting at job site as required. Include these sheets in Paint Materials Manual.
- .4 Submit work schedule for various stages of work to Contractor.
- .5 For any painting and finishing work within an occupied area, submit schedule for the work outlining proposed start and completion dates and times, materials to be used and details of occupancy including extent of occupancy, ventilation requirements and nature of materials being used. Obtain Owner's approval proposed schedule of all work within occupied areas before commencing work. Owner reserves the right to proposed alternate schedule and to require the work to cease should conditions warrant it.
- .6 Submit opaque paint samples in triplicate on 100 mm x 150 mm (4" x 6") draw down cards on white surface.
- .7 Submit Paint Materials Manual comprised an itemized list of all primers, sealers, block fillers and finish paints complete with product data sheet, MSDS sheets, manufacturer's contact information for each product, colour samples (chips or draw down cards) marked with the colour name and number for each paint, all for Project Manuals.
- .8 Submit for inclusion in Contractor's project manual, warranty covering all labour and materials applicable to this section for a period of 1 year following the date of substantial performance.
- .9 At project completion provide properly packaged maintenance materials as noted herein and obtain a signed receipt.

1.6 MOCK-UPS:

- .1 Prepare and paint designated surface, area, room or item to display each paint colour scheme and using means required to meet or exceed specified materials and methods described herein, with specified paint or coating demonstrating selected colors, gloss / sheen, textures, cover and workmanship for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for all similar on-site work.

1.7 REGULATORY REQUIREMENTS:

- .1 Conform to the latest edition of Ministry of Labour and Occupational Health and Safety Regulations issued by applicable authorities having jurisdiction with respect to all aspects of site safety, including, but not limited to ventilation, personal protection, ladders, scaffolding, etc.
- .2 Conform to requirements of local authorities having jurisdiction with respect to the storage, mixing, application and disposal of all paint and related waste materials. Refer to Waste Management and Disposal.

- .3 Refer to section 01 35 35 Fire Safety Requirements regarding volatile or flammable materials and daily procedures.

1.8 SCOPE OF WORK PROVIDED BY OTHER SECTIONS:

- .1 Correction of defects and deficiencies in substrates which may adversely affect painting work, except for minimal work performed by this trade and preparation of surfaces to receive paint and finishes under this section of work.
- .2 Abrasive blasting, shop cleaning, shop priming including site touch-ups, and shop painting when applicable, of structural steel, miscellaneous metal, ornamental metal and steel equipment as specified on drawings and under Section 05 50 00 Metal Fabrications.
- .3 Shop priming (and shop or pre-painting when applicable) of metal doors, frames and interior windows including fittings.
- .4 Painting of copper, aluminum, stainless steel, nickel, bronze or brass surfaces, baked enamel surfaces, chrome plated items or other materials intended to be exposed in their supplied state unless otherwise specified herein.
- .5 Painting of materials and equipment off-site including kitchen cabinets and bases.
- .6 Paint identification of equipment and services and hazards to safety.
- .7 Painting of mechanical (heating, ventilating and plumbing services and equipment) and electrical work including color coding, stenciling and banding.
- .8 Do not paint exterior caulking.
- .9 Do not paint exposed conduits, ductwork or piping located within service rooms or within Storage/Clean-up room, or that are not exposed to view, electrical closets and electrical rooms or manifold closets.
- .10 Do not paint piping or conduits located below countertops unless exposed to view and not finished with pipe insulation or chromium plated plumbing fittings, or within cabinetry or behind equipment.
- .11 All items above suspended ceilings are not considered "exposed to view".
- .12 Do not paint stainless steel items.
- .13 For instructions on painting mechanical and electrical work: refer to Mechanical Requirements and Electrical Requirements respectively.
- .14 Prime and finish coats are applied by other Sections to structural steel. Read carefully other Sections of Specifications to determine extent thereof.

1.9 SCOPE OF WORK INCLUDED IN THIS SECTION:

- .1 Construction Aids, Equipment and Protection Materials:
 - .1 Provision of aids to perform the work such as all ladders, scaffolds, lifts, tools and equipment.
 - .2 Provision of all tarps, drop sheets and protection of surfaces adjacent to the work. Provide masking tapes, card stock, and kraft paper to mask items that might be affected by the work, overspray, roller spatter, spillage, etc.
 - .3 Provision of masking including tapes and plastic sheets or paper sheets as required for the scope of the work.
 - .4 Provision of all equipment associated with cleaning of brushes and equipment within the job site enclosure.
 - .5 Provision of tack cloth and vacuum cleaner equipped with HEPA filter for preparation work. Provision of brooms and dust collecting clothes and associated clean supplies.
 - .6 Provision of sand paper, sealants and associated materials for preparation work.
 - .7 Provision of all equipment required to apply paint finish.

- .8 Provision of spackling compound, silicone and latex paintable sealants for minor patching, sealants and caulking prior to paint application.
- .9 Provision of all buckets, accessories and materials or chemicals required to clean equipment and paint residue, spillage or spatter.
- .2 General Responsibilities for this Section:
 - .1 This Section shall be responsible for accepting all surfaces and the Work of others as suitable for the application of specified materials. Patching, sanding and filling work required which would be beyond the customary scope for this Section shall be reported to the Contractor.
 - .2 This Section shall be responsible for the quality of the paint finish of all surfaces. Commencement of finishing shall indicate acceptance by this Section of all surfaces in this Scope of Work.
 - .3 Failure to inform the Contractor of unacceptable surface conditions does not relieve this Section from the responsibility to achieve finish results acceptable to the Owner.
 - .4 This section shall prepare surfaces using sanding, vacuum cleaning and application of fillers for minor imperfections within the scope of its preparation work.
 - .5 This section shall conduct moisture tests for all materials prior to commencing paint application.
 - .6 This section shall not use sanitary drains for cleaning painting equipment or for disposal of water used for cleaning equipment except as directed by Owner. Owner shall establish location and restrictions associated with disposing cleaning water. Adhere to disposal procedures listed within this Section.
 - .7 All finishes are Premium Level as defined within the MPI Specification – minimum 3 coats of finished materials applied to an appropriately prepared substrate including primer for all painted surfaces.**
- .3 Scope of Finishing Work:
 - .1 Patching, spackling, and sanding of gypsum wall and ceiling board.
 - .2 Application of paintable sealants between differing materials.
 - .3 Cleaning and scraping.
 - .4 Creating a surface appropriate to the finished surfaces following the work of this Section.
 - .5 Preparation and finishing of all new gypsum board surfaces below suspended ceilings: walls, bulkheads and ceiling surfaces exposed to view.
 - .6 Preparation and finishing of all gypsum board or repaired gypsum board located below suspended ceilings and exposed to view within rooms and corridors where paint finish is indicated on schedules or drawings.
 - .7 Apply primer to all MDF/HDF and other wood products, gypsum board walls and ceilings indicated to receive new paint.
 - .8 Primer shall be 100% acrylic solids, free of polyvinyl acetate. Primer shall be formulated to accommodate application of 100% acrylic solids paint.
 - .9 Apply primer and finished paints to all surfaces that will be covered with wall protection or cabinetry or countertops.
 - .10 Preparation and finishing of all metal doors and frames, both interior and exterior and frames of all interior windows shown on drawings and schedules with paint.
 - .11 Preparation and finishing of all access doors and service panel covers that are not chromed steel, stainless steel or similarly intended to be exposed in their finished state.
 - .12 Preparation and finishing of all wood and MDF/HDF trims, panels, baseboards with primer and three coats finish paint.
 - .13 Preparation, priming and painting of steel hand railings, guards, pickets and brackets.
 - .14 All finishes are Premium Level as defined within the MPI Specification – minimum 3 coats of finished materials applied to an appropriately prepared substrate.**
- .4 Colour Selection:

- .1 All colour selections to be made by the Consultant or as described within this Section on additional pages prepared by at a later date. Request colour selections 4 weeks prior to required application.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store materials in original containers with labels intact bearing manufacturer's name, brand name, type of paint or coating and colour designation with mixing formula or colour number. Retain reducing mixing information on labels together with application requirements.
- .2 Store all materials in an area meeting manufacturer's instruction and MSDS requirements. Keep stored materials with lids securely covered.
- .3 Keep materials in use during the work covered when applicators are not using the containers.
- .4 Ventilate, heat and maintain storage area at minimum temperature of 10 deg C (50 deg F) and protected from direct rays of sun.
- .5 Take necessary precautions against fire and spontaneous combustion. Provide warning signs where toxic materials and explosive solvents are used. Provide CO₂ fire extinguisher of minimum 9 kg (20 lb) capacity in storage area while materials are stored within.
- .6 Materials that constitute a fire hazard including, but not limited to, paints, solvents, drop clothes, rags, brushes and solvent containers, etc. shall be stored in suitable closed and rated containers and removed from the site on a daily basis.
- .7 Comply with requirements of authorities having jurisdiction with respect to the use, handling, storage and disposal of hazardous materials.
- .8 Leave storage areas clean and free from evidence of occupancy on completion.

1.11 SCHEDULING:

- .1 Refer to item 1.5 Submittals above regarding schedule requirements for owner-occupied areas.
- .2 Schedule painting operations to prevent disruption other trades and such that other trades are not required to perform work within the same area.
- .3 Schedule work in close co-operation with the Contractor to ensure that paints and primers are not applied in areas where dust-generating activities are required during the paint application period or after paint has been applied.
- .4 Schedule work such that painted surfaces will have dried before occupants are affected.
- .5 Review and conform to specified phasing plan: work of this section shall be completed for each phase entirely and the cost of multiple start-up occurrences and mobilization together with associated closeout process for each phase, within the Bid Price.
- .6 Obtain written authorization from Owner for changes in work schedule that affect occupied areas.

1.12 PROJECT CONDITIONS

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

- .4 This section shall provide portable ventilation fans required for all work of this section that is suitable to the use of such fans.
- .5 Perform no painting or decorating work when the relative humidity is above 85% or when the dew point is less than 3° C variance between the air / surface temperature.
- .6 Perform no painting or decorating work when the maximum moisture content of the substrate exceeds:
 - .1 12 % for concrete and masonry (clay and concrete brick/block).
 - .2 15% for wood.
 - .3 12 % for plaster and gypsum board.
- .7 Conduct all moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors.
- .8 General Contractor shall bear responsibility for concrete floor moisture emission test.
- .9 Test concrete and masonry surfaces for alkalinity before applying paint. Do not apply paint if test results are beyond the tolerance of the paint or primer product application intended.
- .10 Concrete and masonry surfaces must be installed at least 28 days prior to painting and decorating work and must be visually dry on both sides.
- .11 Apply paint to dry, clean, properly cured and adequately prepared surfaces, only and within areas where dust is no longer generated by construction activities such that airborne particles will not affect the quality of finished surfaces.
- .12 Perform no painting or decorating work unless a minimum lighting level of 323 Lux (30 foot candles) is provided on surfaces to be painted or decorated. Adequate general lighting facilities shall be provided by the General Contractor.
- .13 This section shall provide adequate portable work lighting to evaluate condition of substrates, to review paint primer and application for consistency of coverage, sheen or blemishes of any kind.
- .14 Ensure that Contractor will maintain minimum interior temperature of 18 deg C during application and drying of paint and maintain until building occupancy occurs.

1.13 MAINTENANCE MATERIALS:

- .1 At project completion provide 4 liters of each type and colour of paint from same production run and colour mix used in unopened cans in addition to any surplus paint in opened or unopened containers, all properly labeled and identified for Owner's later use in maintenance. Store where directed.

1.14 WASTE MANAGEMENT AND DISPOSAL:

- .1 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Obtain information on these controls from Municipal hazardous waste depot at the Municipal Public Works Department.
- .2 All waste materials shall be separated and recycled. Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility. Materials that cannot be reused must be treated as hazardous waste and disposed at the Municipal Hazardous Waste Facility or any similar facility at another location.
- .3 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, within larger, temporary containers equipped with lids for transport out of the work area.
- .4 To reduce the amount of contaminant entering waterways, sanitary drain systems or into the ground, strictly adhere to the following procedures:
 - .1 Retain cleaning water for water-based materials and allow solids and sediments to settle prior to carefully pouring clear water into sanitary drains. Do not allow settled solids to enter drainage system. In no case shall equipment be cleaned using free draining water.

- .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal. Seal such containers for transport through occupied areas.
- .3 Return solvent and oil-soaked rags used during finishing operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering. Place such rags within sealed containers for transport through occupied areas.
- .4 Dispose residual solids in water-based paints, solvents and residual oil-based paints as hazardous waste in accordance with Municipal regulations.
- .5 Empty paint cans are to be dry prior to disposal at hazardous waste facility.
- .6 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.
- .7 Set aside and protect surplus and uncontaminated finish materials not required by the Owner and deliver or arrange collection for verifiable re-use or re-manufacturing.

PART 2 PRODUCTS

2.1 GENERAL:

- .1 All materials shall be low VOC and shall be 100% acrylic resin formulation (no polyvinyl acetate permitted in products for this contract).
- .2 All materials shall be lead and mercury free without exception.
- .3 Use finish paint materials from a single manufacturer for all finish paint applications throughout the entire project.
- .4 Use primers and other surface preparation materials suitable for preparation of surfaces being finished and ensure their compatibility with the finish paint products utilized.
- .5 This section shall provide shellac, stain sealers, thinners, solvents, cleaning products not specified if required by manufacturer's instructions for any substrate finished under the scope of work indicated for this project.
- .6 Masking tapes and other items used for protection of surfaces shall be designed to be removed without marring or otherwise damaging the surfaces to which they are applied.

2.2 EQUIPMENT:

- .1 Painting Equipment: to best trade standards for type of product and application.
- .2 Spray Painting Equipment: of ample capacity, suited to the type and consistency of paint or coating being applied and kept clean and in good working order at all times. Top coat of all materials sprayed on walls shall be back-rolled.

2.3 MIXING AND TINTING:

- .1 All paint shall be ready-mixed and pre-tinted. Re-mix all paint in containers prior to and during application to ensure complete dispersion of settled pigment and solids and uniformity of gloss.
- .2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.
- .3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.
- .4 If required, thin paint for spraying in strict accordance with paint manufacturer's instructions. Do not thin second topcoat of paint. If spraying requires thinning, do not spray final topcoat but roll apply paint.

2.4 GLOSS / SHEEN RATINGS:

- .1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following values:

Gloss Level	Description	Units @ 60 degrees	Units @ 85 degrees
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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

2.5 FINISH AND COLOURS:

- .1 Colours not specified herein shall be as selected by the Consultant from a manufacturer's full range of colors. Basis of Design is Sherwin Williams Paints. A Paint Colour Schedule will be furnished after award of the Contract.
- .2 Steel doors shall be painted a different colour than door frames and interior window frames and these two items will differ in colour from walls throughout all areas.
- .3 Unless otherwise noted or scheduled, all steel doors, steel door and interior window frames and trim shall be painted using a G 4 (pearl-gloss) finish. Aluminium doors and frames shall not be painted by this Section.
- .4 Unless otherwise noted, all ceilings and bulkheads shall be painted with paint having a flat G1 sheen.
- .5 All interior walls within all rooms shall be painted using paint with an eggshell G3 sheen.

2.6 INTERIOR CEILINGS AND BULKHEADS:

- .1 Interior Wall Colours:
 - .1 Base Wall Colours: Five (5) distinct base wall colours shall be selected for use throughout the entire project. Each room or relatively discrete corridor space shall have one of the specified base colours selected by the Owner and applied within the majority of the space.
 - .2 Accent colours will be selected for specified surfaces within various rooms.
 - .3 Base Wall colours will be formulated using light or medium base tints.
 - .4 Accent Colours will be formulated using dark or bright tints. Up to five (5) different accent colours may be selected by the Owner. Any of the selected Accent colours may be applied to one or more discrete wall surfaces or planes in addition to base wall colours within any room or space and as many as 5 accent colours may be used, in total, throughout the project.
- .2 Interior Ceilings and Bulkheads:
 - .1 Interior wood ceilings shall be finished as Hardwood materials specified below. These are coated in sanding sealers, light stain and a top coating of polyurethane.
 - .2 Ceilings and bulkheads within all rooms and spaces shall be painted with the same colour and sheen selected by the Owner unless they are finished with wood.
 - .3 Ceilings and bulkheads shall be painted using a G1 flat sheen, light colour based on white, off-white, beige, light gray or ivory or a similar tone.
- .3 Interior Steel Window Frames, Steel Doors, Steel Door Frames and Jambes:
 - .1 Interior steel doors shall be painted with the same colour on each face and all 4 edges.
 - .2 Steel window and door frames shall be painted using a dark or deep base colour selected by the Owner.
 - .3 Steel doors shall be painted using a colour that differs from the door or window frame and may be a deep base colour, selected by the Owner.
 - .4 Interior steel doors, steel door frames and interior steel window frames shall be painted using paint formulated with for a G4 semi-pearl sheen.

- .4 Access doors and electrical panel doors installed in gypsum board assemblies shall be prime coated and painted to match adjacent surfaces (i.e. same color, texture and sheen), unless otherwise noted or where pre-finished.

2.7 PAINTING AND FINISHING MATERIALS

- .1 Paint and finishing materials for each procedure listed in Finish Schedule or for each item listed in the Section shall be products of single manufacturer throughout the project.
- .2 Paint products shall meet or exceed requirements of ECP-07 Guidelines for water-based paints and ECP-12 Guidelines for solvent-based paints. In addition, paint products shall meet or exceed applicable performance standards issued by CGSB or other such standards approved by accredited standards writing organisations. Paint shall be formulated using 100% acrylic resin (no PVA permitted in formulae).
- .3 Paint and primer shall have excellent flowing and brushing properties. Paint shall cure free of sags, runs, wrinkles to yield desired finish specified.
- .4 All products shall conform to Environmental Choice Program guidelines and carry EcoLogo on paint containers. Where specified products do not have an EcoLogo option, provide alternate product suggestions for review and approval of architect before proceeding with work. Not all products available from listed companies conform to stated guidelines and where not possible to achieve, EcoLogo products may not be used.
- .5 Painting methods, coatings and products are provided as follows according to the surface coated:

2.8 GALVANIZED METALS INCLUDING EMT CONDUITS:

- .1 Primer:
 - .1 Sherwin Williams equivalent products matching characteristics of the following products or use the following specified products:
 - .1 Equivalent to Benjamin Moore Ironclad galvanized Metal Primer, product code 155.
 - .2 Equivalent to Glidden Ultra Alkyd Cementitious Galvanized Metal Primer no. 8000.
- .2 Finish coat Interior Applications (three coats):
 - .1 Sherwin Williams equivalent products matching characteristics of the following products or use the following specified products:
 - .1 Equivalent to Benjamin Moore Regal Select Acrylic, eggshell sheen G3 product 549 or Semi-Gloss sheen G5 product 549 or Flat sheen G1 product 547 to match background sheen), colour to match adjacent surfaces.
 - .2 Equivalent to ICI Paint, Dulux Lifemaster 59188 flat, 59388 eggshell, 59288 Semi-Gloss, sheen to match background sheen and colour.
- .3 Sherwin Williams Products:
 - .1 Semi-Gloss Finish:
 - .1 First Coat: S-W Pro Industrial Pro-Cryl Universal Primer Off White, B66-1300 Series. Coating thickness: 5 to 10 mils (0.127 to 0.254 mm) wet, 1.9 to 3.8 mils (0.048 to 0.096 mm) dry.
 - .2 Second Coat: S-W Harmony Interior Latex Semi-Gloss, B10 Series.
 - .3 Third and Fourth Coat: S-W Harmony Interior Latex Semi-Gloss, B10 Series. Coating Thickness: 4 mils (0.102 mm) wet, 1.7 mils (0.043 mm) dry per coat.

2.9 HOLLOW METAL DOORS AND FRAMES AND INTERIOR FERROUS METAL:

- .1 Benjamin Moore and Glidden Products:
 - .1 All ferrous metal components to be prepared by cleaning, scraping and light sanding prior to application of finishes unless abrasive blasted. Spot prime all bare metal areas with appropriate metal primer before applying prime coat below.
 - .2 Primer:
 - .1 Benjamin Moore Fresh Start Primer product 023.

- .2 ICI Paint Dulux Lifemaster Primer product 59113.
- .3 Finish Paints (three coats):
- .4 Finish – Two coats Interior Applications:
 - .1 Benjamin Moore Regal Select Acrylic, Semi-Gloss sheen G5 product 549 product 547.
 - .2 ICI Paint, Dulux Lifemaster, 59288 Semi-Gloss sheen G5.
- .2 Sherwin Williams Products:
 - .1 Semi-Gloss Finish:
 - .1 First Coat: S-W Pro Industrial Pro-Cryl Universal Primer Off White, B66-1300 Series. Coating thickness: 5 to 10 mils (0.127 to 0.254 mm) wet, 1.9 to 3.8 mils (0.048 to 0.096 mm) dry.
 - .2 Second Coat: S-W Pro Industrial Semi-Gloss, B66-650 Series.
 - .3 Third Coat: S-W Pro Industrial Acrylic Semi-Gloss, B66-650 Series. Coating Thickness: 2 to 4 mils (0.051 to 0.102 mm) dry per coat.

2.10 GYPSUM CEILING AND WALL PANELS:

- .1 Painting to meet or exceed provisions of Gypsum Association Manual 232-04.
- .2 Primers for new gypsum board:
 - .1 Benjamin Moore Fresh Start Primer product 023.
 - .2 ICI Paint Dulux Lifemaster Primer product 59113.
 - .3 Sherwin Williams S-W Harmony Interior Latex Primer B11. Coating Thickness: 4 mils (0.102 mm) wet, 1.3 mils (0.033 mm) dry.
- .3 Finish Paints (three coats):
 - .1 Walls - Finish coat Interior Applications – Egg Shell Sheen G3:
 - .1 Benjamin Moore Regal Select Acrylic, eggshell sheen G3 product 549.
 - .2 Dulux Lifemaster 59388 eggshell sheen G3.
 - .2 Gypsum board ceilings and bulkheads Finish Coats, Interior:
 - .1 Benjamin Moore Regal Select Acrylic, flat sheen G1 product 547.
 - .2 ICI Paint Dulux Lifemaster product 59188 flat sheen G1.
- .4 Sherwin Williams Products - Walls:
 - .1 .1 Egg-Shell Finish G3 sheen:
 - .1 First Finish Coat: S-W Harmony Interior Latex Egg-Shell, B9 Series.
 - .2 Second and Third Finish Coats: S-W Harmony interior Latex Egg-Shell, B9 Series. Coating Thickness: 4 mils (0.102 mm) wet, 1.7 mils (0.043 mm) dry per coat.
 - .2 Gypsum board ceilings and bulkheads Finish Coats, Interior:
 - .1 First Finish Coat: S-W Harmony Interior Latex Flat, B5 Series.
 - .2 Second and Third Finish Coats: S-W Harmony Interior Latex Flat, B5 Series. Coating Thickness: 4 mils (0.102 mm) wet, 1.7 mils (0.043 mm) dry per coat.

2.11 INTERIOR WOOD SURFACES – PAINTED INCLUDING MDF AND HDF:

- .1 Wood fillers:
 - .1 Plastic Wood.
 - .2 Benjamin Moore's Benwood Interior Paste Wood Filler, no. 238.
- .2 Softwoods and other wood materials to be painted:
 - .1 Knot Sealer:
 - .1 Benjamin Moore SPS, ammonia thinned.
 - .2 ICI Paint Glidden Ultra Hide Gripper #250 Stain Killer.
- .3 Benjamin Moore and Glidden Products:
 - .1 Primer:
 - .1 Moore's Alkyd Primer Sealer, product no. 200.
 - .2 ICI Paint Glidden Ultra Interior Alkyd Undercoat, no. 9431-0.

- .2 Finish Coats (three coats):
- .3 Benjamin Moore Regal Select Acrylic, Semi-Gloss sheen G5 product 549 product 547.
- .4 ICI Paint, Dulux Lifemaster, product 59288 Semi-Gloss sheen G5.
- .4 Sherwin Williams Products:
 - .1 G4 Semi-Pearl Finish:
 - .1 First Coat: S-W Multi-Purpose Latex Primer/Sealer, B51 Series. Coating Thickness: 4 mils (0.102 mm) wet, 1.4 mils (0.036 mm) dry.
 - .2 Second Coat: S-W ProMar 200 HP Zero VOC Latex Semi-Gloss, B31-1900 Series.
 - .3 Third Coat: S-W ProMar 200 HP Zero VOC Latex Semi-Gloss, B31-1900 Series. Coating Thickness: 4 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry per coat.

2.12 HARDWOOD SITE FINISHED:

- .1 Hardwood solids:
 - .1 Wood to be clear finished and stained:
 - .1 All hardwood items shall be coated with stain, sanding sealer by this section before application of two coats of clear finish.
 - .2 Stain – wiped coat, wood stain prior to sealer.
 - .1 ICI Paint Wood Pride product number 7900.
 - .2 Benjamin Moore Waterborne Stain product 205.
 - .3 Sherwin Williams Minwax Interior Wood Stain, Performance Series.
 - .3 Apply Sanding Sealer, 1 coat:
 - .1 Benjamin Moore's Woodfinishes Quick Drying Sanding Sealer no. 411.
 - .2 Glidden Alkyd Sanding Sealer, no. 5035.
 - .3 Sherwin Williams Minwax Performance Series, Fast Drying Sanding Sealer, Satin Finish.
 - .4 Clear finish, 3 Coats:
 - .1 Benjamin Moore Stays Clear Polyurethane Low Lustre Finish no. 423.

2.13 INTERIOR CONCRETE MASONRY:

- .1 Benjamin Moore and Glidden Products:
 - .1 Block filler:
 - .1 Benjamin Moore Ultra Spec Hi-Build Masonry Block Filler product K571.
 - .2 Dulux X-Pert Blockfiller.
 - .2 Top Coats (3) for interior concrete masonry:
 - .1 Benjamin Moore Product 549 Regal Eggshell G3 sheen.
 - .2 Dulux Lifemaster 59388 eggshell sheen G3.
- .2 Sherwin Williams Products:
 - .1 Egg-Shell Finish:
 - .1 First Coat: S-W Pro Industrial Heavy Duty Block Filler, B42-150.
Application Rate: 75 to 100 sq ft per gal (1.84 to 2.45 sq m per L).
 - .2 Second Coat: S-W Harmony Interior Latex Eg-Shel, B9 Series.
 - .3 Third Coat: S-W Harmony Interior Latex Eg-Shel, B9 Series. Coating Thickness: 4 mils (0.102 mm) wet, 1.7 mils (0.043 mm) dry per coat.

2.14 INTERIOR CONCRETE:

- .1 Benjamin Moore and Glidden Products:
 - .1 Block filler:
 - .1 Benjamin Moore Ultra Spec Hi-Build Masonry Block Filler product K571.
 - .2 Dulux X-Pert Blockfiller.
 - .2 Top Coats (3) for interior concrete masonry:
 - .1 Benjamin Moore Product 549 Regal Eggshell G3 sheen.

- .2 Dulux Lifemaster 59388 eggshell sheen G3.
- .2 Sherwin Williams Products:
 - .1 Egg-Shell Finish:
 - .1 First Coat: S-W Loxon Concrete and Masonry Primer, LX02 Series. Application Rate: 200 to 300 sq ft per gal (4.91 to 7.36 sq m per L).
 - .2 Second Coat: S-W Harmony Interior Latex Egg-Shell, B9 Series.
 - .3 Third Coat: S-W Harmony Interior Latex Egg-Shell, B9 Series. Coating Thickness: 4 mils (0.102 mm) wet, 1.7 mils (0.043 mm) dry per coat.

2.15 DRYFALL PAINTING: INTERIOR EXPOSED METAL STRUCTURE, AND SPRINKLER PIPING:

- .1 Spray application to prepared surfaces is acceptable.
- .2 Do not paint electrical conduit, sprinkler piping or ductwork exposed to view.
- .3 Prepare Structural Steel Columns, Beams, Roof Purlins and New Sheet Steel Decking:
 - .1 Sand and grind and thoroughly clean existing steel columns and beams. Remove mould and oily residue. Clean with TSP or similar.
 - .2 Use Benjamin Moore No. M83 Oil and Grease Emulsifier to clean both new steel, existing structural steel and new roof purlins. Clean underside of new metal decking.
- .4 Primer: Benjamin Moore Product no. 554 All Purpose Alkyd Primer.
- .5 Finish Paint: One colour for overhead elements, separate colour for columns.
- .6 Column Paints:
 - .1 MooreSpec Interior Acrylic Latex Semi-Gloss no. 594.
 - .2 Glidden Lifemaster 2000, 59210 Latex Semi-Gloss.
- .7 Acceptable Materials for steel structure/metal deck, ductwork, conduits, etc.:
 - .1 Benjamin Moore MooreSpec Interior Acrylic Latex no.591.
- .8 Dryfall Spray-Applied, Deep Base, Tinted:
 - .1 3 coatings Sherwin Williams Pro-Industrial Waterborne Acrylic Dry Fall, flat finish.
 - .2 Dulux:
 - .1 One coat Dulux Metalclad product 218490.
 - .2 Two coatings Dulux Dryfall Paint, Interior 100% acrylic latex Product 10113, flat finish.

PART 3 EXECUTION

3.1 EXAMINATION:

- .1 Do work when surfaces and conditions are satisfactory for production of quality of work only. Report to Owner, Consultant and Contractor in writing, the presence of any surface which is found to be unsatisfactory. Do not proceed with work unless unsatisfactory conditions are rectified and written notice to proceed is provided by Contractor.
- .2 **Commencement of work shall imply acceptance of substrate surfaces.**
- .3 Ensure temperature of surfaces to be finished is between 10 and 20 deg C (50 and 68 deg F) and surfaces are dry and free of dirt, all dust, grease or other contaminants that may affect applied finish.
- .4 Verify moisture content of surfaces with electronic moisture metre. Do not proceed without written directions if moisture reading is higher than 12-15%.
- .5 If substrate is steel, do not apply coatings over moisture or when surface temperature is within 3 deg C (5 deg F) of dew point.
- .6 If substrate is wood, do not stain or paint if moisture reading is higher than 12%. Inspect work to assure surfaces are smooth, free from machine marks and that nail heads have been countersunk.
- .7 If substrate is cast-in-place concrete, allow 60 to 90 days curing time before proceeding with priming.
- .8 If substrate is gypsum board, inspect to ensure joints are completely filled and sanded smooth. Inspect surfaces for "nail popping", screw heads not recessed and taped, breaks in surface or other

imperfections and have these repaired or apply spackling or gypsum board finishing compound and allow curing.

3.2 PREPARATION:

- .1 Preparation and finishing of all surfaces shall be in accordance with paint manufacturers' instructions and the instructions shall be as indicated for the condition and type of surface which is to be painted.
- .2 Provide scaffolding, staging, platforms and ladders, as required for execution of the work. Erect scaffolding to avoid interference with work of other trades. Comply with Occupational Health and Safety Act, Ministry of Labour and all other applicable legislation. Review construction safety policies with Contractor prior to selecting means of reaching high items.
- .3 Remove and securely store all miscellaneous hardware and surface fittings and device covers including, but not limited to electrical device cover plates, mechanical louvers, door and window hardware (hinges, knobs, locks, trim, frame stops), escutcheon plates, 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.
- .4 Confirm preparation and primer used with fabricator of steel items. Refer to Quality Assurance.
- .5 Sand, clean, dry, etch, neutralize and/or test all surfaces under adequate illumination, ventilation and temperature requirements.
- .6 Remove dust, grease, rust and extraneous matter from all surfaces. Vacuum fibrous and porous surfaces not suited to cleaning with liquids.
- .7 Remove mildew by scrubbing affected area with solution of tri-sodium-phosphate (TSP) (150 g) and bleach (125 g) in 3.5 L water. Rinse well with clean water and allow drying. If condition is serious, report situation to the Contractor and do not proceed with finishing until directed by the Contractor.
- .8 Ferrous Metal: Solvent clean to SSPC-SP1. Remove loose rust and prime bare metal with rust inhibitive steel primer. Touch-up damaged shop applied primer using compatible product. Provide full coat primer only if damage is extensive. Treat all weld areas with phosphoric acid (5% solution).
- .9 Sand all previously painted surfaces repaired or damaged after initial painting or that require preparation when they are delivered or installed on the job site, with particular attention to wood and metal items. Use gradation of sanding papers such that final sanding is accomplished using 220 grit or finer as the case requires. Feather all junctions of previous paint with areas exhibiting removed, damaged or absent paint to create uniform, smooth appearance free of evident ridges or differences in plane.
- .10 Gypsum Board:
 - .1 Examine wall and ceiling boards for minor imperfections. Fill indentations; nail holes, marks, etc., with gypsum board finishing joint or spackling compound and sand smooth using 220 grit sanding paper or finer grit
 - .2 All gypsum board surfaces must be finished to level 4 state for all areas or 5 state for epoxy coated areas, prior to preparation and primer application.
 - .3 If surface conditions on Work appear unsuitable for finishing, inform Contractor and do not proceed with finishing until concerns have been properly addressed.
 - .4 Apply paintable latex sealant to all junctures between metal doorframes, casing, trims and other moldings and gypsum board.
 - .5 Apply paintable latex sealant at all junctures between gypsum board and other materials or at returns into window and doorframe and sills.
 - .6 Seal around pipe penetrations with paintable sealant under counters without base cabinets and where pipes do not have escutcheon plates.

- .7 Remove and store for reinstallation, as required, all device covers, louvers, grilles, etc. or mask diffusers and other devices that cannot be removed prior to commencing priming of gypsum board.
- .8 Apply one or more coats of specified 100% acrylic primer to all patched areas and gypsum board. Sand surfaces as necessary to ensure even coverage of finish paint between patched areas and other adjacent surfaces.
- .9 Apply three or more coatings of finish paint to ensure that paint finish (sheen and texture) have complete coverage for all specified colours and achieve an even finish and colour.
- .10 Apply two full coats of epoxy wall coating primer to gypsum board intended to receive epoxy paint coating. Ensure that walls had been finished to level 5, fully skim-coated state and all finishing compound is fully cured.
- .11 Metal Surfaces:
 - .1 Remove door and interior window hardware where possible or mask the remaining hardware entirely prior to commencing preparation and painting of metals. Mask all equipment and devices such as emergency lighting, light fixtures, fire detectors and sprinkler heads. When in doubt about painting a device, clarify the situation with the consultant before commencing preparation work and masking.
 - .2 Wash access doors to remove mill scale, grease and finger prints prior to application of primers and finish paints.
 - .3 Remove grease, oil flux, alkali contamination, etc. with appropriate chemical wash mineral spirits and Oil and Grease Emulsifier (SSPC-SP1 Solvent Cleaning) especially at ductwork, galvanized items. Note: cutting of steel pipes in field, threading and installation of ferrous metal elbows and other connectors results in rust at joints and abraided areas. Threading and cutting of piping involves lubricating of pipe with oils, which must be removed from the pipes prior to painting. Change rags frequently to avoid spreading contaminants onto adjacent uncontaminated surfaces. Repeat solvent cleaning at least once. Use clean rags, only, for final cleaning prior to priming and finish painting.
 - .4 Sand, scrape and brush surfaces, which exhibit corrosion, (to bare metal in the case of rust) etc., as required and wash with solvent as required. Apply appropriate primer using Rust Inhibitive Primer for areas sanded to bare metal. Touch-up shop primed elements with matching primer where rust is not evident.
 - .5 Remove all rust from existing steel components and prime immediately.
 - .6 Wipe, vacuum, wash and rinse existing steel elements requiring paint thoroughly prior to scraping, priming and sanding. Remove all dust prior to priming or coating. Sand areas where paint remaining has less thickness relative to adjacent surfaces to leave surface free of evident differences in coating thickness when completed.
 - .7 Use rust inhibitive paint to seal rust that cannot be removed. Ensure compatibility with new finish paint and sand using 220 grit paper or finer grit prior to priming and finishing.
 - .8 Seal stains including ink or similar marks using stain sealer recommended by manufacturer for stubborn stains and ink.
 - .9 Galvanized steel: Wash thoroughly with mineral spirits and wipe completely with clean cloths. Apply galvanized steel primer.
 - .10 Ferrous Metal Piping: Paint one coat of rust inhibitive paint or stain suppressant coating to all sprinkler piping joints, T's and elbows prior to commencement of finish painting. Wipe sprinkler piping carefully to remove oils, especially at joints.
- .12 Wood Surfaces:
 - .1 Prepare all wood surfaces in accordance with AWMAC AWS Manual standards.
 - .2 Remove dust, marks, pencil marks, stains, etc. prior to commencing further preparation.
 - .3 Check wood materials with moisture meter. Do not finish trims, panels and hardwoods if moisture content is 8% or higher. Do not finish softwoods if moisture content exceeds 12%.

- .4 Fill fastener holes, joints and visible defects with wood filler colour-matched to stain for all stained materials.
- .5 Sand all unfinished wood, including veneer or veneer panels, doors, hardwood flush panels and solid hardwoods with 180 and 220 grit sand paper consecutively to remove mill seal prior to application of stains.
- .6 Apply stain suppressant sealer to all softwood knots or other areas exhibiting resin for wood that will be painted.
- .7 Inspect wood surfaces for rough spots and sand as required.
- .8 Dust, vacuum and wipe using tack cloths immediately prior to applying finishes.
- .9 Sand wood components. Remove grease and other dirt which may mar the final finish. Apply alkyd primer compatible with oil base finish for woods that will be painted. Sand after priming using 220 grit paper or finer prior to applying finishes. Apply products specified for stained wood in accordance with manufacturer's instructions.

3.3 CLEANING:

- .1 Ensure that Contractor and all sub-trades have completed Work which generates dust or other air-borne contaminants, which will adversely affect the quality of the paint finishes.
- .2 Brush and otherwise remove all paint chips, sanding residue, etc. from existing building surfaces prior to commencing finishing.
- .3 Vacuum all surfaces immediately prior to commencing applications of primers and paints.
- .4 Use clean cloths and tack cloths to wipe surfaces prior to priming and painting.

3.4 PROTECTION:

- .1 Provide drop sheets, metal pans, card stocks, kraft paper, masking tape, etc., to mask and protect adjacent finished areas, surfaces which are not to be painted and the floor and installed finished ceiling components from damage, spatter, over-spray, staining and soiling arising from paint application. Include the masking of all instruction plates and fire rating labels prior to applying paint. This provision includes the requirement to install tarps or other protection for the all surfaces below the work including existing exterior walls.
- .2 Apply masking tape to labels and to other items not intended to be painted and which cannot be removed prior to painting including fire rating labels on frames and doors.
- .3 Remove cloths and other disposable materials used as wipes, cleaning cloths, etc. each day from the site of the Work and dispose to avoid accidental combustion. Store such cloths, while they are awaiting disposal from the site, in metal vessels which contain water.
- .4 Ensure that appropriate trades have removed and safely stored switch, receptacle and other cover plates, hardware, escutcheons, luminaire frames, etc., prior to commencing painting.
- .5 Porous materials from which soil and finishing materials cannot be completely removed shall be removed and replaced by this Section.
- .6 Post appropriate and "Wet Paint" signage and remove same when paints are cured.
- .7 Ensure that spark-proof tools are utilized where products utilized are inflammable.
- .8 When handling materials containing flammable solvents, wear approved vapour/particulate respirator as protection from vapours. Dust respirators do not provide protection from vapours.

3.5 APPLICATION

- .1 Prior to priming any surface, confirm timing and schedule requirements for recoating and application of finish paint with manufacturer. This is particularly important for metal primers.

- .2 Provide a minimum of 3 coats of finish paint for all surfaces and for deeply tinted, dark colours apply sufficient paint to generate a consistent colour and sheen for all surfaces. Apply additional coats to any surface, as found necessary, to completely cover substrate and achieve an even, consistent colour.
- .3 Provide finish uniform in sheen, colour and texture, free from streaks, shiners and brush or roller marks or other defects.
- .4 Apply materials in accordance with manufacturer's directions and specifications. Do not use adulterants or thinners. Any reduction of coating's viscosity shall be done in accordance with manufacturer's directions and such coatings shall never be used for the final finish coating.
- .5 Finish all surfaces indicated on Room Finish Schedule(s) and noted on Drawing(s) and as specified hereunder. For clarity, this includes all surfaces throughout the job site of this Contract that are not installed in their finished state (finished state materials are ceiling tiles, ceiling tile suspension grid, device covers, fire detectors, ceiling speakers, diffusers, items faced with plastic laminate or melamine, light fixtures and prefinished or stainless steel sheets, electrical covers for devices).
- .6 Finishes and number of coats specified hereinafter in Finish Schedule are intended as minimum requirements, only. Refer to manufacturer's recommendations for exact instructions for thickness of coating to obtain optimum coverage and appearance. Some materials and colours may require additional coats and deeper colours may require use of manufacturers' special tinted primers. Unless otherwise specified, provide Premium (3 coats) finish as defined by OPCA as minimum finish.
- .7 Obtain colour chart giving colour schemes and gloss value for various areas from Owner's Designee. Colour chart shall give final selection of colours and surface textures of all finishes, and whether finishes are transparent (natural) or opaque (paint).
- .8 Spraying, other than dryfall specified, is not permitted without architect's written permission.
- .9 Paint entire plane of areas exhibiting incomplete or unsatisfactory coverage and of areas which have been cut and patched. "Patching" by painting repair area, only, is not acceptable.
- .10 Do not paint baked enamel, chrome plated, stainless steel, aluminium or other surfaces finished with final finish in factory. Apply finished coats of paint to all primed surfaces.
- .11 Sand and dust between each coat to provide an anchor for next coat and to remove defects visible from a distance up to 1000 mm (39").
- .12 Do not apply finishes on surfaces that are not sufficiently dry. Unless manufacturer's directions state otherwise, each coat shall be sufficiently dry and hard before a following coat is applied.
- .13 Paint finish shall continue through behind all wall-mounted items (e.g. metal lockers, countertops, cabinets, steel wall protection, tack boards, etc.).
- .14 Advise Departmental Representative when each applied paint coat can be inspected. Do not recoat without inspection. Tint each coat slightly to differentiate between applied coats.
- .15 Sand smooth enamel and varnish undercoats prior to recoating.
- .16 Apply primer coat soon after surface preparation is completed to prevent contamination of substrate.
- .17 Test wood delivered to site with moisture meter. Do not paint if products exceed moisture tolerance specified herein. Otherwise, prime sufficiently dry woodwork designated for painting as soon as possible after delivery to Site and before installation. Prime all cut surfaces, whether exposed or not, i.e. all six edges of wood doors, before installation. Prime all cut surfaces of woodwork.
- .18 Seal using sanding sealer, top and bottom edges of wood doors with 3 coats of sanding sealer permitting curing between coats. Sand and stain and seal hinge and latch edge of wood doors to establish finish matching face veneer.

- .19 Apply primer-sealer coats by brush or roller. Permit to dry in accordance with manufacturer's recommendations before applying succeeding coats. Touch up suction spots and sand between coats with No. 120 sandpaper.
- .20 Apply primer coat to bare ferrous metal surfaces.
- .21 Apply final coats on smooth surfaces by roller or brush. Hand brush wood trim surfaces.
- .22 Apply top coating of epoxy wall and ceiling finish in accordance with manufacturer's instructions.

3.6 MECHANICAL AND ELECTRICAL WORK

- .1 Read Mechanical and Electrical Requirements for instruction on painting Mechanical and Electrical work and perform such work under supervision of respective Mechanical and Electrical Divisions.
- .2 Finish paint primed mechanical equipment: heaters, convectors, radiators, wall fin perimeter induction units, fan coil units, and similar items when they are not installed within mechanical or service rooms.
- .3 Prime and paint exposed unfinished electrical raceways, fittings, outlet boxes, junction boxes, pull boxes, and similar items unless concealed above ceilings or within walls or covered by cover plates.
- .4 Take steps to protect gauges, identification plates and similar items from being painted over or paint splattered.
- .5 Remove grilles, covers, access panels for mechanical and electrical systems from installed location and paint separately, if these items are not factory-finished.
- .6 Paint work to match surfaces they are seen against unless directed otherwise.
- .7 Paint interior surfaces of air ducts visible through grilles and louvres, with 1 coat of flat black metal paint to limit of sight line.

3.7 PAINT FINISH APPLICATION GYPSUM BOARD AND CONCRETE BLOCK:

- .1 Work shall conform to MPI Specification, Premium Standard.
- .2 Ensure other Work which may produce dust or otherwise adversely affect the quality of the finishes, is completed prior to commencing primer and finish paint applications.
- .3 Use electric moisture meter to determine that all surfaces have reached a dryness recommended for the products being applied. Do not commence application of finishes until recommended dryness levels have been achieved.
- .4 Apply appropriate primer and finishes to rates recommended by manufacturer and to result in a surface free from brush marks, sags, crawls, streaks, runs, laps, skips voids, pin holes, missed areas and other perceptible defects. End result must be a surface with a consistent sheen, even colour and texture.
- .5 Leave all details in trims, etc., with crisp profiles and free from accumulations of paint which obscure the shapes of profiled materials. Leave corners and edges of trims free of excessive paint accumulation.
- .6 Make clean and true all junctures with no overlap of adjoining applications of finished coatings.
- .7 Use materials of a single manufacture for each finishing system.
- .8 Apply each subsequent coat of each material after preceding coat is cured to manufacturer's recommendations.
- .9 Sand surfaces lightly between coatings.
- .10 Remove spatters from adjacent surfaces immediately after occurrence using methods which will not harm surfaces.
- .11 Do not paint exterior caulked joints. Interior paintable latex caulking shall be painted to match surfaces the sealant is joining
- .12 Apply a minimum of three coats of each finish. Apply additional coats as required to obtain complete coverage of all surfaces to Owner's satisfaction.
- .13 Use only unadulterated paint and thin only as recommended by manufacturer unless otherwise noted.

- .14 Paint entire wall surface for all walls or ceilings with patches to nearest 90 deg corner. Do not paint patches only. Paint new patches with two or more coats until sheen and texture matches adjacent existing wall surfaces. Paint two final coats over entire wall surface.

3.8 PAINT FINISH APPLICATION FOR WOOD:

- .1 Softwood and other painted wood materials:
 - .1 Use electric moisture meter to determine that all surfaces have reached a dryness recommended for the products being applied. Do not commence application of finishes until recommended dryness levels have been achieved.
 - .2 Seal all knots and other areas exhibiting resin with SPS sealer prior to applying primers.
 - .3 Apply alkyd primer to all wood surfaces which will receive paint finish. Apply additional coats of primer as required to achieve satisfactory finish results. Sand between coats.
 - .4 Coat all edges of doors requiring paint finish with primer.
 - .5 Apply minimum of two coats of finish paint to all exposed wood surfaces to be painted and all edges of wood doors requiring paint.
 - .6 Apply paint as described in "Application" above to avoid drips, runs, skipped areas and paint build-up in corners and at trim details.

3.9 SITE FINISHED HARDWOOD:

- .1 Apply products in sequence presented for finishing of hardwood products and sand between coats.

3.10 ADJUSTMENT AND CLEANING:

- .1 Remove spatters and drips from all surfaces. Do not mar surfaces during removal.
- .2 Touch-up paint areas as describe. Where spot sanding and spot painting results in surfaces on which such spot painting is visible, recoat entire surface.
- .3 Remove all supplies and equipment from the job site and leave area clean and ready for occupancy.

3.11 DISPOSAL OF PAINT WASTE

- .1 Be responsible for removal and disposal of material and waste generated by this Section.
- .2 Remove empty and partly used containers from Site and recycle or disposed of as Hazardous Waste in accordance with local municipal, provincial and federal environmental regulations. Provide proof of such action in form of receipts of tipping fees, disposal fees or bills of lading, as applicable.
- .3 Remove from Site peripheral items, such as clean up solvents, paint brushes, rags, and similar items and dispose of where necessary in accordance with local municipal, provincial and federal environmental regulations.
- .4 Do not rinse paints from brushes and rags under running water using the Owner's plumbing system. While work is underway, whether acrylic or alkyd products are in use, rinse all brushes and rags in container with appropriate solvent (water or paint thinner). Leave this container in a well-lit and well-ventilated area, away from any flammable conditions. Dispose of emulsion created in accordance with local municipal, provincial and federal environmental regulations.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 05 50 00 Metal Fabrications
- .2 Section 06 10 00 Rough Carpentry
- .3 Section 09 21 16 Gypsum Board Assemblies
- .4 Section 09 30 13 Ceramic Tile
- .5 Section 09 58 00 Acoustic Ceiling Assemblies
- .6 Section 09 91 23 Interior Painting
- .7 Section 10 28 10 Bathroom Accessories

1.2 RELATED WORK:

- .1 Related work specified elsewhere shall include accessories and anchorage/blocking for attachment of compartments. Refer to Section 06 10 00 Rough Carpentry.

1.3 SYSTEM DESCRIPTION AND WORK INCLUDED:

- .1 Other manufacturer's products equivalent to the specified product line will be considered, however, all aspects of the product must be found to be equivalent by the architect before alternatives will be accepted. Accepted alternates must be approved via issued addenda, only.
- .2 Basis of Design:
 - .1 High Pressure Laminate (HPL) with Particle Board Substrate (Bobrick DesignerSeries) including the following items:
 - .1 Toilet partitions.
 - .2 Urinal privacy screens.
 - .2 Mounting Style:
 - .1 Floor-mounted and overhead braced partitions and standard hardware and fasteners.
 - .3 Work in this section shall include but is not limited to:
 - .1 Toilet compartments shown on plans.
 - .2 Standard hardware for toilet compartments.
 - .3 Urinal Screens – wall-mounted.
 - .4 Provision of Shop Drawings and Samples.
 - .5 Manufacturer's guarantee.
- .3 **Separate Price:**
 - .1 **This section shall provide a separate price for Washroom Accessories associated with the Public Washroom illustrated on drawing A-406 and separate this cost from the cost to supply all other Accessories specified below.**

1.4 TECHNICAL REFERENCES:

- .1 American Society for Testing Materials:
 - .1 ASTM A167-99 (2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A240/A240M-12, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - .3 ASTM A480/A480M-12, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat Resisting Steel Plate, Sheet, and Strip.
 - .4 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .5 ASTM D 6578 Resistance to graffiti
 - .6 ASTM D 2197 Resistance to imposed loads.
 - .7 ASTM D 2794 Resistance to impact forces.

- .8 ASTM E 84 Smoke Developed and Flames Spread Ratings Tests.
- .2 Canadian Standards Association:
 - .1 CSA B651-12, Accessible Design for the Built Environment.
- .3 National Fire Protection Association:
 - .1 NFPA Interior Wall and Ceiling Finish Classes.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include the following:
 - .1 product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Preparation instructions and recommendations.
 - .3 Storage and handling requirements and recommendations.
 - .4 Installation methods.
- .3 Shop Drawings:
 - .1 Attend the site and conduct field measurements of the work when it is in a state that will permit accurate determination of dimensions.
 - .2 Verify blocking installed by Section 06 10 00 and instruct Contractor of necessary correction; illustrate required blocking on shop drawings.
 - .3 Indicate fabrication details, plans, elevations, hardware, and installation details.
 - .4 Indicate all standard connections and custom connections.
 - .5 Show dimensions measured in field.
 - .6 Indicate nature, material and type for all fasteners.
 - .7 Indicate all connectors, hangers, brackets and reinforcements and their finish
- .4 Samples:
 - .1 Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
 - .2 Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.
 - .3 Submit duplicate representative samples of hardware items, including brackets, fastenings and trim.
- .5 Tools:
 - .1 Provide special tools required for assembly, disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 78 00 - Closeout Submittals.
 - .2 Deliver special tools to Owner's Designee.

1.6 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Minimum 10 year experience manufacturing similar products.
- .2 Installer Qualifications: Minimum 2-years-experience installing similar products.
- .3 Single Source Requirements: To the greatest extent possible provide products from a single manufacturer.
- .4 Accessibility Requirements: Comply with requirements applicable in the jurisdiction of the project, including but not limited to OADA and ICC/ANSI A117.1 requirements as applicable.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area, indoors.
 - .2 Store and protect compartment materials from blemishes and physical damage of any kind.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for recycling materials eligible for recycling and corrugated or box board packaging materials as specified within Construction Waste Management Plan and in accordance with Section 01 74 21 - Construction Waste Management and Disposal.

1.8 PROJECT CONDITIONS

- .1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 SEQUENCE:

- .1 All overhead work completed; all flooring installed. Surfaces to which partitions connect are cured and completed.
- .2 Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.10 WARRANTY

- .1 Manufacturer's Warranty: Manufacturer's standard 2-year warranty for materials and workmanship.

Part 2 Products

2.1 MANUFACTURERS

- .1 Acceptable Manufacturer: Bobrick Washroom Equipment, Inc., which is located at: 6901 Tujunga Ave.; North Hollywood, CA 91605-6213; Tel: 818-764-1000; Fax: 818-765-2700; Email: info@bobrick.com; Web: www.bobrick.com

2.2 MATERIALS

- .1 Basis of Design: High-pressure plastic laminate adhered to particle board core substrate equivalent to Bobrick DesignerSeries High Pressure Laminate, product number 1042, overhead braced toilet compartments and wall-mounted urinal screens with the following characteristics:
- .2 High Pressure Laminate wall-mounted Urinal Screen Panels:
 - .1 Mounting Configuration: Wall-hung.
 - .2 Screen Height: 42 inches (107 cm) with 18 inches (46 cm) floor clearance.
- .3 High Pressure Laminate Toilet Compartment Panels:
 - .1 Standard Height.
 - .1 Door/Panel Height: 58 inches (147 cm).
 - .2 Floor Clearance: 12 inches (30 cm).
- .4 Mounting Configuration:
 - .1 Floor-mounted; overhead braced.
 - .2 Stile Standard Height: 69 inches (175 cm).
- .5 Screen and Partition Panels - Finished Thickness: 1 inch (25 mm) for stiles, doors, screens and panels.
- .6 Panel Materials: 3-ply stiles, panels, doors, and screens.
 - .1 Cores: 45 lb (20.4 kg) density, industrial grade, resin-impregnated, particle board.
 - .2 Surface finish exposed to view: High-pressure laminated plastic NEMA LDS-1985 minimum thickness 0.050 inch (1.33 mm) with matte finish.

- .3 Fabrication: high-pressure plastic laminate sheets bonded to core material with adhesive specially formulated to prevent delamination. Edges bonded prior to bonding face sheets. Splices or joints in faces or edges are not acceptable except in the case of laminate material limitations.
- .4 ADD Stainless Steel Edge Option.
- .5 Edge Trim: 18-8, Type 304 stainless steel channel with satin finish.
 - .1 Stainless Steel Channels: Mortised for flush fit with routed substrate.
 - .2 Corners: Mitered.
- .6 Colour:
 - .1 Selected by architect from manufacturer's standard Plastic Laminate range.
- .7 Fire Resistance:
 - .1 National Fire Protection Association/International Building Code Interior Wall and Ceiling Finish: Class B / Uniform Building Code: Class II.
 - .1 Flame Spread Index (ASTM E 84): 60 for panels and stiles.
 - .2 Smoke Developed Index (ASTM E 84): 265 for panels and stiles.
- .8 Stiles: Floor-anchored stiles furnished with expansion shields and threaded rods.
 - .1 Leveling Devices: 3/8-inch x 7/8-inch (10 mm x 22 mm) steel bar welded to 11-gauge (3 mm) steel-reinforcing core; chromate-treated and double zinc-plated; welded to sheet-steel core of stiles.
 - .2 Stile Shoes: One-piece, 22-gauge (0.8 mm), 18-8, Type 304 stainless steel, 4-inch (102 mm) height; tops with 90-degree return to stile. One-piece shoe capable of adapting to ¾-inch (19 mm) or 1-inch (25 mm) stile thickness and capable of being fastened (by clip) to stiles starting at wall line.
- .9 Wall Posts: Pre-drilled for door hardware, 18-8, Type 304, 16 gauge (1.6 mm) stainless steel with satin finish; 1 inch (25 mm) x 1-1/2 inches (38 mm) x 58 inches high (1473 mm).
- .10 Anchors: Expansion shields and threaded rods at floor connections as applicable.
- .11 Hardware:
 - .1 Compliance: Operating force of less than 5 lb (2.25 kg).
 - .2 Emergency Access: Hinges, latch allow door to be lifted over keeper from outside compartment on inswing doors.
 - .3 Materials: Stainless Steel 18-8, Type 304, heavy-gauge stainless steel with satin finish.
 - .4 Fastening: Hardware secured to door and stile by theft-resistant, pin-in-head Torx stainless steel machine screws into factory-installed, threaded inserts.
 - .5 Door Latch: Track of door latch prevents inswing doors from swinging out beyond stile; on outswing doors, door keeper prevents door from swinging in beyond stile; 16 gauge (1.6 mm) sliding door latch, 14 gauge (2 mm) keeper.
 - .6 Locking: Door locked from inside by sliding door latch into keeper.
 - .7 Hinge Type:
 - .1 Standard: Balanced, with field-adjustable cam to permit door to be fully closed or partially open when compartment is unoccupied.
 - .8 Mounting Brackets:
 - .1 Standard Concealed: Mounted inside compartment; exposed brackets on exterior of compartment not acceptable with the exception of outswing doors.
 - .9 Clothes Hook: mount one on each toilet compartment door.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for toilet compartment and wall mounted urinal screen installation in accordance with manufacturer's written instructions.
- .2 Inspect areas scheduled to receive compartments for correct dimensions, plumb walls, and soundness of surfaces that would affect installation of mounting brackets.

- .3 Verify spacing of plumbing fixtures to assure compatibility with installation of compartments.
- .4 Verify location of blocking, reinforcement, plumbing fixtures and final panel installation does not interfere with door swings or use of fixtures.
- .5 Notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions. Inform contractor and architect of unacceptable conditions immediately upon discovery.
- .6 Do not proceed with installation until substrates have been properly prepared with blocking and supports in walls and ceilings at points of attachment and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.

3.2 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.

3.3 PREPARATION

- .1 Prepare substrates including but not limited to blocking and supports in walls and ceilings at points of attachment using methods recommended by the manufacturer for achieving the best result for the substrates under the project conditions.
 - .1 Inspect areas scheduled to receive compartments for correct dimensions, plumbness of walls, and soundness of surfaces that would affect installation of mounting brackets.
 - .2 Verify spacing of plumbing fixtures to assure compatibility with installation of compartments.
- .2 If preparation is the responsibility of another installer, notify Architect and Contractor in writing of deviations from manufacturer's recommended installation tolerances and conditions.
- .3 Do not proceed with installation until substrates have been properly prepared with blocking and supports in walls and ceilings at points of attachment and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.

3.4 INSTALLATION:

- .1 Do work in accordance with CSA B651 and current requirements of OADA.
- .2 Partition erection.
 - .1 Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:
 - .1 Verify blocking and supports in walls and ceilings has been installed properly at points of attachment.
 - .2 Verify location does not interfere with door swings or use of fixtures.
 - .3 Use fasteners and anchors suitable for substrate and project conditions
 - .4 Install units rigid, straight, plumb, and level.
 - .5 Conceal evidence of drilling, cutting, and fitting to room finish.
 - .2 Anchor mounting brackets to surfaces using screws and shields: (blocking/backing must be provided) to hollow walls using bolts and toggle type anchors.
 - .3 Attach panel and pilaster to brackets with through type sleeve bolt and nut.
 - .4 Allow for adjustment of floor-braced pilasters and ceiling variations with screw jack through steel saddles made integral with pilaster.
 - .5 Conceal ceiling and floor fixings with stainless steel shoes.
 - .6 Equip doors with hinges, latch set, and each stall with coat hook, mounted on door.
 - .1 Adjust and align hardware for easy, proper function. Set door open position at 30 degrees to front.
 - .2 Install door bumper on door.

- .7 Equip out-swinging doors with door pulls on outside and inside of door in accordance with CSA B651.

- .8 Install hardware including grab bars.

3.5 ADJUSTMENT

- .1 Adjust doors and locks for optimum, smooth operating condition.
- .2 Lubricate hardware and other moving parts.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .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 11 - Cleaning.
 - .1 Clean surfaces after installation using manufacturer's recommended cleaning procedures.
 - .2 Adjust hardware for proper operation after installation. Set hinge cam on in-swinging doors to hold doors open when unlatched. Set hinge cam on out-swinging doors to hold unlatched doors in closed position.
 - .3 Touch-up, repair or replace damaged products.
 - .4 Clean exposed surfaces of compartments, hardware, and fittings.
 - .5 Clean and polish hardware and stainless components.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 – Construction Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by metal toilet compartment installation.

END OF BASE BID PRICE WASHROOM ACCESSORIES

Part 4 Separate Price:

4.1 REFER TO ARCHITECTURAL DRAWINGS A-406 AND A-406.1:

- .1 The following items shall be calculated as a Separate Price and the cost relayed separately to Bidders:

4.2 ROOMS INCLUDED IN SEPARATE PRICE CALCULATION:

- .1 Men's Washroom 056.
- .2 Women's Washroom 057.
- .3 Service Room (Janitorial) 058.

4.3 TOILET COMPARTMENTS FOR SEPARATE PRICE:

- .1 Men's Washroom 056:
 - .1 1 such unit will be required.
- .2 Women's Washroom 057:
 - .1 3 such units will be provided in this washroom.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 08 80 50 Glass and Glazing
- .3 Section 09 21 16 Gypsum Board Assemblies
- .4 Section 09 22 16 Non-Structural Metal Framing
- .5 Section 09 91 23 Interior Painting
- .6 Section 10 21 14 Toilet Compartments

1.2 SCOPE OF WORK

- .1 This Section shall supply and install all washroom accessories required under this Contract.
- .2 Alternate products are acceptable if proven equal to specified products and approved through written addenda or by Consultant.
- .3 Provide shop drawings for all accessories listed herein.
- .4 Installation of all washroom accessories may be within scope of Section 06 10 00 Rough Carpentry under this Contract rather than through this Section, to best advantage of the Contractor.
- .5 This section shall co-ordinate with Section 06 10 00 that all required wood blocking is installed to support accessories prior to mounting accessories.
- .6 Robe and coat hooks for shower and toilet compartments shall be supplied and installed by Section 10 21 13 Toilet Compartments.
- .7 Some dispensers and Accessories for selected washrooms shall be supplied by the Owner and installed under Other Sections or Section 06 10 00 Rough Carpentry if not assigned to any other Section.
- .8 **Separate Price:**
 - .1 **This section shall provide a separate price for Washroom Accessories associated with the Public Washroom illustrated on drawing A-406 and separate this cost from the cost to supply all other Accessories specified below.**

1.3 REFERENCES

- .1 American Society for Testing Materials (ASTM):
 - .1 ASTM A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM B456, Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - .3 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM A924/A924M, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-1.81, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
 - .2 CAN/CGSB-1.88, Gloss Alkyd Enamel, Air Drying and Baking.
 - .3 CGSB 31-GP-107MA, Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.
- .3 Canadian Standards Association (CSA):
 - .1 CAN/CSA-B651-04, Accessible Design for the Built Environment.
 - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .4 National Fire Protection Association (NFPA):
 - .1 Fire Performance Characteristics: Provide shower curtains that conform with NFPA 701, Fire Tests for Flame and Resistant Textiles and Films.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

- .1 Provide manufacturer's printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

- .1 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, building-in details of anchors for grab bars.

1.5 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for toilet and bath accessories for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- .1 Tools:
 - .1 Provide special tools required for assembly, disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 78 00 - Closeout Submittals.
 - .2 Deliver special tools to Owner's Designee.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and to conform to manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoor, in dry location and in accordance with manufacturer's recommendations within water tight building or container at the Place of the Work.
 - .2 Store and protect toilet and bathroom accessories from blemishes, paint, grout and damage of any kind.
 - .3 Replace defective or damaged materials with new.
 - .4 Packaging Waste Management: remove for recycling packaging materials in accordance with Section 01 74 19 - Construction Waste Management and Disposal.

1.8 WARRANTY

- .1 15-years for silver spoilage on mirrors.
- .2 Manufacturer's standard warranty for other products.

Part 2 Products

2.1 MATERIALS

- .1 Stainless steel sheet metal: to ASTM A167, Type 304, with number 4 brushed finish.
- .2 Stainless steel tubing: Type 304, commercial grade, seamless, welded, 1.2 mm wall thickness.
- .3 Fasteners: concealed screws and bolts shall be hot dip galvanized; exposed fasteners shall match face of unit. Expansion shields fibre, lead or rubber as recommended by accessory manufacturer for component and its intended use. Exposed fasteners shall be stainless steel.

2.2 TOILET TISSUE DISPENSER

- .1 Owner will supply these units through the Owner's paper products supplier.
- .2 Staff Washroom Women 015a and Men's Staff 015b:
 - .1 6 in total such units are required; wall-mounted adjacent to each of the toilets within each washroom.
- .3 Universal Washroom 036:
 - .1 1 such unit wall-mounted adjacent to the toilet.
- .4 Women's Washroom 036a and Men's Washroom 036b:

- .1 3 such units will be required in total: wall-mounted adjacent to each toilet in each washroom.

2.3 DOOR OR WALL COAT HOOK

- .1 Wall-mounted on gypsum board wall within individual washrooms or mounted on the Toilet Compartment door.
- .2 Connect to gypsum board partitions wall using stainless steel screws into wood blocking installed within steel stud frame.
 - .1 Mounted on Door within the Universal Washroom;
 - .2 Mounted on Door within staff washrooms;
- .3 Acceptable materials:
 - .1 Bobrick B212.
 - .2 Frost 1146.
- .4 Staff Washroom Women 015a and Men's Staff 015b:
 - .1 6 in total such units are required; attached to each of the toilet compartment doors within each of the washrooms.
- .5 Universal Washroom 036:
 - .1 1 such unit mounted on the side of the door.
- .6 Women's Washroom 036a and Men's Washroom 036b:
 - .1 3 such units will be required in total: wall-mounted within each toilet compartment in each washroom.

2.4 STAINLESS STEEL SHELF:

- .1 16" long x 5" wide; Bobrick B-295x16.
- .2 Staff Washroom Women 015a and Men's Staff 015b:
 - .1 1 wall-mounted shelf within each washroom.
- .3 Universal Washroom 036:
 - .1 1 wall-mounted shelf illustrated on drawings.
- .4 Women's Washroom 036a and Men's Washroom 036b:
 - .1 1 wall-mounted shelf within each washroom.

2.5 GRAB BARS:

- .1 A set of grab bars is required adjacent to water closets where the grab bars are shown on drawings. Sets consist of one bar for each water closet mounted horizontally above rear of water closet and a second bar to be wall mounted to side of water closet, L-shaped as specified.
- .2 All bars shall meet or exceed AODA Guidelines.
- .3 All bars to have 38 mm (1.5") diameter, 38 mm (1.5") wall clearance, peened finish, concealed mounting, stainless steel or hot-dipped galvanized fasteners. Coordinate blocking with Section 06 10 00.
- .4 Acceptable Materials are Equal to:
 - .1 ASI 3700-P, 24" (610 mm) length horizontal; Type 04, RH, 30" x 30" L shape, peened.
 - .2 Frost – 1001-SP, 24" (610 mm) long, horizontal; ASI 1001-SP-30" x 30", "L" shape, peened.
 - .3 Bobrick - B-6806 x 24 (610 mm) length horizontal; B-6898.99 - 30" x 30", "L" shape, peened.
- .5 Staff Washroom Women 015a and Men's Staff 015b:
 - .1 1 set of wall-mounted grab bars within each washroom.
 - .2 1 set of Urinal bars will be mounted on the wall adjacent to 1 urinal within 015b.
- .6 Universal Washroom 036:
 - .1 1 set of wall-mounted grab bars.
- .7 Women's Washroom 036a and Men's Washroom 036b:
 - .1 1 set of wall-mounted grab bars within each washroom.

2.6 MIRRORS - GENERAL:

- .1 One mirror is required over each washroom lavatory whether the mirror is noted, illustrated or not. The Contractor shall tally the total number of mirrors required for the project.

- .2 Mirrors within barrier-free washrooms are selected for size to avoid sloped or tilting mirrors.
- .3 All mirrors shall have 15-year silver spoilage warranty.
- .4 Framed Mirrors:
 - .1 All mirror frames to be fabricated using 18-8 alloy, 304 grade, stainless steel channel frames mounted using concealed hardware, steel finish shall be satin finish No. 4.
- .5 Acceptable Materials are Equal to:
 - .1 ASI 0620-2436 – 610 x 914 mm (24" wide x 36" high).
 - .2 Frost 941-2436 – 610 mm W x 914 mm H x 13 mm thickness (24" W x 36" H x ½" D).
 - .3 Bobrick 923 2436, 610 mm x 914 mm.
- .6 Staff Washroom Women 015a and Men's Staff 015b:
 - .1 2 wall-mounted mirrors within each washroom.
- .7 Universal Washroom 036:
 - .1 1 wall-mounted mirror.
- .8 Women's Washroom 036a and Men's Washroom 036b:
 - .1 2 wall-mounted mirrors within each washroom.

2.7 NAPKIN DISPOSAL:

- .1 All units stainless steel type 304; 22 ga; no. 4 brushed finish.
- .2 Acceptable Materials are Equal to:
 - .1 Frost 622 surface mounted
 - .2 ASI 0852
 - .3 Bobrick B270.
- .3 Staff Washroom Women 015a:
 - .1 4 units required: one adjacent to each toilet mounted on toilet compartment panels.
- .4 Universal Washroom 036:
 - .1 1 unit is required wall-mounted adjacent to the toilet.
- .5 Women's Washroom 036a:
 - .1 2 units required: one adjacent to each toilet mounted on toilet compartment panels.

2.8 PAPER TOWEL DISPENSER

- .1 Wall mounted; provided by owner and installed by Contractor. Provide blocking under Section 06 10 00.
- .2 Coffee Room 000:
 - .1 1 wall-mounted towel dispenser.
- .3 Lunch Room 019d:
 - .1 1 wall-mounted towel dispenser.
- .4 Staff Washroom Women 015a and Men's Staff 015b:
 - .1 2 wall-mounted towel dispensers within each washroom.
- .5 Council Office 035:
 - .1 1 wall-mounted towel dispenser.
- .6 Universal Washroom 036:
 - .1 1 wall-mounted towel dispenser.
- .7 Women's Washroom 036a and Men's Washroom 036b:
 - .1 2 wall-mounted towel dispensers within each washroom.
- .8 Executive Boardroom 037:
 - .1 1 wall-mounted towel dispenser.
- .9 Corridor 039:
 - .1 1 wall-mounted towel dispenser.

2.9 SOAP DISPENSER

- .1 Wall-mounted; provided by owner and installed by Contractor. Provide blocking.

- .1 Install one wall-mounted soap dispenser adjacent to sink for every wall mounted towel dispenser noted above.

2.10 WASTE RECEPTACLES:

- .1 430 stainless steel, no. 4 brushed finish all parts. 20 ga spun top; 1 piece, roll formed 22 ga body; 22 ga spun bottom.
- .2 Acceptable materials:
 - .1 Frost A.R.C. Code 310.
 - .2 Bobrick B2400.
- .3 Staff Washroom Women 015a and Men's Staff 015b:
 - .1 1 unit within each washroom.
- .4 Universal Washroom 036:
 - .1 1 unit.
- .5 Women's Washroom 036a and Men's Washroom 036b:
 - .1 1 unit within each washroom.

2.11 MOP HANGER - ONE REQUIRED FOR EACH HOUSEKEEPING ROOM OR JANITORIAL ROOM AND FOR ANY SINK WITH "MOP SINK" OR "FLOOR MOUNTED SINK" DESIGNATION:

- .1 Wall-mount above floor-mounted sink within all Custodian Room 014.
- .2 Acceptable Materials:
 - .1 Bobrick B224x36
 - .2 Frost 1115
 - .3 ASI 1315-3.

2.12 FABRICATION

- .1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners when approved by Consultant, only.
- .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 CAN/CSA-G164 or use stainless steel.
- .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.
- .10 Manufacturer's or brand names on face of units not acceptable.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that substrates and surfaces previously installed under other Sections or Contracts and that will receive toilet and bathroom accessories, are completed to an acceptable state for product installation by this Section in accordance with manufacturer's instructions.
- .2 Inform Contractor and Consultant of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of Contractor's written approval.
- .4 Examine shower curtain and rod installation conditions as described above.

3.2 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 Toilet and shower compartments: use male to female through bolts.
- .2 Use tamper proof screws/bolts for fasteners.
- .3 Fill units with necessary supplies shortly before final acceptance of building.
- .4 Install mirrors in accordance with Section 08 80 50 – Glazing and manufacturer's recommendations.
- .5 Install shower curtain rods and tracks according to manufacturer's instructions. Hang curtains with hooks and rollers according to manufacturer's instructions.

3.3 ADJUSTING

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

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .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 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 – Construction Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

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

END OF BASE BID PRICE WASHROOM ACCESSORIES

Part 4 Separate Price:

4.1 REFER TO ARCHITECTURAL DRAWING A-406 AND A-406.1:

- .1 The following items shall be calculated as a Separate Price and the cost relayed separately to Bidders:

4.2 ROOMS INCLUDED IN SEPARATE PRICE CALCULATION:

- .1 Men's Washroom 056.
- .2 Women's Washroom 057.
- .3 Service Room (Janitorial) 058.

4.3 TOILET TISSUE DISPENSER

- .1 Owner will supply these units through the Owner's paper products supplier.
- .2 Men's Washroom 056:
 - .1 1 such unit will be required adjacent to the toilet.
- .3 Women's Washroom 057:
 - .1 3 such units will be provided in this washroom: wall-mounted adjacent to each of the toilets.

4.4 DOOR OR WALL COAT HOOK

- .1 Wall-mounted on gypsum board wall within individual washrooms or mounted on the Toilet Compartment door.
- .2 Connect to gypsum board partitions wall using stainless steel screws into concrete unit masonry.
- .3 Acceptable materials:
 - .1 Bobrick B212.
 - .2 Frost 1146.
- .4 Men's Washroom 056:
 - .1 1 such unit will be mounted on the toilet compartment door.
 - .2 1 such unit will be mounted on the wall of each the two shower enclosures.
- .5 Women's Washroom 057:

- .1 1 such units will be mounted on each of the 3 toilet compartment doors.
- .2 1 such unit will be mounted on the wall of each of the two shower enclosures.

.6 Service Room 058:

- .1 1 coat hook will be mounted on the inside of the Service Room Door.

4.5 STAINLESS STEEL SHELF:

.1 16" long x 5" wide; Bobrick B-295x16.

.2 Men's Washroom 056:

- .1 1 such unit will be mounted on the wall within the toilet compartment.
- .2 1 such unit will be mounted on the wall of each of the two shower enclosures.

.3 Women's Washroom 057:

- .1 1 such unit will be mounted on the wall of the barrier-free stall near the toilet.
- .2 1 such unit will be mounted on the wall of each of the two shower enclosures.

.4 Service Room 058:

- .1 1 such unit will be mounted on the wall within the Room.

4.6 GRAB BARS:

.1 A set of grab bars is required adjacent to water closets where the grab bars are shown on drawings. Sets consist of one bar for each water closet mounted horizontally above rear of water closet and a second bar to be wall mounted to side of water closet, L-shaped as specified.

.2 All bars shall meet or exceed AODA Guidelines.

.3 All bars to have 38 mm (1.5") diameter, 38 mm (1.5") wall clearance, peened finish, concealed mounting, stainless steel or hot-dipped galvanized fasteners. Coordinate blocking with Section 06 10 00.

.4 Acceptable Materials are Equal to:

- .1 ASI 3700-P, 24" (610 mm) length horizontal; Type 04, RH, 30" x 30" L shape, peened.
- .2 Frost – 1001-SP, 24" (610 mm) long, horizontal; ASI 1001-SP-30" x 30", "L" shape, peened.
- .3 Bobrick - B-6806 x 24 (610 mm) length horizontal; B-6898.99 - 30" x 30", "L" shape, peened.

.5 Men's Washroom 056:

- .1 1 set will be mounted on the wall within the toilet compartment.
- .2 1 set of Urinal bars will be mounted on the wall adjacent to 1 urinal.
- .3 2 bars are required within the barrier-free shower; refer to drawings for length and position.

.6 Women's Washroom 057:

- .1 1 set will be mounted on the wall within the barrier-free toilet compartment.
- .2 1 such unit will be mounted on the wall of the barrier free shower enclosure; refer to drawings for length and position.

4.7 MIRRORS - GENERAL:

.1 One mirror is required over each washroom lavatory whether the mirror is noted, illustrated or not. The Contractor shall tally the total number of mirrors required for the project.

.2 Mirrors within barrier-free washrooms are selected for size to avoid sloped or tilting mirrors.

.3 All mirrors shall have 15-year silver spoilage warranty.

.4 Framed Mirrors:

- .1 All mirror frames to be fabricated using 18-8 alloy, 304 grade, stainless steel channel frames mounted using concealed hardware, steel finish shall be satin finish No. 4.

.5 Acceptable Materials are Equal to:

- .1 ASI 0620-2436 – 610 x 914 mm (24" wide x 36" high).
- .2 Frost 941-2436 – 610 mm W x 914 mm H x 13 mm thickness (24" W x 36" H x ½" D).
- .3 Bobrick 923 2436, 610 mm x 914 mm.

.6 Men's Washroom 056:

- .1 1 such unit will be mounted on the wall above each of the two sinks.

.7 Women's Washroom 057:

- .1 1 such unit will be mounted on the wall above each of the two sinks.

4.8 NAPKIN DISPOSAL:

- .1 All units stainless steel type 304; 22 ga; no. 4 brushed finish.
- .2 Acceptable Materials are Equal to:
 - .1 Frost 622 surface mounted
 - .2 ASI 0852
 - .3 Bobrick B270.
- .3 Women's Washroom 057:
 - .1 3 such units will be required – one mounted within each of the toilet compartments.

4.9 PAPER TOWEL DISPENSER

- .1 Wall mounted; provided by owner and installed by Contractor. Provide blocking under Section 06 10 00.
- .2 Men's Washroom 056:
 - .1 2 such units will be required: one adjacent to each of the two sinks.
- .3 Women's Washroom 057:
 - .1 2 such units will be required: one adjacent to each of the two sinks.
- .4 Service Room 058:
 - .1 1 such unit will be mounted on the wall within the Room.

4.10 SOAP DISPENSER

- .1 Wall-mounted; provided by owner and installed by Contractor. Provide blocking.
 - .1 Install one wall-mounted soap dispenser adjacent to sink for every wall mounted towel dispenser noted above.

4.11 MOP HANGER - ONE REQUIRED FOR EACH HOUSEKEEPING ROOM OR JANITORIAL ROOM AND FOR ANY SINK WITH "MOP SINK" OR "FLOOR MOUNTED SINK" DESIGNATION:

- .1 Wall-mount above floor-mounted sink within all Custodian Room 014.
- .2 Acceptable Materials:
 - .1 Bobrick B224x36
 - .2 Frost 1115
 - .3 ASI 1315-3.
- .3 Service Room 058:
 - .1 1 such unit will be mounted on the wall within the Room.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 00 31 01 Geotechnical Investigation Report
- .2 Section 02 41 13 Site Clearing, Grubbing and Protection of Landscape
- .3 Section 03 00 00 Cast-in-Place Concrete
- .4 Section 32 14 13 Pre-Cast Concrete Unit Paving
- .5 Section 32 92 19 Hydraulic Seeding
- .6 Section 32 92 23 Sod
- .7 Section 32 93 45 Top Soil Placement, Grading and Landscaping

1.2 SECTION INCLUDES

- .1 Erect silt control measures and ensure access control fences are in place.
- .2 Provide geotextiles as part of silt control fences.
- .3 Provide geotextile within planting beds.
- .4 Excavation and removal of existing paved surfaces, topsoil and plantings, existing topsoil and loose fill for disposal off site.
- .5 Excavation to footing elevations shown anticipated to be between 2.4m and 4.0m below the finished floor elevation of the ground floor. Refer to Geotechnical Investigation Report.
- .6 Perform rock removal for the extent of the elevator pit and sufficient in volume to accommodate its foundation slab and space required for erection of formwork.
- .7 De-watering (pumping of ground water) is not anticipated. Underpinning work is not anticipated. Review Geotechnical Investigation Report.
- .8 Assumed soil bearing capacity at footing depth: 150kPa, verified in field by Field Engineer.
- .9 All excavation, trenching, rock removal and backfilling necessary to perform the scope of work shown on drawings and specified.
- .10 Contractor may elect to sub-divide excavation work among sub-contractors.
- .11 Contractor shall be solely responsible for comprehensive analysis for entire scope of work for this Section and its inclusion in the Bid and Contract Price.
- .12 Incidental work including hauling, lifting, removal of demolished elements, etc. may be included in the work of this section to Contractor's best advantage.
- .13 Blasting of rock is prohibited.
- .14 Responsibility to contact Field Engineer to verify founding conditions prior to erection of formwork.
- .15 Backfill and compaction.

1.3 DEFINITIONS

- .1 Granular 'A' means a set of requirements for dense graded aggregates meeting any of the requirements for Granular 'A' Native, Granular 'A' RCM or Granular 'A' RAP, as follows:
 - .1 Granular 'A' Native means a set of requirements for dense graded aggregates produced by crushing bedrock or as found and screened out of naturally formed deposits of sand, gravel and cobbles.
 - .2 Granular 'A' RCM means a set of requirements for dense graded recycled concrete material intended for use as bedding, embedment material and trench backfill around underground infrastructure.
 - .1 Granular 'A' RCM produced from reclaimed concrete material and intended primarily for pipe bedding shall:
 - .1 contain up to 100 per cent by mass of crushed RCM only;
 - .2 not contain glass or ceramic material; and
 - .3 not contain more than a combined total of 0.5 per cent by mass of deleterious material.
 - .4 Gypsum, gypsum plaster and wall board mix shall not be allowed in the mix.
 - .3 Granular 'A' RAP means a set of requirements for dense graded recycled asphaltic material intended for use as granular base within the pavement structure.

- .1 Granular 'A' RAP produced from reclaimed asphalt pavement material:
 - .1 may contain up to 100 per cent by mass of crushed RCM but shall not contain more than 30 percent of RAP by mass;
 - .2 shall not contain glass or ceramic material; and
 - .3 shall not contain more than a combined total of 0.5 per cent by mass of deleterious material.
 - .4 Gypsum, gypsum plaster and wall board mix shall not be allowed in the mix.
- .4 50 mm Crushed Aggregate means a set of requirements for dense graded recycled material intended for use as granular base within the pavement structure.
 - .1 50 mm crushed aggregate:
 - .1 may contain up to 100 per cent by mass of crushed RCM but shall not contain more than 30 percent of RAP by mass;
 - .2 shall not contain glass or ceramic material; and
 - .3 shall not contain more than a combined total of 0.5 per cent by mass of deleterious material.
 - .4 Gypsum, gypsum plaster and wall board mix shall not be allowed in the mix.
- .5 Granular 'B':
 - .1 Granular 'B' may be either Type I or Type II as described below:
 - .1 OPSS 1010.05.03.02 Granular B Type I:
 - .1 produced from naturally formed deposits of sand, gravel, and cobbles or by crushing quarried bedrock, air-cooled blast-furnace slag or nickel slag, RCM or RAP up to 30% by mass with glass or ceramic materials up to 15% by mass, combined.
 - .2 Granular 'B' Type I may contain up to 100% RCM but shall not contain more than 30% by mass of asphalt-coated particles.
 - .3 Granular B Type I may not contain more than a combined total of 15% by mass of glass and the combined amount of deleterious material shall not exceed 1% by mass.
 - .4 RAP containing steel slag aggregates shall not be allowed.
 - .2 OPSS 1010.05.03.03 Granular 'B' Type II:
 - .1 Granular 'B' Type II shall only be obtained from crushing quarried bedrock, air-cooled blast furnace slag, or nickel slag. Steel slag and reclaimed materials shall not be used in the production of Granular B Type II.
 - .2 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .3 Unshrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated. Refer to Section 03 30 00 Cast-in-Place Concrete.
 - .4 Unsuitable bedding, fill and base and sub-base materials:
 - .1 Weak and compressible materials under excavated areas.
 - .2 Frost susceptible materials under excavated areas.
 - .3 Frost susceptible materials:
 - .4 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136:
 - .5 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

1.4 REFERENCES

- .1 American Society for Testing Materials (ASTM):
 - .1 ASTM C117-95, Standard Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

- .3 ASTM D698-10, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
- .4 ASTM D422-98, Standard Test Method for Particle-Size Analysis of Soils.
- .5 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (2,700 kN-m/m³).
- .6 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .7 ASTM D4491-a, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
- .8 ASTM D4595, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
- .9 ASTM D4716, Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
- .10 ASTM D4751a, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .2 Bureau de normalisation du Québec (BNQ)
 - .1 BNQ 3624-115-[04], Polyethylene (PE) Pipe and Fittings-Flexible Corrugated Pipes for Drainage-Characteristics and Test Methods.
- .3 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-4.2-M, Textile Test Methods.
 - .2 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .3 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
 - .4 CAN/CGSB-148.1, Methods of Testing Geotextiles and Geomembranes.
 - .1 No.2-M85, Mass per Unit Area.
 - .2 No.3-M85, Thickness of Geotextiles.
 - .3 No.7.3-92, Grab Tensile Test for Geotextiles.
 - .4 No.6.1-93, Bursting Strength of Geotextiles Under No Compressive Load.
- .4 Canadian Standards Association (CSA):
 - .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel.
 - .3 CAN/CSA-G164-M, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .4 CSA A3000, Cementitious Materials Compendium.
 - .5 CAN/CSA-B1800 Perforated plastic pipe and fittings.
- .5 Ontario Provincial Standard Specifications (OPSS)/Ontario Ministry of Transportation
 - .1 OPSS 314 Construction Specifications for Untreated Subbase, Base, Surface Shoulder, Selected Subgrade and Stockpiling.
 - .2 OPSS 1004-05, Material Specification for Aggregates - Miscellaneous.
 - .3 OPSS 1010-04, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.
 - .4 OPSS. MUNI 501 - Construction Specification for Compacting.
 - .5 OPSS. MUNI 1001 - Material Specification for Aggregates – General.
 - .6 OPSS. MUNI 1010 - Material Specification for Aggregates – Base, Subbase, Select Subbase and Backfill Material.
 - .7 OPSS. MUNI 1150 - Material Specifications for Hot Mix Asphalt.
 - .8 OPSS. MUNI 1350 - Material Specification for Concrete – Materials and Production
- .6 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.5 DEFINITIONS

- .1 Excavation classes: two classes of excavation will be recognized - common excavation and rock excavation.

- .1 Rock: any solid material in excess of 0.25 m³ and which cannot be removed by means of heavy-duty mechanical excavating equipment with 0.95 to 1.15 m³ bucket. Frozen material not classified as rock.
- .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .3 Refer to Section 02 41 13 Site Clearing, Grubbing and Protection of Landscape.
- .2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.
- .3 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .6 Unsuitable materials:
 - .1 Weak and compressible materials under excavated areas.
 - .2 Frost susceptible materials under excavated areas.
 - .3 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136:
 - .2 Sieve sizes to CAN/CGSB-8.1 and CAN/CGSB-8.2. and as follows:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 – 100
0.02 mm	10 – 80
0.005 mm	0 – 45
 - .3 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.
- .7 Unshrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated. Refer to Section 03 30 00 Cast-in-Place Concrete.

1.6 FUNDAMENTAL CONDITIONS AND TASKS FOR WORK OF THIS SECTION

- .1 Existing soil has a variable nature and conditions at one location may differ from other locations.
- .2 Finished floor 223.55 (verify on Civil Engineering Drawings). Retain benchmark throughout course of the work.
- .3 Soil composition is described within the Geotechnical Report and bedrock is encountered at depth ranging from 221.30m to 220.60m at the southern end of the proposed building. Bedrock depth is approximately 220.40m elsewhere on the property. It is assumed that the profile of the bedrock varies between measured points.
- .4 All loose fill, roots, topsoil and removed mixed granular material shall be removed from the site and disposed at a location of the Contractor's choosing.
- .5 New addition foundation will be constructed on bedrock, engineered fill and stiff, native material free of organics.
- .6 Apply new, imported topsoil over prepared sub-grade for a consistent depth of 150mm over all disturbed areas of the work where hydraulic seeding or sod will be planted. Where Planting Beds are illustrated, provide 500mm topsoil depth over free-draining granular backfill.
- .7 Maintain safe working conditions and ensure excavation remains safe as work proceeds.
- .8 Control erosion of soil exposed to weather at all times.

1.7 SERVICES EXAMINATION, LOCATION, PREPARATION AND ADMINISTRATIVE REQUIREMENTS

- .1 Locate and mark utilities and Municipal services using a professional locating service. Liaise with utility provider prior to affecting services. Complete applications and pay associated fees.
- .2 Carefully hand-dig to reveal domestic water service, natural gas service, communications service and electrical power conductors located within Municipal right-of-way.

1.8 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00.
- .2 Samples: submit to designated testing agency, 23 kg sample of backfill material proposed for use, no later than 7 business days prior to commencement of backfilling or filling work.
- .3 Site Quality Control Submittals: submit in accordance with Section 01 45 00.
- .4 Erosion Control:
 - .1 Ensure erosion control measures are in place prior to commencement of construction.
 - .2 Construction Waste Management: dispose unused fill specified above, off site as it is removed from excavation.
- .5 As-Built Drawings
 - .1 The Contractor shall submit "as-built" drawings locations of service lines, maintenance holes, catch basins, valves and top and invert elevations at maintenance holes and catch basins.
 - .2 As - built drawings shall be transferred to an electronic copy of contract documents by the consultant as described in Division 1 sections of the specification.

1.9 QUALITY CONTROL

- .1 Site conditions affecting the construction are the responsibility of the Contractor.
- .2 Review condition of all existing features within the boundary of the site and adjacent to the site together with the existing infrastructure, fencing, signage, service terminals, transformers, service poles, light fixtures, paving, drainage structures and slope conditions and record current condition with digital photography. Notify Owner and Consultant of any existing condition that could be misconstrued as occurring as a result of the new work in this Contract.
- .3 The Contractor shall immediately notify the Consultant of any site condition, which could result in conditions which are unfavourable to the performance of any part of the Work and the performance of the new building.
- .4 Notify the Consultant if soil encountered during excavation does not appear to be stable or capable of supporting structures and slabs specified.
- .5 Coordinate with Owner regarding utility connections, disconnections or alterations of electricity, telephone, domestic water well and septic.
- .6 Notify Field Engineering Consultant of progress of work and request testing and inspection in a timely manner. Do not commence placement of concrete footings without clearance of foundation conditions with field engineer or Departmental Representative. Notify field engineer as the work progresses and to satisfy engineer's requirements for testing including concrete strength; compaction of sub-grades for slabs-on-grade and granular sub-bases for future paving; placement and compaction of backfill and services bedding and backfill installation.
- .7 Quality Control Details:
 - .1 Refer to OPSS 1010.07.02.01 and as follows:
 - .1 The Contractor shall be responsible to undertake sampling in order to monitor Quality Control sampling and testing required to show conformance of the aggregates to this specification. Either the stockpile/pit-run method or control chart method shall be used.
 - .2 These records shall be made available to the Consultant upon request.
 - .1 These records shall be made available to the Contract Administrator upon request.
 - .2 When the stockpile/pit-run method has been selected, test data shall be obtained from samples taken from stockpiled or pit-run material to be used in the work.

- .3 When the control chart method has been selected, control charts shall be prepared in accordance with LS-624 or similar method. Each control chart shall contain information regarding control limits, specification limits, target values, testing frequencies, sampling locations, and time period over which the testing has taken place.
- .4 Each control chart shall include individual test data of the most recent sample indicated on the chart.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 and comply with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, well-ventilated area.
 - .2 Store and protect geotextiles from direct sunlight and UV rays.
 - .3 Replace defective or damaged materials with new.

1.11 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 19.
 - .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

Part 2 Products

- .1 Materials Details:
 - .1 Refer to OPSS 1010.07.02.01 and as follows:
 - .2 The contractor shall provide materials that meet or exceed the requirements of the following:
 - .1 Materials matching material qualities specified below are required.
 - .2 The Contractor shall be responsible to undertake sampling in order to monitor Quality Control sampling and testing required to show conformance of the aggregates to this specification. Either the stockpile/pit-run method or control chart method shall be used.
 - .3 These records shall be made available to the Consultant upon request.
 - .1 These records shall be made available to the Contract Administrator upon request.
 - .2 When the stockpile/pit-run method has been selected, test data shall be obtained from samples taken from stockpiled or pit-run material to be used in the work.
 - .3 When the control chart method has been selected, control charts shall be prepared in accordance with LS-624 or similar method. Each control chart shall contain information regarding control limits, specification limits, target values, testing frequencies, sampling locations, and time period over which the testing has taken place.
 - .4 Each control chart shall include individual test data of the most recent sample indicated on the chart.

2.2 MATERIALS

- .1 Perforated plastic pipe and fittings: to CAN/CSA-B1800. Nominal pipe sizes 100 mm. HDPE perforated pipe with geotextile sock.
- .2 Granular "A", Granular "B" Type I and Granular "B" Type II shall meet or exceed requirements of OPSS 1010. Sand to meet or exceed requirements of OPSS 1004.
- .3 Granular "A" – for use as compacted fill below floor slabs, exterior concrete slabs placed on ground and exterior concrete walks, concrete unit pavers, concrete unit paver base and all curbs.
- .4 Granular "B" may be either Type I or Type II as described below.
- .5 OPSS 1010.05.03.02 Granular "B" Type I shall meet or exceed the following criteria:
 - .1 Granular "B" Type I may be produced from naturally formed deposits of sand, gravel, and cobbles or by crushing one or more of the following:
 - .1 Quarried bedrock.

- .2 Air-cooled blast-furnace slag or nickel slag.
- .3 RCM.
- .4 RAP up to 30% by mass.
- .5 Glass or ceramic materials up to 15% by mass combined.
- .6 Granular B Type I may contain up to 100% RCM but shall not contain more than 30% by mass of asphalt-coated particles. Granular B Type I may not contain more than a combined total of 15% by mass of glass and ceramic material. The combined amount of deleterious material shall not exceed 1% by mass.
- .7 RAP containing steel slag aggregates shall not be allowed.
- .6 Granular 'O' shall only be produced by crushing quarried bedrock, or by crushing cobbles or boulders retained on the 50 mm sieve.
Granular "B" shall be OPSS 1010.05.03.05 Select Subgrade Material shall be non-plastic granular or sandy type soil, only, produced from naturally formed deposits.
- .7 Granular 'B' Type 1 and Type 2, compacted fill for use over sub-grade fill and below granular 'A' material below slabs and walks or as bedding and backfill over services:
 - .1 Granular B may be either Type I or Type II as described below.
 - .1 1010.05.03.02 Granular B Type ii:
 - .1 Granular B Type I may be produced from naturally formed deposits of sand, gravel, and cobbles or by crushing one or more of the following:
 - .1 Quarried bedrock.
 - .2 Air-cooled blast-furnace slag or nickel slag.
 - .3 RCM.
 - .4 RAP up to 30% by mass.
 - .5 Glass or ceramic materials up to 15% by mass combined.
 - .2 Granular B Type I may contain up to 100% RCM but shall not contain more than 30% by mass of asphalt coated particles. Granular B Type I may not contain more than a combined total of 15% by mass of glass and ceramic material. The combined amount of deleterious material shall not exceed 1% by mass.
 - .3 RAP containing steel slag aggregates shall not be allowed.
 - .2 Granular Sub-base: meet or exceed the following requirements:
 - .1 Crushed stone.
 - .3 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.
 - .4 Table:

Sieve Designation	% Passing	
Type 1	Type 2	
75 mm	-	100
50 mm	-	-
37.5 mm	-	-
25 mm	100	-
19 mm	75-100	-
12.5 mm	-	-
9.5 mm	50-100	-
4.75 mm	30-70	22-85]
2.00 mm	20-45	-
0.425 mm	10-25	5-30
0.180 mm	-	-
0.075 mm	3-8	0-10

- .5 Use Granular 'A' as compacted backfill over bedrock and below granular B material; as fill to establish sub-grade slopes below new concrete paving units and landscaping areas and as compacted backfill against foundation walls or over bedded services within trenches. This material shall not be placed such that it would reduce specified thickness of granular A, B or crushed stone materials specified or noted on drawings.
- .8 Select Sub-Grade Material fill:
 - .1 Selected material from imported sources, approved by Owner for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.
 - .2 Use as imported and compacted backfill against foundations and within service trenches as backfill over bedded services where landscape is the finished surface over the fill area.
- .9 Unshrinkable fill: proportioned and mixed to provide:
 - .1 Maximum compressive strength of 0.4 MPa at 28 days.
 - .2 Maximum cement content of 25 kg/m³ : to CSA-A3001, Type GU.
 - .3 Minimum strength of 0.07MPa at 24 h.
 - .4 Concrete aggregates: to CSA-A23.1/A23.2.
 - .5 Cement: Type GU.
 - .6 Slump: 160 to 200 mm.
- .10 Sand: natural river or bank sand or manufactured; washed; free of silt, clay, loam, friable and soluble materials, and organic matter.
- .11 Top soil: imported; free of inorganic material and debris; augmented as specified; free of weed seeds.
- .12 Unshrinkable fill proportioned and mixed to provide:
 - .1 Maximum compressive strength of 0.4 MPa at 28 days.
 - .2 Maximum Portland cement content of 25 kg/m³.
 - .3 Minimum strength of 0.07MPa at 24 hours.
 - .4 Concrete aggregates: to CSA A23.1/A23.2-09.
 - .5 Cement: to CSA A3000, Type GU.
 - .6 Slump: 160 to 200 mm.
- .13 Stockpile Tarps: 0.25 mm minimum thick, polyethylene or rip stop nylon, woven.

2.3 GEOTEXTILE:

- .1 Geotextile: woven synthetic fibre fabric, supplied in rolls.
 - .1 Width: 2m minimum.
 - .2 Composed of: minimum 85% by mass of polypropylene or polyester with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure for 60 days.
- .2 Physical properties:
 - .1 Factory seams: sewn in accordance with manufacturer's recommendations.
 - .2 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.
- .3 Hydraulic properties:
 - .1 Apparent opening size (AOS): to ASTM D4751.
 - .2 Filtration opening size (FOS): to CAN/CGSB-148.1 No.10 and OPSS 1860.
 - .3 Transmissivity: to ASTM D4716.
 - .4 Permittivity: to ASTM D4491.
- .4 Securing pins and washers: to CAN/CSA-G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to CAN/CSA G164.

Part 3 Execution

3.1 EXAMINATION

- .1 Evaluation and Assessment:
 - .1 Examine Phase 2 Environmental Assessment report available through Owner.

- .2 Before commencing work establish precise locations of buried services within extent of construction area.
- .2 Verification of Conditions: verify that conditions of substrate previously installed under other sections or Contracts are acceptable for geotextile material installation in accordance with manufacturer's written instructions.
 - .1 Inform Contractor and Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation following correction of unacceptable conditions and subsequent receipt of Contractor's written consent to commence installation, only.

3.2 INSTALLATION - GEOTEXTILE

- .1 Geotextile is required for construction of silt fences, control of erosion, and work of other Sections, including Landscaping.
- .2 Locate buried services in the vicinity of the site and mark as necessary and considered prudent by the Contractor.
- .3 Temporary erosion and sedimentation control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent areas beyond extent of construction area mutually agreeable sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal when all site work is completed.
- .4 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain position with securing pins or granular material according to situation.
- .5 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .6 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
- .7 Overlap each successive strip of geotextile 600 mm over previously laid strip.
- .8 Pin successive strips of geotextile with securing pins at 600mm interval at mid point of lap.
- .9 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .10 After installation, cover with overlying layer within 4 hours of placement.
- .11 Replace damaged or deteriorated geotextile to approval of Owner.
- .12 Protection:
 - .1 No vehicles or traffic permitted directly on geotextile.

3.3 SILT FENCING

- .1 Supply and install geotextile on wood stakes or wood frame held in place with weight for silt control structure arranged along entire perimeter of work area at outer limit of work. Fixe geotextile to wood frame using galvanized roofing nails and arrange geotextile to lie horizontally on ground for 300 mm minimum, and extend vertically on frame 610 mm. Silt fence is required during entire course of the site work and excavation work until exposed earth is covered by intended work. No silt shall be permitted run over areas beyond the extent of the work illustrated on drawings.

3.4 EXCAVATION AND MOVING EARTH REQUIREMENTS - GENERAL

- .1 Protection of existing conditions and work in progress:
 - .1 Protect excavations from freezing.
 - .2 Keep excavations clean, free of standing water, and loose soil.
 - .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to using methods and materials approved by Field Engineer.

- .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .5 Protect buried services that are required to remain undisturbed.
- .2 Removal:
 - .1 Remove trees, stumps, plants, shrubs, bushes, within areas designated on drawings for clearing and in accordance with Section 02 41 13.

3.5 FIELD QUALITY CONTROL AND FIELD ENGINEERING

- .1 The Field Engineering consultant shall be engaged by the Owner or the Contractor. The Field Engineer will provide materials testing, verify concrete slump and bearing capacity and measure compaction of engineered fill, verify compaction of service trench bedding, and the location of the building walls, among other tasks.
- .2 Testing of materials and compaction of backfill and unshrinkable fill will be performed by Field Engineer designated by Owner.
- .3 Not later than 7 business days, minimum, prior to commencing backfilling or filling, submit to designated Field Engineer, samples of backfill as described in PART 1 - SUBMITTALS.
- .4 Do not begin backfilling or filling operations until material has been approved for use by Field Engineer.
- .5 Not later than 48 hours prior to commencement of backfilling or filling with approved material, notify Consultant and Field Engineer to schedule compaction tests.
- .6 The Field Engineering consultant shall provide third-party testing and inspection services.
- .7 Contractor shall contact Field Engineer for inspection and testing of the following items:
 - .1 Review of excavations for soil bearing capacity and associated reporting.
 - .2 Excavation shoring found to be necessary.
 - .3 Foundation bearing conditions and water table location.
 - .4 Examination of native materials free of organics as use for backfill against foundation walls below landscaping.
 - .5 Compaction of native materials at founding elevations and below sub-grade for pavements or slabs on grade.
 - .6 Compaction of engineered fill and base material.
 - .7 Permission to use lean concrete as backfill or in place of engineered fill.
 - .8 Installation of all buried service piping.
 - .9 Concrete mix and strength testing.
 - .10 Verification of rough and finished grading.
 - .11 Service and utilities trenching and bedding.
 - .12 Cold or hot weather concrete methods.
 - .13 Other requirements of all other sections
- .8 Contractor shall schedule inspections as required by the progress of the work and shall be responsible for scheduling tests to avoid delays in the progress of the construction.
- .9 Cost of inspection and testing shall be paid through the inspection and testing allowances.
- .10 Contact Field Engineer and Consultant when excavation reaches foundation elevation.

3.6 LOCATING AND PROTECTING EXISTING FEATURES

- .1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures, details shown on drawings and applicable local regulations.
- .2 Existing buried utilities and structures:
 - .1 Prior to commencing excavation Work, notify applicable Owner or authorities having jurisdiction for all existing services to establish location and state of use of buried utilities and structures.
 - .2 Confirm locations of buried utilities by careful test excavations:
 - .1 Before commencing work establish precise location of buried services through machine excavation followed by hand digging carefully to expose services.

- .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
- .3 Remove obsolete buried services, if any, as they are discovered: cap cut-off piping or conduits.
- .3 Size, depth and location of existing utilities and structures as indicated on drawings are for guidance only. Completeness and accuracy are not guaranteed.
- .4 Where utility lines or structures that are not identified on drawings exist in area of excavation, obtain direction of Consultant before removing or re-routing. Record location of maintained, re-routed and abandoned underground lines for as-built and site survey drawings.
- .5 Maintain and protect from damage, water, sewer, electric, telephone and other utilities and structures encountered.
- .6 Where utility lines or structures exist in area of excavation, obtain direction of Owner before removing or adjustment of location. Cost for such Work to be paid by Owner when work to the service in question is not shown on drawings or otherwise specified. Note: all work and cost incurred to locate, mark, preserve, adjust and connect to new construction for existing electrical service, existing telephone service, domestic water well and sanitary sewer items is included within Base Bid Price.
- .7 Record location of maintained, re-routed and abandoned underground lines.
- .8 Existing surface features:
 - .1 Conduct, with Owner, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, survey bench marks and monuments which may be affected by Work.
 - .2 Protect existing surface features from damage while Work is in progress. In event of damage, immediately make repair to approval of Consultant and Owner.
 - .3 Where required for excavation, cut roots or branches under direction of arborist and in accordance with Section 2 41 13 Site Clearing, Grubbing and Protection of Landscape.

3.7 CONSTRUCTION SPECIFICATIONS AND STANDARD DRAWINGS

- .1 Works of this section shall be constructed in accordance with the following Ontario Provincial Standard Specifications:
 - .1 OPSS 180 - Construction Specification for the Management and Disposal of Excess Material.
 - .2 OPSS 206 - Construction Specification for Grading
 - .3 OPSS 310 - Construction Specification for Hot Mix Asphalt
 - .4 OPSS 314 - Construction Specification for Untreated Granular, Sub-base, Base, Surface, Shoulder and Stockpiling
 - .5 OPSS 351 - Construction Specification for Concrete Sidewalk
 - .6 OPSS 353 - Construction Specification for Concrete Curb and Gutter Systems
 - .7 OPSS 501 - Construction Specification for Compaction
 - .8 OPSS 503 - Construction Specification for Site Preparation for Pipe Lines, Utilities and Associated Structures in Open Cut
 - .9 OPSS 504 - Construction Specification for Preservation, Protection and Reconstruction of Existing Facilities
 - .10 OPSS 514 - Construction Specification for Trenching, Backfilling and Compacting
 - .11 OPSS 516 - Construction Specification for Excavating, Backfilling and Compacting for Maintenance Holes, Catch Basins, Ditch Inlets and Valve Chambers.
- .2 Works shall be constructed in accordance with the latest revision to the following Ontario Provincial Standard Drawings:
 - .1 OPSD 301.010 - Concrete Sidewalk
 - .2 OPSD 400.110 - Catch Basin Frame and Grate
 - .3 OPSD 600.110 - Concrete Barrier Curb
 - .4 OPSD 705.010 - Precast Concrete Catch Basin (600 x 600)
 - .5 OPSD 802.010 - Flexible Pipe Embedment and Backfill Earth Excavation
- .3 Material Requirements:

- .1 All materials used in construction of the civil site works shall conform to the requirements of the following Ontario Provincial Standard Specifications:
- .2 OPSS 1001 - Material Specification for Aggregates – General
- .3 OPSS 1002 - Material Specification for Aggregates – Concrete
- .4 OPSS 1003 - Material Specification for Aggregates – Hot Mix Asphalt
- .5 OPSS 1004 - Material Specification for Aggregates – Miscellaneous
- .6 OPSS 1010 - Material Specification for Aggregates – Granular A, B, M and Select Sub-grade Material
- .7 OPSS 1150 - Material Specification for Hot Mix Asphalt
- .8 OPSS 1350 - Material Specification for Concrete – Materials and Production
- .9 OPSS 1351 - Material Specification for Precast Reinforced Concrete Components for Maintenance Holes, Catch Basins, Ditch Inlets and Valve Chambers
- .10 OPSS 1841 - Material Specification for Non-Pressure Polyvinyl Chloride (PVC) Pipe Products
- .11 OPSS 1850 - Material Specification for Frames, Grates, Covers and Gratings
- .12 OPSS 1860 - Material Specification for Geotextiles

3.8 UTILITIES

- .1 The Contractor shall locate all existing site services using the appropriate utility or service provider, prior to the commencement of excavation, connection to or relocation of all services.
- .2 Ensure that all persons operating excavation and grading equipment, trucks and other vehicles and those delivering material to the site are aware of the presence of all services and that they avoid damaging these during the course of the Work.
- .3 The Contractor shall co-ordinate the installation of all site services including the provision for connections, etc., by the various sub-trades, utilities and service suppliers.
- .4 The Contractor shall schedule, in advance, and with full cooperation and knowledge of the Owner and affected adjacent land owners and in the case of the electrical power, the utility, the removal or disconnection or temporary disconnection of all existing services including, but not limited to, water, sewer, electrical and telephone services serving the property.
- .5 All work associated with the electrical service shall be undertaken by the Contractor with full cooperation and participation of the Utility provider. Cost of new electrical connection to the new and existing building is included in the contract price. Cost of temporary electrical service is included in the Contract Price.

3.9 STRIPPING OF TOPSOIL

- .1 Begin topsoil stripping of areas shown on drawings after area has been cleared of brush weeds and grasses which are subsequently removed from site.
- .2 Strip topsoil to depths as indicated. Do not mix topsoil with subsoil.
- .3 Stockpile topsoil at location selected by Owner and cover with tarps.

3.10 STOCKPILING

- .1 Stockpile new imported fill materials in areas designated by Owner.
- .2 Stockpile approved and imported fill materials in accordance with Contractor's work requirements and processes.
- .3 Areas not designated as part of the work site shall not be used for stockpiling of any kind.
- .4 Stockpile granular materials to just-in-time delivery methods in manner to prevent segregation.
- .5 Protect fill materials from contamination.
- .6 Tarp Stockpiled topsoil and prevent from blowing, erosion or contamination.
- .7 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.11 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29 Health and Safety Requirements

- .2 Construct temporary Works to depths, heights and locations required to complete work expeditiously and safely.
- .3 During backfill operation:
 - .1 Unless otherwise as indicated or as directed by Consultant, remove sheeting and shoring from excavations.
 - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
- .4 Upon completion of substructure construction:
 - .1 Remove shoring and bracing.
 - .2 Remove excess materials from site and restore site as indicated.
- .5 When sheeting is required to remain in place, cut off tops at elevations as indicated.
- .6 Upon completion of substructure construction:
 - .1 Remove cofferdams, shoring and bracing.
 - .2 Remove excess materials from site and restore watercourses.

3.12 DEWATERING AND HEAVE PREVENTION

- .1 Contractor shall include provision of drainage trenches, intercepting drains, well points, pumps and hoses and construct sumps required to re-direct water arriving in excavation regardless of source. Direct water so removed to area selected by Owner and do not let water carry silts, sand or other aggregates into existing water courses, swales or ponds.
- .2 Keep excavations free of water while Work is in progress.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Contractor shall include provision of drainage trenches, intercepting drains, well points, pumps and hoses and construct sumps required to re-direct water arriving in excavation regardless of source. Direct water so removed to area selected by Owner and do not let water carry silts, sand or other aggregates into existing water courses or ponds.
- .6 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.
- .7 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

3.13 CLEARING

- .1 Clear areas required for access to site and execution of Work to meet or exceed requirements of Section 02 41 13.
- .2 All vegetation, topsoil and organic material shall be removed from all areas, which will be surfaced with new landscaping or restored after construction damage, covered by concrete slabs-on-grade, below any part of the new construction or below foundation locations and all areas to be paved with asphalt.
- .3 All areas of the site affected by the work shall be re-graded and compacted to rough grade elevations required by new landscaping, paving or construction of walks, foundations, slabs and services.
- .4 Remove excavated material, all topsoil and organic debris resulting from site stripping at the General Contractor's expense to an appropriate location off-site and determined by the Contractor. This disposal location shall not be a sanitary landfill.
- .5 Clear site as required for the work, but restrict clearing to that which is required for the execution of the work and for the full extent of the work area shown on the drawings. Consider required grading when calculating removal or relocation of removed material.
- .6 Site clearing includes removal of all landscaping, brush and trees in vicinity of new construction or noted as requiring removal on the site plan.

3.14 CIVIL SITE WORKS INCLUDED

- .1 Supply and installation of all silt fencing and related erosion control measures, pumping of water out of excavations and coordination with Municipal officials regarding disposal of ground water.

- .2 This section shall ensure that all benchmarks, batter boards and other survey markers are established and staked for identification include location of existing services in the vicinity of the site prior to commencing work.
- .3 This section shall report any shift or change occurring to survey markers, stakes and batter boards or bench marks as a result of their work to the Contractor.
- .4 This section shall coordinate all operations related to trenching and service installation with Contractor.
- .5 This section shall supply excavation and backfill required to permit Mechanical Divisions to install and modify water and sanitary drainage to make way for new construction.
- .6 This section shall form and grade all drainage swales. Ponding of water within 6000 mm of any part of the new structure in a location where finished grading is new or for a location within 1.5m of the structure where finished grading is minimal to preserve tree cover, constitutes a deficiency and re-grading and restoration work will be required under the direction of the field engineer. This provision includes water arriving on the site as a result of precipitation, overland surface drainage from other sites, roof water drainage to swales, water accumulating in swales, water running over land or over parking and paving areas or run-off due to snow melt.
- .7 This section shall coordinate the requirements of field testing engineer to confirm building location, location of services, all grade elevations and the finished floor level and depths for foundations, drainage structures and service trenches.
- .8 This section shall coordinate all excavation requirements for mechanical and electrical works and other site services that are the responsibility of mechanical and electrical divisions. Arrangements for sharing of the cost of site work among mechanical, electrical divisions, the general contractor and others, shall be made by the General Contractor and communicated to this section.
- .9 This section shall supply and install all site works including pavement, slabs-on-grade, sidewalks, curbs and gutters shown and all exterior concrete slabs shown on drawings.
- .10 All items and implied work illustrated on the site works drawings shall be the responsibility of this section and the general contractor is solely responsible for the division of the work into sub-trade contracts such as installation pavements or concrete walks, etc., and such division of responsibility shall be at the discretion of the general contractor regardless of any division of responsibilities indicated or implied on drawings or within specifications.
- .11 This section shall establish all grades, finished grade elevations in all cases and construct swales as indicated under the direction of the surveyor and the field engineer.
- .12 Where there is doubt about the intent of the drawings or specifications, this section shall seek clarification from the general contractor in the first instance and the field engineer in the second instance.
- .13 The consultant and the field engineer shall review and confirm grades.
- .14 This section shall ensure that the as-built drawings illustrate accurate locations of all service trenches, building location, walks and extent of any paving with dimensions building face at foundation walls.

3.15 WATER SUPPLY

- .1 Refer to Mechanical Engineering documents.
- .2 This section shall locate existing buried water main connected to new building and sequence excavation to permit establishment of new permanent connection coordinated with the requirements of the new construction. Mark location of piping.
- .3 This section shall coordinate with Contractor, sleeve locations or coring of foundations to permit installation of water service to each building and for each water line shown.

3.16 STORM WATER DRAINAGE

- .1 Contractor shall ensure that all grades are set to drain away from structures and door entries to existing sloped areas or through new swales that direct water to drainage paths shown.
- .2 Form surface drainage adjacent to buildings to ensure continuous drainage down-gradient to intended outlets. Provide positive drainage away from slabs-on-grade or walks associated with entrances and

entrance canopies. Establish surfaces free of projections that would dam water flowing in direction of drainage.

3.17 SANITARY SEWERS

- .1 Refer to Mechanical Engineering documents.
- .2 Contractor shall, throughout the course of the work of the Contract, maintain existing sanitary sewage connection and establish a new, permanent connection for all buildings on the site arranged to accommodate new construction.
- .3 This Section shall coordinate the installation of sleeves through foundation wall or the installation of bridged footings with the general contractor. This section shall provide the sanitary drainage piping to the outside face of the foundation wall or as agreed between this Section and mechanical division to ensure complete continuity of the system.
- .4 Mechanical Division - Plumbing shall connect sanitary drains from the outside face of the foundation wall throughout the interior area of the building covered by the slab on grade building to work of this Section beyond the outside face of the foundation wall.
- .5 This section shall ensure all sanitary drains installed outside of foundation walls are buried a minimum of 1750mm below proposed new finished grade or insulated with sufficient layers of Styrofoam SM or Foamular 300 to replace soil cover lacking. Each layer of 50mm insulation thickness is equivalent to approximately 200mm of soil.

3.18 EXCAVATION

- .1 Identify required lines, levels, contours, and datum. Review final grading requirements including all new imported fill and topsoil depths specified. Remove existing native material and rock required to ensure that final grades are achieved with fill specified in place in the final, graded condition of the site.
- .2 Protect trees, shrubs, and lawns, remaining as portion of final landscaping.
- .3 Protect above and below grade utilities which are to remain.
- .4 Ensure sediment control measures are installed.
- .5 Continually review soil and rock conditions as work progresses on all excavations. Remove soil and organics to expose bearing conditions approved by Field Engineer.
- .6 Remove topsoil by stripping stipulated within Section 02 41 13. Blasting is prohibited.
- .7 Excavate soil required to carry out work of contract.
 - .1 Do not disturb soil or rock below bearing surfaces.
 - .2 Notify Field Engineer and Consultant when excavations are complete.
 - .3 If bearings are unsatisfactory, additional excavation will be authorized in writing and cost for same paid as additional work.
 - .4 Excavation taken below depths shown without Consultant's written authorization shall be filled with clear stone or 10MPa concrete specified for below footings.
 - .5 Excavate to depth of granular material shown on drawings placed below new footings.
- .8 Excavate to establish service trenches providing uniform continuous bearing and support for 150 mm or greater thickness of pipe bedding material on solid and undisturbed ground.
 - .1 Trench widths below point 150 mm above pipe not to exceed diameter of pipe plus 600 mm.
- .9 Excavate for slabs to bottom of granular material layers specified. In addition, remove all topsoil, organic matter, debris and other loose and harmful matter encountered at subgrade level.
- .10 Shore and brace excavations, protect slopes and banks and perform work in accordance with Provincial regulations.
- .11 Grade top of excavation perimeter away from trench to reduce surface water run-off into excavation.
- .12 Install dewatering system to keep subgrades dry and convey groundwater away from excavations. Maintain until dewatering is no longer required.
 - .1 Outfall dewatering system to acceptable sediment trapping device constructed using wood stakes, geotextile and straw bales, assembly of which must be approved by Municipality.
- .13 Dispose removed pavements, fill and rock material off-site.

- .14 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth.
- .15 Correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with concrete specified for footings, fill compacted to not less than 100% of corrected Standard Proctor maximum dry density or use lean concrete or use crushed limestone.
 - .2 Fill within all other excavations and trenches use Sub-Grade material or selected sub-grade material fill compacted to not less than 100 % of corrected Standard Proctor maximum dry density where it will be below walks or slabs on grade and to 98% SPMDD where it will be below landscape. Fill sub-grade granular to elevation of Granular B determined by elevation of finished floor less thickness of slab less 150 mm compacted granular A or crushed, washed limestone less 300mm Granular B type 1 or 2.,
 - .3 Fill immediately below slabs using Granular A compacted to 100% SPMDD and Granular B, Type 1 or 2 minimum 300 mm thickness, compacted to 10% SPMDD below Granular A in all cases.
- .16 Excavation must not interfere with bearing capacity of adjacent new foundations.
- .17 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .18 Keep excavated and stockpiled materials safe distance away from edge of trench.
- .19 Restrict vehicle operations directly adjacent to open trenches.
- .20 Dispose of surplus and unsuitable excavated material in approved location.
- .21 Hand trim, make firm and remove loose material and debris from excavations.
- .22 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
- .23 Clean out rock seams and fill with concrete mortar or grout to approval of Owner and field engineer.
- .24 Notify Field Engineer when bottom of excavation is reached.
- .25 Obtain Field Engineer approval of completed excavation.

3.19 BACKFILLING

- .1 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.
- .2 Do not backfill over porous, wet, frozen or spongy subgrade surfaces. Cut out soft areas of subgrade not capable of in-place compaction.
- .3 This contract requires all new, imported tested and inspected free-draining backfill below all new construction, structures or pavements. All cost associated with handling, storing and compacting new engineered fill materials shall be included in this contract Bid Price.
- .4 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.
- .5 Free draining, imported granular material shall be used as backfill on the site against all foundations, below all walks and pavements and below any slab on grade including all floor slabs. Granular "B", compacted and "A" material compacted is acceptable when layered with Granular "A" placed and compacted to a depth of 200mm below the finished grade, floor slab or pavement unless otherwise noted on drawings.
- .6 Clear or crushed and washed 20mm limestone may be substituted as backfill in any location with confirmation of material quality and source by the field engineer.
- .7 Granular materials of lesser grades than noted above shall not be used unless approved by the field engineer and compacted to specified density and provided that the backfill will not be below an area paved with concrete or asphalt or a slab-on-grade.
- .8 All paved areas covered with concrete slabs-on-grade, gravel or concrete walks shall have engineered fill imported and placed to elevate existing top of bedrock elevation, to finished sub-grade elevations shown. The contractor is solely responsible providing all required fill from established cleared sub-grade to finished elevations

- .9 Compaction of subgrade: compact existing subgrade under slabs on grade, to same compaction as fill where native material free of organics is found acceptable to field engineer.
- .10 Fill rock excavated areas with clear stone to underside of footing elevation.
- .11 Placing:
 - .1 Place backfill, fill and base course material in 200 mm lifts: add water as required to achieve specified density.
 - .2 Place unshrinkable fill in areas identified by field engineer: consolidate and level unshrinkable fill with internal vibrators.
- .12 Compaction: compact each layer of material to following densities for material to ASTM D698:
 - .1 To underside of base courses: 100%.
 - .2 Base courses: 100%.
- .13 Beyond line of footings placed for exterior perimeter walls: 98%. Compact backfill in areas outside of building foundation to 98% SPMDD for all areas not covered by pavements, granular driveways or slabs on grade.
- .14 Under slabs:
 - .1 Use Granular B fill up to bottom of granular base courses.
 - .2 Use 150 to 200mm thickness of clear 19mm crushed stone base course below insulation below slabs.
- .15 In trenches:
 - .1 Up to 300 mm above pipe or conduit: clear stone placed by hand and wrapped in geotextile.
 - .2 Over 300 mm above pipe or conduit: native material approved by Field Engineer.
- .16 Compaction below slab-on-grade and all pavements shall take place in 200mm lifts, maximum and under supervision of the field engineer.
- .17 Establish rough grading in accordance with slope requirements noted below and with consideration to the final grading and finished surface treatments indicated.
- .18 Removed rock material not capable of fine grading, is not acceptable as backfill or sub-grade material. Imported material must be placed as backfill.
- .19 Against foundations (except as applicable to trenches and under slabs and paving): excavated material or imported material with no stones larger than 75 mm diameter within 600 mm of structures.
- .20 Service Trench Bedding
 - .1 Refer to Mechanical Divisions.
 - .2 Bedding and cover materials for water service and sanitary sewer pipes shall be Granular "A" wrapped in geotextile extending from 150 mm below the bottom of the pipe to 300 mm over the top of the pipe. Bedding and cover materials shall be compacted to 98% of maximum dry density. The remaining material over the pipe shall be placed after the bedding has been compacted to the spring line, only.
 - .3 Backfill above the cover materials in sanitary sewer and water main trenches shall be approved native material free of clods, stones over 76 mm (3") in diameter, waste material, organic material, debris or frozen portions and compacted to 100% maximum dry density in areas not subject to vehicular traffic.
 - .4 Where located under parking areas or driveway, backfill shall be Granular "B" material compacted to 98% maximum dry density extending from the top of cover material to the bottom of the granular sub-grade.
 - .5 Backfill over-excavated areas with 20mm clear limestone or 10 MPa concrete under supervision of field engineer. Do not re-fill over excavated areas with removed or other material.

3.20 GRADING

- .1 Review drawings for final grading requirements. This section shall review sub-grade and compaction and verify the suitability of the sub-base prior to completing final grading.
- .2 Minimum slope for all grades away from new construction are as follows:

- .1 For planting beds, drip line stone, grass areas or treed landscape, slope away 5%.
- .2 For paved areas, walks or patios, slope away 2% or as shown on drawings.
- .3 Establish that sub-grades are set with adequate allowance for finished surfaces and slopes indicated. Remove material from the sub-grade if it is apparent that the sub-base will not permit full thickness of finish material.
- .4 Allow a minimum of 8" (200 mm) between finished grade and top of foundation wall except where noted and at entrances. Make allowance for appropriate granular fill indicated in order to achieve finished grades shown. This includes importation of new granular base specified and in sufficient quantity to achieve the final result indicated on drawings.
- .5 Adhere to grades indicated on drawings and report situations contrary to installation indicated in this section to the architect prior to commencing final grading.
- .6 All walks at all building entrance locations shall drain completely away from the building structure with water flowing over surface smoothly, leaving no puddles.
- .7 All asphalt pavements shall drain completely and sufficiently to permit water to flow over surfaces smoothly, in the direction of catch basins, leaving no puddles.

3.21 LANDSCAPING FEATURES

- .1 Place geotextile over granular material below mulch shown on drawings as part of weed control system.
- .2 Protection:
 - .1 No vehicles permitted directly on geotextile.

3.22 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 35 50 - Waste Management and Disposal, trim slopes, and correct defects as directed by Consultant.
- .2 Place and compact base for planting beds and lay geotextile as marked on drawings.
- .3 Place new topsoil in minimum 150mm depth on existing native soil overburden for all landscaped areas shown and 500mm depth within planting beds shown.
- .4 Reinstate grade to elevation which existed before excavation.
- .5 Clean and reinstate areas affected by Work as directed by Owner.
- .6 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.
- .7 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

3.23 AS-BUILT DRAWINGS

- .1 The Contractor shall submit "as-built" drawings locations of service lines, maintenance holes, catch basins, valves and top and invert elevations at maintenance holes and catch basins.
- .2 As - built drawings shall be transferred to an electronic copy of contract documents by the consultant as described in Division 1 sections of the specification.

3.24 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .2 Leave Work area clean at end of each day.
- .3 Dispose of cleared and grubbed material off site daily.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS:

- .1 Section 32 14 13 Pre-Cast Concrete Unit Paving.

1.2 REFERENCES

- .1 CAN/CGSB-1.5-M91, Low Flash Petroleum Spirits Thinner.
- .2 CGSB1-GP-12c-68, Standard Paint Colours.
- .3 CGSB1-GP-71-83, Method, of Testing Paints and Pigments.
- .4 CGSB1-GP-74M-79, Paint, Traffic, Alkyd.
- .5 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition MPI #32, Traffic Marking Paint, Alkyd.

1.3 SUMMARY

- .1 Section includes obtaining layout services from Contractor.
- .2 Section includes application of 102mm (4") wide lines designating parking areas.
- .3 Application of barrier-free designated parking place symbols.
- .4 Application of diagonal markings as shown to designate cross walk and no parking areas.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Paint:
 - .1 To CGSB1-GP-74M, alkyd traffic paint.
 - .2 White and yellow traffic marking paint shall be methyl methacrylate and conform to AASHTO M 248, Type F.
 - .3 Colour: to CGSB1-GP-12C, white 513-301 and blue for barrier-free symbol components.

PART 3 EXECUTION

- .1 Ensure that parking lot and driving aisle painting marks are measured and positioned by Contractor prior to commencement of pavement marking.
- .2 Perform work in accordance with the Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition using MPI #32, Traffic Marking Paint, Alkyd.

3.2 EQUIPMENT REQUIREMENTS

- .1 Paint applicator to be an approved pressure type, capable of applying marking components uniformly and to dimensions as indicated, and to have positive shut-off.

3.3 CONDITION OF SURFACES

- .1 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.

3.4 TRAFFIC CONTROL

- .1 Erect barriers, cones, tapes and other devices to direct traffic away from areas being painted.
- .2 Maintain barriers until paint has cured sufficiently to support traffic without distorting or otherwise damaging markings.
- .3 Remove barriers at completion of painting.

3.5 APPLICATION

- .1 Lay out pavement markings under direct supervision of general contractor. General contractor shall be present at all times during paint application. Where there is doubt about the intent of marking shown, do not paint marking, but contact consultant for clarification.
- .2 Apply paint only when air temperature is above 10 degrees C, wind speed is less than 60 km/h and no rain is forecast within next 4 hours or as recommended by paint manufacturer.
- .3 Apply traffic paint evenly at rate of 3 m²/L.

- .4 Do not thin paint.
- .5 Symbols and letters to conform to dimensions indicated and Ontario standards for barrier-free symbol.
- .6 Parking stalls to be painted as indicated.
- .7 Paint lines to be of uniform colour and density with sharp edges.
- .8 Thoroughly clean distributor tank before refilling with paint of different colour.

3.6 TOLERANCE

- .1 Paint markings to be within plus or minus 1/2" of dimensions indicated.
- .2 Remove incorrect markings in accordance with consultant's instructions and reapply as directed.

3.7 PROTECTION OF COMPLETED WORK

- .1 Protect pavement markings until dry.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 00 31 00 Designated Substance Study Report and Phase 2 Environmental Assessment Report.
- .2 Section 02 41 13 Site Clearing, Grubbing, Protection of Landscape and Site Work Demolition.
- .3 Section 03 00 00 Cast-in-Place Concrete.
- .4 Section 06 10 00 Rough Carpentry.
- .5 Section 32 12 18 Painted Traffic Lines

1.2 SECTION INCLUDES

- .1 Erect silt control measures and ensure access control fences are in place.
- .2 Provide geotextiles as part of silt control fences.
- .3 Precast concrete institutional curbs.
- .4 Precast concrete unit pavers on a cast-in-place concrete base.
- .5 Precast concrete unit pavers on a compacted granular sub-base and base.
- .6 Bedding and Jointing Materials.
- .7 Maintenance and cleaning instructions for the work.

1.3 DEFINITIONS

- .1 Aspect Ratio means the overall length of a paver divided by its thickness. For example, a 100 mm wide by 200 mm long by 80 mm thick paver has an aspect ratio of 2.5. Compare to Plan Ratio.
- .2 Bedding Sand means a layer of uncompacted sand that is screeded smooth prior to placement of the pavers.
- .3 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .4 Sieve sizes to CAN/CGSB-8.1 and CAN/CGSB-8.2. and as follows:
 - .1 Sieve size: 2.00 mm; percent passing: 100.
 - .2 Sieve size: 0.10 mm; percent passing: 45-100.
 - .3 Sieve size: 0.02 mm; percent passing: 10 - 80.
 - .4 Sieve size: 0.005 mm; percent passing: 0-45.
 - .5 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.
- .5 Concrete Base – **If Used:**
 - .1 The materials for and the production of concrete base shall be as follows:
 - .1 Cement type: Normal Portland GU/Portland limestone GUL.
 - .2 Minimum 28-day cylinder compressive strength 32 MPa.
 - .3 Class of exposure: C-1 (exposed to chlorides and freezing and thawing).
 - .4 Nominal maximum size of coarse aggregate 19 mm
 - .5 Slump at point of discharge (formed concrete) 80 ± 30 mm
 - .6 Total air content 6.5 ± 1.5%
 - .7 Maximum water/cementing materials ratio: 0.45.
- .6 Concrete Paver means a precast concrete paving product according to CSA A231.2.
- .7 Edge Paver means a precast concrete unit made or field cut with a straight side for placement flush with a concrete curb or other edge restraint.
- .8 Edge Restraint means a curb, edging, building or other appurtenance that is intended to confine the bedding sand and concrete pavers so that the pavers do not spread and lose interlock.
- .9 Granular 'A' means a set of requirements for dense graded aggregates meeting any of the requirements for Granular 'A' Native, Granular 'A' RCM or Granular 'A' RAP, as follows:
 - .1 Granular 'A' Native means a set of requirements for dense graded aggregates produced by crushing bedrock or as found and screened out of naturally formed deposits of sand, gravel and cobbles.

- .2 Granular 'A' RCM means a set of requirements for dense graded recycled concrete material intended for use as bedding, embedment material and trench backfill around underground infrastructure.
 - .1 Granular 'A' RCM produced from reclaimed concrete material and intended primarily for pipe bedding shall:
 - .1 contain up to 100 per cent by mass of crushed RCM only;
 - .2 not contain glass or ceramic material; and
 - .3 not contain more than a combined total of 0.5 per cent by mass of deleterious material.
 - .4 Gypsum, gypsum plaster and wall board mix shall not be allowed in the mix.
- .3 Granular 'A' RAP means a set of requirements for dense graded recycled asphaltic material intended for use as granular base within the pavement structure.
 - .1 Granular 'A' RAP produced from reclaimed asphalt pavement material:
 - .1 may contain up to 100 per cent by mass of crushed RCM but shall not contain more than 30 percent of RAP by mass;
 - .2 shall not contain glass or ceramic material; and
 - .3 shall not contain more than a combined total of 0.5 per cent by mass of deleterious material.
 - .4 Gypsum, gypsum plaster and wall board mix shall not be allowed in the mix.
- .4 50 mm Crushed Aggregate means a set of requirements for dense graded recycled material intended for use as granular base within the pavement structure.
 - .1 50 mm crushed aggregate:
 - .1 may contain up to 100 per cent by mass of crushed RCM but shall not contain more than 30 percent of RAP by mass;
 - .2 shall not contain glass or ceramic material; and
 - .3 shall not contain more than a combined total of 0.5 per cent by mass of deleterious material.
 - .4 Gypsum, gypsum plaster and wall board mix shall not be allowed in the mix.
- .10 Granular 'B':
 - .1 Granular 'B' may be either Type I or Type II as described below:
 - .1 OPSS 1010.05.03.02 Granular B Type I:
 - .1 produced from naturally formed deposits of sand, gravel, and cobbles or by crushing quarried bedrock, air-cooled blast-furnace slag or nickel slag, RCM or RAP up to 30% by mass with glass or ceramic materials up to 15% by mass, combined.
 - .2 Granular 'B' Type I may contain up to 100% RCM but shall not contain more than 30% by mass of asphalt-coated particles.
 - .3 Granular B Type I may not contain more than a combined total of 15% by mass of glass and the combined amount of deleterious material shall not exceed 1% by mass.
 - .4 RAP containing steel slag aggregates shall not be allowed.
 - .2 OPSS 1010.05.03.03 Granular 'B' Type II:
 - .1 Granular 'B' Type II shall only be obtained from crushing quarried bedrock, air-cooled blast furnace slag, or nickel slag. Steel slag and reclaimed materials shall not be used in the production of Granular B Type II.
- .11 Laying Face means the exposed vertical face of a row of pavers on the bedding sand.
- .12 Plan Ratio means the overall length of a paver divided by its width. Compare to Aspect Ratio.
- .13 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .14 Unshrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated. Refer to Section 03 30 00 Cast-in-Place Concrete.

- .15 Unsuitable bedding, fill and base and sub-base materials:
 - .1 Weak and compressible materials under excavated areas.
 - .2 Frost susceptible materials under excavated areas.
 - .3 Frost susceptible materials:
 - .4 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136:
- .16 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

1.4 REFERENCES

- .1 American Society for Testing Materials (ASTM):
 - .1 ASTM C29 - Bulk Density and Voids in Aggregate Materials.
 - .2 ASTM C33 - Standard Specification for Concrete Aggregates.
 - .3 ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile, Section 8, Freezing and Thawing.
 - .4 ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .5 ASTM C140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units & Related Units.
 - .6 ASTM C144 - Standard Specifications for Aggregate for Masonry Mortar.
 - .7 ASTM D448 - Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
 - .8 ASTM C936 - Standard Specification for Solid Concrete Interlocking Paving Units.
 - .9 ASTM C979 - Standard Specification for Pigments for Integrally Colored Concrete.
 - .10 ASTM C1645 - Standard Test Method for Freeze-thaw and De-icing Salt Durability of Solid Concrete Interlocking Paving Units.
 - .11 ASTM D698 - Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 5.5 lb (24.4 N) Rammer and 12 in. (305 mm) drop.
 - .12 ASTM D1557 - Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 10-lb (44.5 N) Rammer and 18 in. (457 mm) drop.
 - .13 ASTM D1883 - Test Method for California Bearing Ratio of Laboratory-Compacted Soils.
 - .14 ASTM D2940 - Graded Aggregate Material for Bases or Subbases for Highways or Airports.
 - .15 ASTM D4254 - Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
 - .16 ASTM D4354 - Standard Practice for Sampling of Geosynthetics for Testing.
 - .17 ASTM D4491 - Standard Test Method for Water Permeability of Geotextiles by Permittivity.
 - .18 ASTM D4533 - Standard Test Method for Index Trapezoidal Tearing Strength of Geotextiles.
 - .19 ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
 - .20 ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.
 - .21 ASTM D4759 - Standard Practice for Determining the Specifications Conformance of Geosynthetics.
 - .22 ASTM D4833 - Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products.
 - .23 ASTM D5261 - Standard Test Method for Measuring Mass per Unit Area of Geotextiles.
 - .24 ASTM D422-98, Standard Test Method for Particle-Size Analysis of Soils.
 - .25 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (2,700 kN-m/m³).
 - .26 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - .27 ASTM D4491-a, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - .28 ASTM D4595, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
 - .29 ASTM D4716, Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
 - .30 ASTM D4751a, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

- .2 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-4.2-M, Textile Test Methods.
 - .2 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .3 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
 - .4 CAN/CGSB-148.1, Methods of Testing Geotextiles and Geomembranes.
 - .1 No.2-M85, Mass per Unit Area.
 - .2 No.3-M85, Thickness of Geotextiles.
 - .3 No.7.3-92, Grab Tensile Test for Geotextiles.
 - .4 No.6.1-93, Bursting Strength of Geotextiles Under No Compressive Load.
- .3 Canadian Standards Association (CSA):
 - .1 CSA A23.1, Concrete: Components and workmanship
 - .2 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .3 CSA A23.2 Precast Concrete Pavers.
 - .4 CSA A283, Qualification code for Concrete Testing Laboratories
- .4 Ontario Provincial Standard Specifications (OPSS)/Ontario Ministry of Transportation
 - .1 OPSS 1004-05, Material Specification for Aggregates - Miscellaneous.
 - .2 OPSS 1010-04, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.
- .5 Granular 'A' fill:
 - .1 All Granular 'A' fill shall meet the specifications of Granular 'A' Native, Granular 'A' RCM or Granular 'A' RAP as defined above.
- .6 Granular 'B' fill:
 - .1 All Granular 'A' fill shall meet the specifications of Granular 'A' Native, Granular 'A' RCM or Granular 'A' RAP as defined above.
- .7 Quality Control:
 - .1 OPSS 1010.07.02.01 General and as follows:
 - .2 OPSS. MUNI 1001 - Material Specification for Aggregates – General.
 - .3 OPSS.MUNI 1010 - Material Specification for Aggregates – Base, Subbase, Select Subbase and Backfill Material.
 - .4 OPSS. MUNI 1150 - Material Specifications for Hot Mix Asphalt
 - .5 OPSS.MUNI 1350 - Material Specification for Concrete – Materials and, Production.
- .8 Existing soil has a variable nature and conditions at one location may differ from other locations.

1.5 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00.
- .2 Samples: submit to designated testing agency, samples of sub-base, base, bedding and backfill material proposed for use, no later than 7 business days prior to commencement of backfilling or filling work.
- .3 Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- .4 Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.
- .5 Site Quality Control Submittals: submit in accordance with Section 01 45 00.
- .6 Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.
- .7 As-Built Drawings
 - .1 The Contractor shall submit "as-built" drawings locations of service lines, maintenance holes, catch basins, valves and top and invert elevations at maintenance holes and catch basins.
 - .2 As - built drawings shall be transferred to an electronic copy of contract documents by the consultant as described in Division 1 sections of the specification.

1.6 QUALITY CONTROL

- .1 Site conditions affecting the construction are the responsibility of the Contractor.
- .2 Review condition of all existing features within the boundary of the site and adjacent to the site together with the existing infrastructure, fencing, signage, service terminals, transformers, service poles, light fixtures, paving, drainage structures and slope conditions and record current condition with digital photography. Notify Owner and Consultant of any existing condition that could be misconstrued as occurring as a result of the new work in this Contract.
- .3 The Contractor shall immediately notify the Consultant of any site condition, which could result in conditions which are unfavourable to the performance of any part of the Work and the performance of the new building.
- .4 Notify the Consultant if soil encountered during excavation does not appear to be stable or capable of supporting structures and slabs specified.
- .5 Notify Field Engineering Consultant of progress of work and request testing and inspection in a timely manner. Do not commence placement of concrete footings without clearance of foundation conditions with Field Engineer. Notify field engineer as the work progresses and to satisfy engineer's requirements for testing including concrete strength; compaction of sub-grades for slabs-on-grade and granular sub-bases for future paving; placement and compaction of backfill and services bedding and backfill installation.
- .6 Quality Control Details:
 - .1 Refer to OPSS 1010.07.02.01 and as follows:
 - .1 The Contractor shall be responsible to undertake sampling in order to monitor Quality Control sampling and testing required to show conformance of the aggregates to this specification. Either the stockpile/pit-run method or control chart method shall be used.
 - .2 These records shall be made available to the Consultant upon request:
 - .1 When the stockpile/pit-run method has been selected, test data shall be obtained from samples taken from stockpiled or pit-run material to be used in the work.
 - .2 When the control chart method has been selected, control charts shall be prepared in accordance with LS-624 or similar method. Each control chart shall contain information regarding control limits, specification limits, target values, testing frequencies, sampling locations, and time period over which the testing has taken place.
 - .3 Each control chart shall include individual test data of the most recent sample indicated on the chart.

1.7 MOCK-UP

- .1 Construct a 3.0 m x 3.0 m mock-up of the paver installation on the specified base materials.
- .2 The mock-up will serve as the benchmark for assessing the work's compliance and can be seamlessly integrated into the project.
- .3 If the architect indicates that the mock-up may remain in the final Project, protect this mock-up in preparation for its integration into the final Project.
- .4 Protect this mock-up in preparation for its integration into the final project.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 and comply with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, well-ventilated area.
 - .2 Store and protect geotextiles from direct sunlight and UV rays.
 - .3 Replace defective or damaged materials with new.

1.9 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 19.
 - .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

Part 2 Products

2.1 MATERIALS

- .1 Granular 'A', Granular 'B' Type I and Granular B Type II shall meet or exceed requirements of OPSS 1010. Sand to meet or exceed requirements of OPSS 1004.
 - .1 Granular 'A' – for use as compacted fill below interior floor slabs, exterior concrete walks, exterior concrete slabs cast on ground and below precast concrete unit pavers.
 - .2 Granular 'B' Type 1 and Type 2, compacted fill for use over sub-grade fill and below granular 'A' material placed below slabs, concrete unit pavers and walks or as bedding and backfill over services as follows:
 - .1 Granular Sub-base: meet or exceed the following requirements:
 - .1 Crushed limestone with aggregate size of 19 mm passing sieve.
 - .2 Use as compacted backfill over bedrock and below granular 'B' material; as fill to establish sub-grade slopes below new landscaping areas and as compacted backfill against foundation walls or over bedded services within trenches. This material shall not be placed such that it would reduce specified thickness of granular 'A', 'B' or crushed stone materials specified or noted on drawings.
 - .3 Contractor-Selected Sub-Grade Material fill:
 - .1 Selected material from imported sources, approved by Owner for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.
 - .2 Reclaimed, demolished materials crushed and prepared for use on the site.
 - .3 Use as imported and compacted backfill against foundations and within service trenches as backfill over bedded services where landscape is the finished surface over the fill area.
 - .2 Unshrinkable fill: proportioned and mixed to provide:
 - .1 Maximum compressive strength of 0.4 MPa at 28 days.
 - .2 Maximum cement content of 25 kg/m³ : to CSA-A3001, Type GU.
 - .3 Minimum strength of 0.07MPa at 24 h.
 - .4 Concrete aggregates: to CSA-A23.1/A23.2.
 - .5 Cement: Type GU.
 - .6 Slump: 160 to 200 mm.
 - .3 Sand: natural river or bank sand or manufactured; washed; free of silt, clay, loam, friable and soluble materials, and organic matter.
 - .4 Top soil: imported; free of inorganic material and debris; augmented as specified; free of weed seeds.
 - .5 Unshrinkable fill proportioned and mixed to provide:
 - .1 Maximum compressive strength of 0.4 MPa at 28 days.
 - .2 Maximum Portland cement content of 25 kg/m³.
 - .3 Minimum strength of 0.07MPa at 24 hours.
 - .4 Concrete aggregates: to CSA A23.1/A23.2-09.
 - .5 Cement: to CSA A3000, Type GU.
 - .6 Slump: 160 to 200 mm.
 - .6 Stockpile Tarps: 0.25 mm minimum thick, polyethylene or rip stop nylon, woven.

2.2 GEOTEXTILE:

- .1 Geotextile: woven synthetic fibre fabric, supplied in rolls.
 - .1 Width: 2m minimum.

- .2 Composed of: minimum 85% by mass of polypropylene or polyester with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure for 60 days.
- .2 Physical properties:
 - .1 Factory seams: sewn in accordance with manufacturer's recommendations.
 - .2 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.
- .3 Hydraulic properties:
 - .1 Apparent opening size (AOS): to ASTM D4751.
 - .2 Filtration opening size (FOS): to CAN/CGSB-148.1 No.10 and OPSS 1860.
 - .3 Transmissivity: to ASTM D4716.
 - .4 Permittivity: to ASTM D4491.
- .4 Securing pins and washers: to CAN/CSA-G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to CAN/CSA G164.

2.3 MANUFACTURERS

- .1 Basis of design is Permacon.
- .2 The concrete elements described below are manufactured by Permacon.
- .3 Any proposal for a component deemed equivalent must be submitted to the architect for review. Acceptance by the architect of an alternative product will be based on demonstrated evidence of compliance with the specifications provided herein.

2.4 PERFORMANCE REQUIREMENTS

- .1 Standards Compliance:
 - .1 Provide pavers meeting the minimum material and physical properties set forth in ASTM C936. Efflorescence is not a cause for rejection.
 - .2 Pigments conforming to ASTM C979.
 - .3 Compressive Strength: 8,000 psi (55 MPa) average, with no individual unit under 7,200 psi (50 MPa).
 - .4 Absorption (ASTM C140): 5 percent average with no unit greater than 7 percent.
 - .5 Resistance to Freeze-Thaw (ASTM C1645): No breakage greater than 1.0 percent loss in dry weight of individual unit after 50 cycles.
 - .6 Maximum allowable breakage of product is 5 percent.

2.5 PREFABRICATED CONCRETE PAVERS AND CURB UNITS:

- .1 Basis of Design :
 - .1 Permacon concrete paver: Boulevard TLI, 100 mm thick, 150 mm wide, 300 mm long. Colour selected by architect from standard range. 5 different colours will be selected for use in the project.
 - .2 Permacon Curb Unit : Institutional Curb, 300 mm x 150 mm x 1200 mm, colour selected by architect from standard range. Curb shapes must be selected by the Contractor to create the pattern shown on the architectural drawings.
- .2 Natural Joint Sand.
 - .1 Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
 - .2 Do not use limestone screenings, stone dust, or sand for the Joint Sand material that does not conform to the grading requirements of ASTM C33.
 - .3 Utilize sands that are as hard as practically available where concrete pavers are subject to vehicular traffic.
 - .4 Gradation Requirements per ASTM C144. Percent Passing Sieve Size:
 - .1 No. 4 (4.75 mm): 100 percent.
 - .2 No. 8 (2.36 mm): 95 to 100 percent.
 - .3 No. 16 (1.18 mm): 70 to 100 percent.
 - .4 No. 30 (0.600 mm): 40 to 75 percent.
 - .5 No. 50 (0.300 mm): 10 to 30 percent.

.6 No. 100 (0.150 mm): 2 to 15 percent.

.7 No. 200 (0.075 mm): 0 to 1 percent.

.5 Compliance to CSA A179:

Sieve designation	% passing for joints	% passing for bedding
10 mm	100	
5 mm	95-100	100
2.5 mm	80-100	90 to 100
1.25 mm	50-90	85 to 100
0.630 mm	25-65	65 to 95
0.315 mm	10-35	15 to 80
0.160 mm	2-10]	0 to 35
0.075 mm	0-1	0 to 1

.6 Compression Strength: Proven resistance to compression of 550 PSI after drying for 7 days under controlled conditions of 73 degrees F (23 degrees C) at 50 percent humidity.

.1 Test Sand Sample Shape: Cylinder; 2-inch (50 mm) dia. x 4 inch (100 mm) high.

.7 Gradation requirements per ASTM C144. Percent Passing Sieve Size:

.1 No. 4 (4.75 mm): 100 percent.

.2 No. 8 (2.36 mm): 95 to 100 percent.

.3 No. 16 (1.18 mm): 70 to 100 percent.

.4 No. 30 (0.600 mm): 40 to 75 percent.

.5 No. 50 (0.300 mm): 20 to 40 percent.

.6 No. 100 (0.150 mm): 10 to 25 percent.

.7 No. 200 (0.075 mm): 0 to 10 percent.

.3 Setting Bed Sand

.1 Setting Bed Sand.

.2 Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.

.3 Do not use limestone screenings, stone dust, or sand for the Joint Sand material that does not conform to the grading requirements of ASTM C33.

.4 Do not use mason sand or sand conforming to ASTM C144.

.5 Utilize sands that are as hard as practically available where concrete pavers are subject to vehicular traffic.

.6 Gradation Requirements per ASTM C33. Percent Passing Sieve Size:

.1 3/8 inch (9.5 mm): 100 percent.

.2 No. 4 (4.75 mm): 95 to 100 percent.

.3 No. 8 (2.36 mm): 85 to 100 percent.

.4 No. 16 (1.18 mm): 50 to 85 percent.

.5 No. 30 (0.600 mm): 25 to 60 percent.

.6 No. 50 (0.300 mm): 10 to 30 percent.

.7 No. 100 (0.150 mm): 2 to 10 percent.

.8 No. 200 (0.075 mm): 0 to 1 percent.

.4 Base Aggregate

.1 As specified in Section 31 00 00 - Earthwork.

.2 Provide Base Aggregate conforming to ASTM D2940. Passing Sieve Size:

.1 2 inch (50 mm): 100 percent.

.2 1-1/2 inch (37.5 mm): 95 to 100 percent.

.3 3/4 inch (19 mm): 70 to 92 percent.

.4 3/8 inch (9.5 mm): 50 to 70 percent.

.5 No. 4 (4.75 mm): 35 to 55 percent.

.6 No. 30 (0.600 mm): 12 to 25 percent.

.7 No. 200 (0.075 mm): 0 to 4 percent.

Part 3 Execution:

3.1 EXAMINATION

.1 Evaluation and Assessment:

- .1 Examine existing grading conditions, drawings and other information to determine whether the installation can take place and be executed in a way that will comply to Contract Documents.
- .2 Before commencing work establish precise locations of buried services within extent of construction area.
- .3 Before commencing work, establish that sub-base materials are appropriate for the installation including, but not limited to, quality of aggregate and compaction of sub-base and as follows:
 - .1 Verification of Conditions: verify that all conditions of substrate previously installed under other sections or Contracts are acceptable for the installation in accordance with manufacturer's written instructions and the Contract Documents.
- .4 Inform Contractor and Consultant in writing of unacceptable conditions immediately upon discovery.
- .5 Proceed with installation following correction of unacceptable conditions and subsequent receipt of Contractor's written consent to commence installation, only.

3.2 SILT FENCING

- .1 Supply and install geotextile on wood stakes or wood frame held in place with weight for silt control structure arranged along entire perimeter of work area at outer limit of work. Fixe geotextile to wood frame using galvanized roofing nails and arrange geotextile to lie horizontally on ground for 300 mm minimum, and extend vertically on frame 610 mm. Silt fence is required during entire course of the site work and excavation work until exposed earth is covered by intended work. No silt shall be permitted run over areas beyond the extent of the work illustrated on drawings.
- .2 Surround domestic water well with geotextile fabric lapped onto ground 500 mm and covered with 150 mm granular material. Textile to be fastened to 89mmx89mm wood posts (4) and fixed in place with battens for duration of construction. Geotextile and wood framing shall extend 610 mm above adjacent ground level.

3.3 EROSION CONTROL:

- .1 Ensure erosion control measures are in place prior to commencement of construction.
- .2 Construction Waste Management: dispose unused fill specified above, off site as it is removed from excavation.

3.4 GRADING

- .1 Review drawings for final grading requirements. This section shall review sub-grade and compaction and verify the suitability of the sub-base prior to completing final grading.
- .2 Minimum slope for all grades away from new construction are as follows:
 - .1 For planting beds, drip line stone, grass areas or treed landscape, slope away 5%.
 - .2 For paved areas, walks or patios, slope away 2% or as shown on drawings.
- .3 Establish that sub-grades are set with adequate allowance for finished surfaces and slopes indicated. Remove material from the sub-grade if it is apparent that the sub-base will not permit full thickness of finish material.
- .4 Make allowance for appropriate granular fill indicated in order to achieve finished grades shown. This includes importation of new granular base specified and in sufficient quantity to achieve the final result indicated on drawings.
- .5 Adhere to grades indicated on drawings and report situations contrary to installation indicated in this section to the architect prior to commencing final grading.

- .6 All walks at all building entrance locations shall drain completely away from the building structure with water flowing over surface smoothly, leaving no puddles.

3.5 INSTALLATION - GEOTEXTILE

- .1 Geotextile is required for construction of silt fences, control of erosion, and work of other Sections, including Landscaping and this Section also. If the silt fencing is not installed and appropriately maintained, do not commence work.
- .2 Locate buried services in the vicinity of the site and mark as necessary and considered prudent by the Contractor.
- .3 Temporary erosion and sedimentation control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent areas beyond extent of construction area mutually agreeable sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal when all site work is completed.
- .4 For pre-cast paving unit assembly: Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain position with securing pins or granular material according to situation.
- .5 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .6 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
- .7 Overlap each successive strip of geotextile 600 mm over previously laid strip.
- .8 Pin successive strips of geotextile with securing pins at 600mm interval at mid point of lap.
- .9 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .10 After installation, cover with overlying layer within 4 hours of placement.
- .11 Replace damaged or deteriorated geotextile to approval of Owner.
- .12 Protection:
 - .1 No vehicles or traffic permitted directly on geotextile.

3.6 INSTALLATION OF CONCRETE PAVERS AND CURBING:

- .1 Replace Concrete Pavers with chips, cracks, voids, discolorations, and other defects that might be visible in finished work.
- .2 Mix Concrete Pavers from a minimum of three (3) bundles simultaneously drawing the paver vertically rather than horizontally, as they are placed, to produce uniform blend of colors and textures. Colour variation occurs with all concrete products. This phenomenon is influenced by a variety of factors, e.g. moisture content, curing conditions, different aggregates and, most commonly, from different production runs. By installing from a minimum of three (3) bundles simultaneously, variation in colour is dispersed and blended throughout the project).
- .3 Exercise care in handling face mix concrete pavers to prevent surfaces from contacting backs or edges of other units.
- .4 Provide Concrete Pavers using laying pattern as indicated. Adjust laying pattern at pavement edges such that cutting of edge pavers is minimized. Cut all pavers exposed to vehicular tires no smaller than one-third of a whole paver.
- .5 Use string lines or chalk lines on Setting Bed Sand to hold all pattern lines true.
- .6 Set surface elevation of pavers 1/8 in. (3 mm) above adjacent drainage inlets, concrete collars or channels.
- .7 Place units hand-tight against spacer bars. Adjust horizontal placement of laid pavers to align straight.

- .8 When installation is performed with mechanical equipment, use unit pavers with spacer bars on sides of each unit, only.
- .9 Provide space between paver units of 1/32 in. (1 mm) wide to achieve straight bond lines.
- .10 Prevent joint (bond) lines from shifting more than $\pm 1/2$ in. (± 13 mm) over 50 ft. (15 m) from string lines.
- .11 Fill gaps between units or at edges of the paved area that exceed 3/8 inch (10 mm) with pieces cut to fit from full-size unit pavers.
- .12 Prevent all traffic on installed Concrete Pavers until Joint Sand has been vibrated into joints. Keep skid steer and forklift equipment off newly laid Concrete Pavers that have not received initial compaction and Joint Sand material.
- .13 Vibrate Concrete Pavers into leveling course with a low-amplitude plate vibrator capable of a to 5000-lbf (22-kN) compaction force at 80 to 90 Hz. Perform at least three passes across paving with vibrator. Vibrate under the following conditions:
 - .1 After edge pavers are installed and there is a completed surface or before surface is exposed to rain.
 - .2 Compact installed Concrete Pavers to within 6 feet (2 meters) of the laying face before ending each day's work. Cover Concrete Pavers that have not been compacted and leveling course on which pavers have not been placed, with nonstaining plastic sheets to prevent Setting Bed Sand from becoming disturbed.
- .14 Protect face mix Concrete Paver surface from scuffing during compaction by utilizing a urethane pad.
- .15 Remove any cracked or structurally damaged Concrete Pavers and replace with new units prior to installing Joint Sand material.

3.7 JOINT SAND

- .1 Provide, spread and sweep dry Joint Sand into joints immediately after vibrating pavers into Setting Bed Sand course until full. Vibrate pavers and add Joint Sand material until joints are completely filled, then remove excess material. This will require at least 4 passes with a plate compactor.
- .2 Leave all work to within 3 ft. (1 m) of the laying face fully compacted with sand-filled joints at the completion of each day.
- .3 Remove excess Joint Sand broom clean from surface when installation is complete.

3.8 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 35 50 - Waste Management and Disposal, trim slopes, and correct defects as directed by Consultant.
- .2 Clean and reinstate areas affected by Work as directed by Owner.
- .3 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.
- .4 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

3.9 FIELD QUALITY CONTROL AND FIELD ENGINEERING

- .1 The Field Engineering consultant shall be engaged by the Owner or the Contractor. The Field Engineer will provide materials testing, verify concrete slump and measure compaction of engineered fill, verify compaction of service trench bedding, and the location of the building walls, among other tasks.
- .2 Testing of materials and compaction will be performed by Field Engineer designated by Owner.
- .3 Verify final elevations for conformance to the Drawings.
- .4 Prevent final Concrete Paver finished grade elevations from deviating more than $\pm 3/8$ in. (± 10 mm) under a 10 ft (3 m) straightedge or indicated slope, for finished surface of paving.
- .5 **Lippage, Paver-to-Paver: No greater than 1/8-inch (3 mm) difference in height between adjacent pavers.**

3.10 AS-BUILT DRAWINGS

- .1 The Contractor shall submit "as-built" drawings locations of service lines, maintenance holes, catch basins, valves and top and invert elevations at maintenance holes and catch basins.
- .2 As - built drawings shall be transferred to an electronic copy of contract documents by the consultant as described in Division 1 sections of the specification.

3.11 REPAIRING, CLEANING AND SEALING

- .1 Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.
- .2 Cleaning: Remove excess dirt, debris, stains, grit, etc. from exposed paver surfaces; wash and scrub clean. Clean Concrete Pavers in accordance with the manufacturer's written recommendations.
- .3 Prevent traffic on pavers until joint material is vibrated into joints.
- .4 Clean products in accordance with the manufacturer's recommendations.
- .5 Touch-up, repair or replace damaged products before Substantial Completion.

3.12 PROTECTION

- .1 Protect completed work from damage due to subsequent construction activity on the site.

END OF SECTION

- .1 General

1.2 RELATED REQUIREMENTS

- .1 Section 02 41 13 Site Clearing, Grubbing and Protection of Landscape
- .2 Section 31 00 00 Earthwork
- .3 Section 32 93 45 Top Soil Placement, Grading and Landscaping

1.3 MEASUREMENT AND PAYMENT

- .1 Hydraulic seed shall be applied to entire limit of work area disturbed by construction and where seeding is indicated on drawings. This includes portions of the property between the Municipal Right-of-Way and the legal property boundary on the eastern and northern side of the limits of the site.
- .2 Seeding shall not be measured; entire scope of seeding is included within the Contract Price.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling:
 - .1 Schedule hydraulic seeding to coincide with preparation of soil surface.
 - .2 Apply hydraulic seed as within 4 business days of placing, grading and preparing topsoil.
 - .3 New, imported topsoil shall be spread over all areas that will receive hydraulic seed.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for seed, mulch, tackifier, fertilizer, liquid soil amendments and micronutrients.
 - .2 Submit electronic copies of WHMIS MSDS material in accordance with Section 01 35 29 - Health and Safety Requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
 - .1 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.
 - .2 Inoculant containers to be tagged with expiry date.
- .3 Storage and Handling Requirements:
 - .1 Store fertilizer off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return to supplier pallets, crates as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Construction Waste Management and Disposal.

1.7 WARRANTY

- .1 For seeding, 12-month warranty period is extended to 1 full growing season which occurs during the period May through October of each year. Completion of seeding during any of these months requires review of conditions found at the commencement of the following May until the end of the month during which the seeding had been completed.
- .2 All conditions of Acceptance of the work noted below must have been met and a full growing season must have passed for the seeding work to be eligible for a "completion" status.
- .3 Completion of seed must be reported to the Construction Manager and the Consultant in writing and the completion must be recognized and considered free of deficiencies by the Owner, Consultant and Construction Manager before the seeding work can be considered completed.

- .4 Extended Warranty: Contractor hereby warrants that seeding will remain free of defects in accordance with General Conditions of Contract and for a period of 1 full growing season next following the date of substantial performance of the Contract.
- .5 End-of-warranty review of the Place of the Work will be conducted by Owner and Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.
 - .1 Grass mixture: "Certified", "Canada No. 1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
- .2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:
 - .1 Type I mulch:
 - .1 Made from wood cellulose fibre.
 - .2 Organic matter content: 95% plus or minus 0.5%.
 - .3 Value of pH: 6.0.
 - .4 Potential water absorption: 900%.
- .3 Tackifier: water soluble vegetable carbohydrate powder.
- .4 Water: free of impurities that would inhibit germination and growth.
- .5 Fertilizer:
 - .1 To Canada "Fertilizers Act" and Regulations.
 - .2 Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.
- .6 Inoculants: inoculant containers to be tagged with expiry date.
- .7 Liquid Soil Amendment and Micronutrients: Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for hydraulic seeding in accordance with manufacturer's written instructions.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation following remedial work to correct unacceptable conditions and subsequent receipt of Consultant's written permission to do so.

3.2 WORKMANSHIP

- .1 Do not perform work under adverse field conditions, including, but not limited to, wind speed exceeding 10 km/h, surfaces intended for application are frozen or ground is covered with snow, ice or standing water.
- .2 Do not spray onto structures, signs, guiderails, fences, plant material, utilities and other than surfaces intended.
- .3 Clean-up immediately, any material sprayed where not intended, to satisfaction of Consultant.
- .4 Protect seeded areas from trespass until plants are established.

3.3 PREPARATION OF SURFACES

- .1 Fertilize prior to fine grading through application of fertilizer such that it is equally distributed over the application area.
- .2 Fine grade areas intended for seed application.
- .3 Ensure that seeded areas intended for seeding are free of humps and hollows. Ensure seeded areas are free of deleterious and refuse materials.
- .4 Cultivate area intended for seed application to depth of 25 mm.
- .5 Ensure areas to be seeded are moist to depth of 100 mm before seeding.

- .6 Obtain Consultant's approval of grade and topsoil depth before commencing seed application.

3.4 PREPARATION OF SLURRY

- .1 Measure quantities of materials by weight or weight-calibrated volume measurement. Supply equipment required for this work.
- .2 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
- .3 After materials are in seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.

3.5 SLURRY APPLICATION

- .1 Ensure seed is placed under supervision of certified Landscape Planting Supervisor.
- .2 Hydraulic seeding equipment:
 - .1 Slurry tank.
 - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
 - .3 Capable of seeding by 50 m hand operated hoses and appropriate nozzles.
 - .4 Tank volume to be certified by certifying authority and identified by authorities "Volume Certification Plate".
- .3 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
 - .1 Using correct nozzle for application.
 - .2 Using hoses for surfaces difficult to reach and to control application.
- .4 Blend application 300 mm into adjacent areas to form uniform surfaces.
- .5 Re-apply where application is not uniform.
- .6 Remove slurry from items and areas not designated to be sprayed.
- .7 Remove protection devices when seeding has germinated and been established as plants.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Keep pavement, paths and walks and area adjacent to site clean and free from mud, dirt, and debris at all times.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Clean and reinstate areas affected by Work.

3.7 PROTECTION

- .1 Protect seeded areas from trespass until plants are established.
- .2 Remove protection devices when directed by Owner or Consultant or when final payment is approved.

3.8 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Fertilize during establishment and warranty periods applying fertilizer equally distributed twice during growing season: once during May or June and once during August or September of the full warranty period.
- .2 Ensure maintenance is carried out under supervision of certified Landscape Maintenance Supervisor.
- .3 Perform following operations from time of seed application until acceptance by Owner and Consultant.
- .4 Grass Mixture:
 - .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
 - .2 Mow grass to 50 mm whenever it reaches height of 90 mm.
 - .3 Fertilize seeded areas the first time 10 weeks following germination provided plants have mature true leaves or immediately following first cutting in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles; water in well.

- .4 Control weeds by mechanical or chemical means utilizing acceptable integrated pest management practices.
- .5 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.
- .6 Do not mow within period commencing 3 weeks before and ending 3 weeks after first severe, average fall frost date and 3 weeks after actual severe fall frost.
- .7 Water seeded areas to maintain optimum soil moisture level for germination and continued growth. Control watering to prevent washouts.

3.9 ACCEPTANCE

- .1 Seeded areas will be accepted by Owner's designee and the Consultant provided that:
 - .1 Plants are uniformly established.
 - .2 Seeded areas are free of rutted, eroded, bare or dead spots.
 - .3 Areas have been mown at least twice.
 - .4 Areas have been fertilized.
- .2 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.10 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations from time of acceptance until end of warranty period:
 - .1 Repair and reseed dead or bare spots to satisfaction of Owner.
 - .2 Mow areas seeded when plants are 90-100 mm tall. Mow to height of 50 mm, and no shorter.
 - .3 Fertilize seeded areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 02 41 13 Site Clearing, Grubbing and Protection of Landscape
- .2 Section 31 00 00 Earthwork
- .3 Section 32 93 45 Top Soil Placement, Grading and Landscaping

1.2 REFERENCES

- .1 ASTM D 4491-99a, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
- .2 ASTM D 4595-86-94, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
- .3 ASTM D 4716-00, Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
- .4 ASTM D 4751-99a, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .5 CAN/CGSB-4.2-M88, Textile Test Methods.
- .6 CAN/CGSB-148.1, Methods of Testing Geotextiles and Geomembranes.
 - .1 No.2-M85, Mass per Unit Area.
 - .2 No.3-M85, Thickness of Geotextiles.
 - .3 No.7.3-92, Grab Tensile Test for Geotextiles.
 - .4 No.6.1-93, Bursting Strength of Geotextiles Under No Compressive Load.

1.3 SCHEDULING

- .1 Schedule sod laying to coincide with preparation of soil surface.
- .2 Do not complete fine grading and top soil preparation more than 4 days prior to placing sod.
- .3 Schedule sod installation when frost is not present in ground.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Provide sod for areas noted as "Sod" on drawings. Edge sod where it abuts planting beds.
- .2 Number One Turfgrass Nursery Sod: Sod that has been especially sown and cultivated in nursery fields as turfgrass crop.
 - .1 Turfgrass Nursery Sod types:
 - .1 Number One Kentucky Bluegrass Sod - Fescue Sod: Nursery Sod grown solely from seed mixture of cultivars of Kentucky Bluegrass and Chewing Fescue or Creeping Red Fescue, containing not less than 40% Kentucky Bluegrass cultivars and 30% Chewing Fescue or Creeping Red Fescue cultivar(s).
 - .2 Turfgrass Nursery Sod quality:
 - .1 Not more than 2 broadleaf weeds or 10 other weeds per 40 square metres.
 - .2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.
 - .3 Mowing height limit: 35 to 65 mm.
 - .4 Soil portion of sod: 6 to 15 mm in thickness.
- .3 Sod establishment support:
 - .1 Geotextile fabric to Section 31 00 00.
 - .2 Wooden pegs: 3/4"x 3/4"x 8".
- .4 Water:
 - .1 Supplied by Owner after services are installed at the site and activated in buildings.
- .5 Fertilizer:
 - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
 - .2 Complete, synthetic, slow release with 65 % of nitrogen content in water-insoluble form.

2.2 SOURCE QUALITY CONTROL

- .1 Obtain approval from Consultant of sod at source.
- .2 When proposed source of sod is approved, use no other source without written authorization.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Verify that grades are correct in accordance with the drawings. If discrepancies occur, notify Consultant and do not commence work until instructed by Consultant.
- .2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.
- .3 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated, to tolerance of plus or minus 8 mm, for Turfgrass Nursery Sod, surface to drain naturally.
- .4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site.

3.2 SOD PLACEMENT

- .1 Lay sod within 24 hours of being lifted if air temperature exceeds 20°C.
- .2 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .3 Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.3 SOD PLACEMENT ON SLOPES AND PEGGING

- .1 Install and secure geotextile fabric in areas indicated, in accordance with manufacturer's instructions.
- .2 Start laying sod at bottom of slopes.
- .3 Peg sod on slopes steeper than 3 horizontals to 1 vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to following pattern:
 - .1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.
 - .2 Not less than 3-6 pegs per square metre.
 - .3 Not less than 6-9 pegs per square metre in drainage structures.
 - .4 Drive pegs to 20 mm above soil surface of sod sections.

3.4 FERTILIZING PROGRAM

- .1 Fertilize during establishment and warranty period as recommended by Canadian Nursery Landscape Association
- .2 Repeat fertilization as required to maintain healthy growth for one entire growing season.
- .3 Provide Owner with fertilization plan to facilitate use and access of the property.

3.5 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of installation until acceptance.
- .2 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 mm to 100 mm.
- .3 Cut grass to 50 mm when or prior to it reaching height of 75 mm. Remove clippings which will smother grassed areas.
- .4 Maintain sodded areas weed free 95%.
- .5 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water well.

3.6 ACCEPTANCE

- .1 Turfgrass Nursery Sod areas will be accepted by Consultant provided that:
 - .1 Sodded areas are properly established.
 - .2 Sod is free of bare and dead spots.
 - .3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.

- .4 Sodded areas have been cut minimum 2 times prior to acceptance.
- .2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.7 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations from time of acceptance until end of warranty period:
 - .1 Water sodded Turfgrass Nursery Sod areas at weekly intervals to obtain optimum soil moisture conditions to depth of 100 mm.
 - .2 Repair and re-sod dead or bare spots to satisfaction of Consultant.
 - .3 Cut grass and remove clippings to height as follows:
 - .1 Turfgrass Nursery Sod:
 - .1 50 mm during normal growing conditions.
 - .2 Cut grass at 2-week intervals, but at intervals so that approximately one third of growth is removed in single cut.
 - .3 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
 - .4 Eliminate weeds by mechanical means.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 41 13 Site Clearing, Grubbing and Protection of Landscape
- .2 Section 03 00 00 Cast-in-Place Concrete
- .3 Section 31 00 00 Earthwork
- .4 Section 32 92 19 Hydraulic Seeding
- .5 Section 32 92 23 Sod

1.2 WORK INCLUDED IN THIS SECTION AND PLANT MATERIAL SOURCE

- .1 Site clearing, grubbing and stripping site of existing organic materials for the extent of the site intended for planting of grasses, planting beds and trees.
- .2 Preparation of sub-grade for placing of topsoil.
- .3 Supply and spreading of new top soil imported onto site.
- .4 Supply and application of soil amendments, including fertilizer.
- .5 Performance of finish grading work.
- .6 Metal edging illustrated on drawings around planting areas.
- .7 Planting beds, top soil and mulch for all plants including grasses.
- .8 For Trees, ground covers, ornamental grasses and planting bed plants:
 - .1 Source all plant stock from province of Ontario sources in the first instance and Canadian sources if an Ontario Source is unavailable.
- .9 Do not source plant stock from outside of Canada unless written consent is granted by Consultant.

1.3 REFERENCES

- .1 Agriculture and Agri-Food Canada
 - .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 American National Standards Institute (ANSI)/Tree Care Industry Association (TCIA)
 - .1 ANSI A300-08, Standards for Tree Care Operations - Tree, Shrub, and Other Woody Plant Maintenance - Standard Practices.
- .3 Canadian Council of Ministers of the Environment
 - .1 PN1340-2005, Guidelines for Compost Quality.
- .4 Canadian Food Inspection Agency (CFIA)/Department of Justice
 - .1 Canada Fertilizer's Act-2004 and Fertilizer Regulations.
- .5 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
 - .2 FSC-STD-20-002-2004, Structure and Content of Forest Stewardship Standards V2-1
 - .3 FSC Accredited Certified Bodies.
- .6 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.4 DEFINITIONS

- .1 COMPOST: A mixture of soil and decomposing organic matter used as a fertilizer, mulch, or soil conditioner. Compost is processed organic matter containing 40% or more organic matter as determined by the Walkley-Black or LOI test. Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below 25), and contain no toxic or growth inhibiting contaminants. Composed bio-solids must meet the requirements of the Guidelines for Compost Quality, Category A produced by the Canadian Council of the Ministers of the Environment (CCME), January 1996.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit Plant Schedule and Planting diagram.

- .3 Submit published literature regarding plant types and trees provided. Literature shall describe the species, characteristics and the source of the material.
- .4 Regional Materials: submit evidence that mulch and topsoil delivered to the site are obtained from sources no farther than 100km distant from site.
- .5 Warranty: Submit warranty for all plant stock provided and extend warranty for trees to 2 full growing seasons from date of substantial performance of the Project.
- .6 Quality control submittals:
 - .1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.
 - .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and for fertilizers, together with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver packaged materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in dry location and in accordance with manufacturer's recommendations within a well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return to manufacturer or supplier, pallets, crates, and padding. Recycle packaging materials specified in Construction Waste Management Plan and Waste Reduction Workplan and in accordance with Section 01 74 19 - Construction Waste Management and Disposal.

1.7 WARRANTY

- .1 Plant Material Warranty Against Death or Unhealthy Conditions: 1-year including one continuous growing season.
- .2 Extended Warranty for Trees:
 - .1 Warranty: Submit extend warranty for trees to 2 full growing seasons from date of substantial performance of the Project.

1.8 CONSTRUCTION WASTE MANAGEMENT:

- .1 Ensure no imported materials are removed from the Place of the Work.
- .2 Recycled Content:
 - .1 Mulch produced on site may be used as mulch in new landscaping.

Part 2 Products

2.1 PERFORMANCE AND DESIGN CRITERIA

- .1 Landscaping Quality Assurance:
 - .1 Quality Standard: Standard Practices to ANSI A300.
- .2 Topsoil: import new friable loam top soil.
- .3 Subsoil: imported material.
- .4 Coarse Granular Material: coarse stone, washed.
- .5 Small Granular Material: pea gravel, graded.
- .6 Sand: natural river or bank sand.
- .7 Limestone fines: applied below stone path.

2.2 SOURCE QUALITY CONTROL

- .1 Advise Construction Manager and Consultant of sources of topsoil intended for use and provide to site with sufficient lead time for testing.
- .2 Contractor is responsible for amendments to supply topsoil as specified.

- .3 Soil testing by recognized testing facility for PH, P and K, and organic matter.
- .4 Testing of topsoil will be carried out by testing laboratory designated by Consultant. Soil sampling, testing and analysis to be in accordance with Provincial standards. Cost of tests will be paid from testing and inspection allowance.
- .5 Soil sampling, testing and analysis to be in accordance with Provincial standards.

2.3 TOPSOIL

- .1 Topsoil Characteristics:
 - .1 Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 70 % sand, minimum 7 % clay, and contain 2 to 10 % organic matter by weight.
 - .2 Contain no toxic elements or growth inhibiting materials.
 - .3 Finished surface free from:
 - .4 Debris and stones over 38 mm measured in any direction.
 - .5 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
 - .6 Consistence: friable when moist.
- .2 Seeded and Sodded Areas:
 - .1 Topsoil for seeded and sodded areas: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
 - .2 This Section shall strip and prepare all parts of the site, including damaged areas outside of the property boundary and prepare them for the work of this Section by conducting stripping and grubbing work, rough grading and importation of granular materials and fine grading and application of top soil.
 - .3 This Section shall prepare new sub-grade wherever new sub-grade is placed by other Sections, by stripping existing vegetation from any area that is part of a planting bed or that will receive sod or hydraulic seed. This stripping shall occur regardless of condition of sub-grade if any plant material is found growing on the previously prepared sub-grade.
 - .4 Top-dress prepared sub-grade with new top soil over entire extent of new Hydraulic Seed or Sod to a depth of 75 mm.
- .3 Planting Beds:
 - .1 Topsoil for planting beds and below sod and hydraulic seeding: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth. All topsoil for planting beds shall be imported. Native materials not acceptable.
 - .2 Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 70 % sand, minimum 7 % clay, and contain 2 to 10 % organic matter by weight.
 - .3 Contain no toxic elements or growth inhibiting materials.
 - .4 Finished surface free from:
 - .1 Debris and stones over 38 mm measured in any direction.
 - .2 Course vegetative material, 10 mm diameter for round or cylindrical shapes and 38 mm length, measured in any direction.
 - .5 Consistence: friable when moist.

2.4 SOIL AMENDMENTS

- .1 Fertilizer:
 - .1 Fertility: major soil nutrients present in following amounts:
 - .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
 - .3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
 - .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
 - .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
 - .6 Ph value: 6.5 to 8.0.

- .2 Peatmoss:
 - .1 Derived from partially decomposed species of Sphagnum Mosses.
 - .2 Elastic and homogeneous, brown in colour.
 - .3 Free of wood and deleterious material which could prohibit growth.
 - .4 Shredded particle minimum size: 5 mm.
- .3 Sand: washed coarse silica sand, medium to coarse textured.
- .4 Organic matter: compost Category A unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.
- .5 Limestone:
 - .1 Ground agricultural limestone.
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
- .6 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and any other micro-nutrients suitable to the specific plant species or application or defined by the soil test.

2.5 PLANTING

- .1 Materials:
 - .1 Trees, Plants, and Ground Cover: species and size noted on landscaping drawings shall also be identified in a Plant Schedule provided by this Section.
 - .2 Grass and Planting:
 - .1 Refer to Section 32 92 19 Hydraulic Seeding and
 - .2 Section 32 92 23 Sod.
 - .3 Refer to drawings and plant schedules for ornamental grass plants, number, species and location.

2.6 MULCH

- .1 Mulching Material: Type 1, cedar chips; 50mm chips.

2.7 METAL GRASS EDGE AND BEDDING EDGE:

- .1 Mill finished aluminum, 4.8 mm (3/16") thick material, 102 mm (4") high, 6063 Aluminum, T6 hardness, nesting design for adjoining pieces, 10" (250mm) steel nails or anti-frost nails provided for specified product, installed at 750mm on-centre, continuously.
- .2 Acceptable Products are Equivalent to:
 - .1 Euroline Slide
 - .2 Sur-Edge, Sure-Loc
 - .3 Perma-Loc CleanLine

Part 3 Execution

3.1 PREPARATION OF SITE

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust off construction area that complies with EPA 832/R-92-005.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal at completion of all site work.
- .2 Stripping of Existing Topsoil and Material Containing Organics
 - .1 Refer to Sections 31 00 00 Earthwork.
 - .2 All topsoil required for the new work shall be imported. Existing topsoil and material containing organics shall not be used in new construction.

- .3 Stripped existing topsoil shall be moved at Contractor's expense off of the site to a location determined by the Contractor that is not in a sanitary landfill.
- .4 Commence topsoil stripping after the area has been cleared of brush weeds and grasses and after all cleared material has been and removed from site.
- .5 Strip existing topsoil to underlying native soil free of organics. Avoid mixing existing topsoil or existing soil containing organic material with native subsoil that is free of organic material.
- .3 Stockpiles for New Materials:
 - .1 Place imported materials on tarps or panel material such as OSB or plywood.
 - .2 Cover with tarps all imported soil stockpiles and stake tarps each 1220mm on centre, minimum, around pile or use weights. Space stakes and weights to resist wind forces actually experienced. Stockpile height shall not exceed 2m.
 - .3 Protect stockpiles from contamination and compaction. Ensure no construction vehicles will travel over stock piles.
 - .4 Unused material shall be removed from the site.

3.2 BACKFILLING

- .1 Refer to Section 31 00 00 Earthwork.

3.3 PREPARATION OF EXISTING GRADE

- .1 Verify that sub-grade prepared by other Sections matches the intent of drawings and that it is set to accommodate specified depth of top soil applied by this Section.
- .2 If discrepancies between grades found at the Place of the Work and the required grades for the finished work, notify Construction Manager and Consultant and do not commence work until instructed by Consultant and Construction Manager.
- .3 Grade new soil, eliminating uneven areas and low spots, and in such a way as to ensure positive drainage away from new structure and toward swales, catch basins and other features intended to be downstream of the building face.
- .4 Remove debris, roots, branches, concrete, stones, boulders and stone shards exceeding 38 mm measured in any direction together with other material deleterious to plant growth.
- .5 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
- .6 Remove debris, which protrudes more than 75 mm above sub-grade surface prior to placement of top soil.
- .7 Dispose all removed material off site to a location determined by the Contractor that is not a landfill if the material is soil or organic.

3.4 PLANTING BEDS:

- .1 Excavate backfill and engineered fill to provide 300 mm (12") thickness of new top soil within entire extent of each planting bed shown on drawings.
- .2 Grade top surface of planting beds away from structure and to match top of adjacent pavements and surrounding sod or hydraulic seeded areas.
- .3 Apply geotextile over full extent of planting beds and overlap joints 300 mm (12").
- .4 Supply and install metal landscaping edge continuously along edges of planting beds that border hydraulic seeded areas or sod. Install stakes at 750 mm on centre continuously. Supply and install metal edging in locations not bound by concrete slabs, walks, curbs and other permanent paving features. Metal edging is noted on site plan drawings.
- .5 Apply wood chip mulch to 75mm (3") thickness over entire planting bed. Ensure that all geotextile is covered by mulch.

3.5 SOIL AMENDMENTS

- .1 For planting beds and sod: apply and thoroughly mix soil amendments into full specified depth of topsoil within planting beds and top 75 mm of soil for hydraulic seed and sod at following rates:

- .1 Mix planting soil of eight parts topsoil and one-part manure, to which add one-part peat moss, one pound of bone meal for each cubic yard of the above soil mix and specified fertilizers in sufficient quantities to overcome the chemical deficiencies in the soil.
- .2 10 m³ of compressed peat moss per 100 m³ of topsoil.
- .3 Mix just before planting, but not when frozen or muddy. Do not stockpile mixed planting soil for longer than two days.

3.6 PLACING AND SPREADING OF TOPSOIL AND PLANTING SOIL

- .1 Topsoil applied over areas that will receive hydraulic seed and sod shall be prepared as follows:
 - .1 This Section shall prepare new sub-grade by stripping all existing vegetation from any sub-graded or ungraded area that will receive sod or hydraulic seed. This stripping shall occur regardless of condition of sub-grade if any plant material is found growing on the prepared sub-grade.
 - .2 Top-dress prepared sub-grade with new top soil over entire extent of new Hydraulic Seed or Sod to a depth of 75 mm.
- .2 Do not place or spread frozen top soil or soil that is excessively wet.
- .3 Place topsoil after Consultant has accepted sub-grade condition.
- .4 Spread topsoil in uniform layers not exceeding 150 mm for each layer and continue layering until planting area has topsoil equal to specified depth.
- .5 For sodded areas keep topsoil 40 mm below finished grade.
- .6 Spread topsoil to following minimum depths after settlement.
 - .1 100 mm for hydraulic seeded grass and sod.
 - .2 500 mm for planting beds and around ornamental grass plants.
 - .3 Depth as noted on drawings for trees.
- .7 Manually spread topsoil/planting soil around trees, shrubs and obstacles.
- .8 Prepare loose friable bed by means of cultivation and subsequent raking.
- .9 Leave surfaces smooth, uniform and firm against deep foot printing.

3.7 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
 - .1 Prepare loose friable bed by means of cultivation and subsequent raking.
 - .2 Leave surfaces smooth, uniform and firm against deep foot printing.
 - .3 Apply mulch to planting beds in uniform layer, 75 mm thick or greater.

3.8 LANDSCAPING AND PLANTING

- .1 Grass Application:
 - .1 Ornamental grasses - planted within planting beds as illustrated and scheduled on drawings.
 - .2 Refer to Section 32 92 19 Hydraulic Seeding and drawings for extent of seeding.
 - .3 Refer to Section 32 93 23 Sod and drawings for extent of sod.
- .2 Plants:
 - .1 Set plants in distributed soil; within excavated pits or beds filled with prepared topsoil and edged with metal edging or pavements.
 - .2 Backfill with soil mixture.
 - .3 Saturate soil with water.
 - .4 Tree planting detail is illustrated on drawings.

3.9 ACCEPTANCE

- .1 Construction Manager, Consultant and Owner will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.10 SURPLUS MATERIAL

- .1 Dispose of materials off site and outside of Park and not in sanitary landfill.

3.11 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning. 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 11 - Cleaning.
- .3 Waste Management: separate surplus materials and removed materials and transport, unload and distribute off site in a location determined by Contractor.

3.12 PLANT MAINTENANCE SERVICE

- .1 Maintain plant life immediately after planting until plants are well established. Continue maintenance program until termination of warranty period.

END OF SECTION